Comments Dataset for A = 129*

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Abstract: The experimental nuclear spectroscopic data for known nuclides of mass number 129 (Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Ce, Pr, Nd, Pm, Sm) have been evaluated and presented together with adopted properties for levels and γ rays. This evaluation represents a revision of previous one about 18 years ago by Y. Tendow (1996Te01). Extensive new data have become available for many nuclides in the intervening years, although, no data are available for excited states in ^{129}Ag, ^{129}Cd, ^{129}Pm and ^{129}Sm. The decay schemes of ^{129}Ag, ^{129}Pm and ^{129}Sm radioisotopes are unknown, and those for ^{129}Cd, ^{129}In, ^{129}Ce, ^{129}Pr and ^{129}Nd are incomplete. Many γ rays and extended level schemes have been reported for the ground state and isomer decays of ^{129}Ba to ^{129}Cs, yet the adopted set of intensities in this evaluation originate from a brief paper in an annual laboratory report. There remain several unplaced gamma rays, coupled with ambiguity about division of intensities amongst the two activities of ^{129}Ba with nearly the same half–lives. Isomerism is expected in ^{129}Pr, but there is no confirmed identification. Low–lying level structure in ^{129}Nd including identification of a possible third long–lived isomer in this nuclide remains uncertain.

The spin–parity assignments of (5/2+) for ground state and (7/2−) for an isomer at 107.6 keV in ^{129}Ce are assigned based on strong support from systematics and band configurations, yet this result is in contradiction with the quadrupole interaction hyperfine structure measurement which favors 9/2− over 7/2− for the isomer, consequently 7/2+ for the ground state. Direct measurements of spins of ground state and isomer of ^{129}Ce are needed to settle this issue. Confirmed spins and parities of ground state and isomer of ^{129}La are also lacking. Assignments in this work are mainly based on systematics of $h_{11/2}$ decoupled structures. A direct measurement of ground state spin of ^{129}La will be desirable.

Recommended data presented in this work supersede those in previous NDS evaluations of A=129 nuclides published by 1996Te01, 1983Ha46 and 1972Ho55

Cutoff Date: Literature available up to February 28, 2014, has been consulted.

General Policies and Organization of Material: See the January issue of the *Nuclear Data Sheets* or http://www.nndc.bnl.gov/nds/NDSPolicies.pdf.

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General Comments: The statistical analysis of γ–ray data and deduced level schemes is carried out through computer codes available at NNDC, Brookhaven National Laboratory (www.nndc.bnl.gov). Theoretical conversion coefficients are from BrIcc code: v2.2b (20–Jan–2009) (2008Ki07) with "Frozen Orbitals" approximation, and with implicit uncertainty of 1.4%. Measured static magnetic dipole moment (μ) and electric quadrupole moments (Q) are from compilation by 2014StZZ, when available. All decay Q values and particle–separation energies are from AME–2012 (2012Wa38)

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Adopted Levels

Q(β^-)=11300 *SY*; S(n)=5380 *SY*; S(p)=14630 *SY*; Q(α)=−12430 *SY* 2012Wa38.

Estimated (2012Wa38) uncertainties: 360 for Q(β^-), 420 for S(n), 670 for S(p), 590 for Q(α).

S(2n)=9770 *360*, Q(β^-n)=6960 *300* (syst,2012Wa38). S(2p)=31890 (theory,1997Mo25).

2000Kr18, 1998KaZM: ^{129}Ag produced through spallation of Uranium using 1 GeV p beam at ISOLDE−CERN facility, Laser isotope separator. Measured β^-n, proportional counter, observed g.s. decay and a possible isomer.

Structure calculations:

2007Cu03: calculated $T_{1/2}$, Q−value, G−T strength distributions, S(2n), delayed one−neutron emission probability.

2003MO09: calculated $T_{1/2}$, discussed astrophysical r−process.

2003Bo06: calculated $T_{1/2}$.

2003Br19: calculated level−mixing features, β−decay $T_{1/2}$.

^{129}Ag Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	(9/2+)	46 ms *+5−9*	%β^-=100; %β^-n>0. Jπ: expected configuration=$\pi g_{9/2}$ (2000Kr18). 2012Au07 propose 7/2+ from systematics; 9/2+ in predictions by 1997Mo25. $T_{1/2}$: from decay curve for delayed neutrons (2000Kr18). Theoretical %β^-n=12.1 (1997Mo25), 11.8, 9.0 (2002Pf04).
0+x?	(1/2−)	≈160 ms	%β^-=?; %β^-n>0. E(level): x=20 *20* (from syst, 2012Au07). $T_{1/2}$: crude estimate from composite decay curve of delayed neutrons from ^{129}Ag g.s. and ^{129}In (2000Kr18). Other: 10 ms from systematics (2012Au07). Jπ: expected configuration=$\pi p_{1/2}$ (2000Kr18); also 1/2− from systematics (2012Au07).

Adopted Levels

Q(β^-)=9330 *SY*; S(n)=4340 *SY*; S(p)=15900 *SY*; Q(α)=–11710 *SY* 2012Wa38.

Estimated (2012Wa38) uncertainties: 200 for Q(β^-) and S(n), 360 for S(p), 450 for Q(α).

Q(β^-n)=2570 *250*, S(2n)=11160 *200*, S(2p)=30650 *540* (syst,2012Wa38).

1986Go10: ^{129}Cd produced by thermal neutron fission of ^{235}U at OSIRIS, Studsvik facility, measured half–life.

2003ArZX, 2005Kr20: ^{129}Cd produced through spallation of Uranium using 1 GeV p beam at ISOLDE–CERN facility, Laser isotope separator. Measured β^-n, proportional counter.

^{129}Cd Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	3/2+	242 ms[†] *8*	%β^-=100; %β^-n>0. μ=+0.8481 *8* (2013Yo02,2014StZZ). momm2=+0.132 *9* (2013Yo02,2014StZZ). Theoretical %β^-n=0.07 (1997m025), 0.77, 0.94 (2002Pf04). Jπ,μ,Q: hyperfine structure in collinear laser spectroscopy (2013Yo02). For Q, uncorrelated uncertainty of 0.007, and correlated uncertainty of 0.005 from electric field gradient combined in quadrature. $T_{1/2}$: other: 0.27 s *4* (1986Go10) is in agreement with the Adopted value but less precise.
0+x	11/2–	104 ms[†] *6*	%β^-=100; %β^-n>0. μ=–0.7063 *5* (2013Yo02,2014StZZ). momm2=+0.570 *26* (2013Yo02,2014StZZ). Jπ,μ,Q: hyperfine structure in collinear laser spectroscopy (2013Yo02). For Q, uncorrelated uncertainty of 0.013, and correlated uncertainty of 0.023 from electric field gradient combined in quadrature. E(level): 0 *200* (syst, 2012Au07).

[†] From decay curve of delayed neutrons (2003ArZX, 2005Kr20).

Adopted Levels, Gammas

Q(β^-)=7769 *19*; S(n)=6760 *150*; S(p)=12885 *8*; Q(α)=−11030 *600* 2012Wa38.
S(2n)=12082 *21*, S(2p)=28830 *200* (syst), Q(β^-n)=2453 *18* (2012Wa38).

1970OsZZ, 1974Gr29, 1975Al11, 1978Al18: ^{129}In produced in thermal neutron fission of ^{235}U followed by mass separation at OSIRIS Studsvik facility, measured half–life, β, β strength functions.

Later decay studies: 1980Lu04, 1986Go10.

2009Ar04: experiment performed at ISOLDE facility. 1 GeV proton beam hit Ta or W rod producing neutrons close to uranium target where fission is induced. The products were laser ionized after diffusion out the heated target. γ–ray single and coincidence spectra measured with laser on and off by four HPGe detectors. β rays measured by ΔE–E β telescope.

2012Ha25: mass measurement using Penning–trap system at JYFL; mass excess=−72838.0 keV *26*.

2013Ka08: mass excess=−72379 keV *4* for (1/2–) isomer in ^{129}In measured relative to that of g.s. of ^{130}Xe using Penning–trap system at JYFL facility.

Most of the level scheme from ^{129}Cd β^- decay is tentative.

^{129}In Levels

Cross Reference (XREF) Flags

A ^{129}Cd β^- Decay: Mixed
B ^{129}In IT Decay (8.7 μs)
C ^{129}In IT Decay (110 ms)
D ^{130}Cd β^-n Decay (162 ms)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0	(9/2+)	ABCD	611 ms *5*	%β^-=100; %β^-n=0.23 *7* (1993Ru01). %β^-n: value recommended in 1993Ru01 and 2002Pf04 based on the following measurements: 0.25 *5* (1980Lu04), 0.13 *3* (1986ReZU), 0.331 *32* (1993Ru01). $T_{1/2}$: weighted average of 611 ms 5 (1993Ru01) and 610 ms 10. (1986Wa17,1986ReZU). Others: 590 ms 20 (1980Lu04), 0.8 s 3 (1970OsZZ, 1974Gr29,1975Al11) for either or both 0.61–s and 1.23–s activities. Configuration=$\nu h_{11/2}^{-2}\otimes\pi g_{9/2}^{-1}$.
459 *5*	(1/2–)	AB	1.23 s *3*	%β^->99.7; %IT<0.3; %β^-n=3.6 *4* (1993Ru01). %β^-n: value recommended in 1993Ru01 and 2002Pf04 based on the following measurements: 2.5 *5* (1980Lu04), 2.52 *52* (1986ReZU), 3.92 *19* (1993Ru01). %IT: Estimated by the evaluators assuming only M4 γ directly to g.s., and β(M4)(W.u.)<30 from nuclear data sheets general policies. E(level): from measured mass excess=−72379 keV *4* (2013Ka08) for (1/2–), 1.3–s isomer using JYFL Penning–trap system (2013Ka08), and mass excess=−72837.9 keV *26* (2012Wa38,2012Ha25) for g.s. of ^{129}In. Earlier value of 369 keV *46* (2004Ga24) determined from β^- end–point energies from the decay of the 1.3–s and 611–ms activities is much less precise and deviates by ≈2σ from value deduced from direct mass measurements by 2013Ka08 and 2012Ha25. $T_{1/2}$: average value of 1.26 s 2 (1980Lu04) and 1.18 s 2 (1986ReZU). Other: 0.8 s 3 (1970OsZZ,1974Gr29,1975Al11) for either or both 0.61–s and 1.23–s activities.
858.8? *4*	(5/2)	A		
995.17 *17*	(11/2+)	AB		Configuration=$\nu h_{11/2}^{-2}\otimes\pi g_{9/2}^{-1}$.
1020.5? *4*	(5/2)	A		
1091.0? *4*	(3/2–)	A		
1354.14 *17*	(13/2+)	AB		Configuration=$\nu h_{11/2}^{-2}\otimes\pi g_{9/2}^{-1}$.
1422.8 *4*	(5/2+)	A		
1562.0? *4*	(5/2)	A		
1585.7 *5*	(9/2+)	A		
1630 *56*	(23/2–)	C	0.67 s *10*	%β^-≈100; %IT=? $T_{1/2}$: from γ(t) (2004Ga24,1998FoZY). E(level): from 2004Ga24, based on beta decay energies.
1632.8? *7*	(5/2–)	A		
1687.97 *25*	(17/2–)	AB	8.7 μs *7*	%IT=100. $T_{1/2}$: weighted average of 8.5 μs *5* (2003Ge04) and 11.3 μs *+22–16* (2012Ka36). Jπ: M2 γ to (13/2+). Configuration=$\nu(d_{3/2})^{-1}(h_{11/2})^{-1}\otimes\pi g_{9/2}^{-1}$.
1911 *56*	(29/2+)	C	110 ms *15*	%IT≈100; %β^-=? $T_{1/2}$: from ^{129}In IT decay (110 ms) (1998FoZY). Jπ: (E3) γ to (23/2–).
2419.2 *4*	(13/2–)	A		
2918.9? *4*	(5/2)	A		

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Adopted Levels, Gammas (continued)

^{129}In Levels (continued)

E(level)[†]	Jπ[‡]	XREF
3150.2 *4*	(13/2−)	A
3183.9 *4*		A
4578.9? *4*	(5/2−)	A

[†] From least–squares fit to Eγ data, keeping energy of 459–keV isomer fixed.

[‡] From shell–model predictions and systematics of neighboring nuclides, unless otherwise stated.

γ(^{129}In)

E(level)	Eγ[†]	Iγ[‡]	Mult.	α	Comments
858.8?	400.5[§] *5*	100 *20*			
	858.1[§] *5*	47 *10*			
995.17	995.2 *2*	100			
1020.5?	561.7[§] *5*	94 *19*			
	1020.3[§] *5*	100 *20*			
1091.0?	631.9 *5*	100			
1354.14	359.0 *2*	100 *10*			
	1354.1 *2*	42 *4*			
1422.8	1422.6 *5*	100			
1562.0?	1103.4[§] *5*	100 *20*			
	1561.5[§] *5*	100 *20*			
1585.7	1585.7 *5*	100			
1632.8?	541.8[§] *5*	100			
1687.97	333.8 *2*	100	M2	0.0816	α(K)=0.0697 *10*; α(L)=0.00968 *14*; α(M)=0.00190 *3*. α(N)=0.000348 *5*; α(O)=2.51×10^{-5} *4*. Mult.: from α(K)exp=0.08 *2* and half life in ^{129}In IT decay (8.5 μs). B(M2)(W.u.)=0.0312 *25*.
1911	281.0 *2*	100	(E3)	0.1695	α(K)=0.1299 *19*; α(L)=0.0320 *5*; α(M)=0.00646 *10*. α(N)=0.001123 *17*; α(O)=5.14×10^{-5} *8*. Eγ: from ^{129}In IT decay (110 ms) (2004Sc42,1998FoZY). Mult.: M2 or E3 from observation of K–x rays (2004Ga24,1998FoZY), with preference for E3 from systematics of neighboring nuclides. B(E3)(W.u.)=0.069 *10*.
2419.2	731.1 *5*	100 *20*			
	1065.2 *5*	94 *19*			
2918.9?	2460.2[§] *5*	100 *20*			
	2918.5[§] *5*	17 *3*			
3150.2	1462.2 *5*	34 *3*			
	1796.1 *5*	100 *9*			
	2155.1 *5*	28 *6*			
3183.9	1760.9 *5*	100 *10*			
	3184.1 *5*	16 *3*			
4578.9?	3487.8 *5*	50 *10*			
	4119.9 *5*	100 *20*			

[†] From ^{129}In IT decay (8.7 μs) when possible.

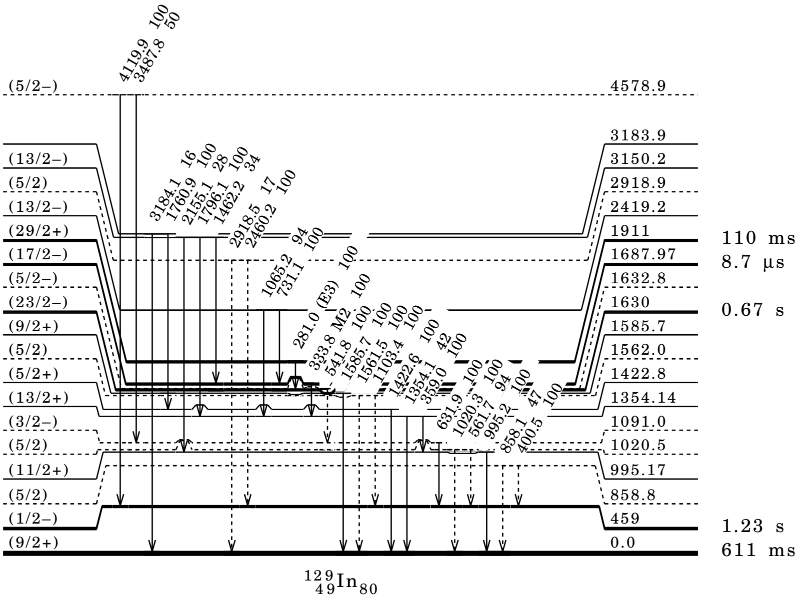
[‡] From ^{129}Cd β$^-$ decay:mixed when multiple values are available.

[§] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level



^{129}Cd β$^-$ Decay: Mixed 2009Ar04

Parent ^{129}Cd: E=0; Jπ=3/2+; $T_{1/2}$=242 ms *8*; Q(g.s.)=9330 syst; %β$^-$ decay=100.
Parent ^{129}Cd: E=0+x; Jπ=11/2–; $T_{1/2}$=104 ms *6*; Q(g.s.)=9330 syst; %β$^-$ decay=100.
^{129}Cd(0)–J,$T_{1/2}$: From ^{129}Cd Adopted Levels.
^{129}Cd(0)–Q(β$^-$): 9330 *200* (syst,2012Wa38).
^{129}Cd(0+x)–J,$T_{1/2}$: From ^{129}Cd Adopted Levels.
^{129}Cd(0+x)–Q(β$^-$): 9330 *200* (syst,2012Wa38).

2009Ar04: experiment performed at ISOLDE facility. 1 GeV proton beam hit Ta or W rod producing neutrons close to uranium target where fission is induced. The products were laser ionized after diffusion out the heated target. γ-ray single and coincidence spectra measured with laser on and off by four HPGe detectors. β rays measured by ΔE–E telescope. All gamma rays from the decay of both the 242-ms and 104-ms activities are listed without separating these into two decay schemes. An earlier list of 32 γ rays is provided in 2003DiZY, also from an experiment at ISOLDE–CERN, possibly the same one as described in 2009Ar04. There seems a systematic difference between the Eγ values quoted in 2003DiZY and 2009Ar04; the intensities are in reasonable agreement.

1986Go10: ^{235}U(n,F),E=th, on-line mass; HPGe γ.

Evaluators consider the decay scheme given here as tentative in view of many unplaced transitions and preliminary nature of the 2009Ar04 conference paper.

^{129}In Levels

E(level)†	Jπ#	$T_{1/2}$#	Comments
0.0	(9/2+)	611 ms *5*	
459 *5*	(1/2–)	1.23 s *3*	%β$^-$=100. E(level): from mass measurement using jyfl Penning-trap system (2013Ka08). Earlier value: 369 keV *46* (2004Ga24) determined from β$^-$ end-point energies from the decay of the 1.3-s and 611-ms activities is about 2σ lower than the value from mass measurements.
858.8?‡ *4*	(5/2)		
995.1§ *4*	(11/2+)		
1020.5?‡ *4*	(5/2)		
1091.0?‡ *4*	(3/2–)		
1354.0§ *4*	(13/2+)		

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^{129}Cd β^{-} Decay: Mixed 2009Ar04 (continued)

^{129}In Levels (continued)

E(level)[†]	Jπ[#]	T$_{1/2}$[#]	Comments
1422.8[‡] *4*	(5/2+)		
1562.0?[‡] *4*	(5/2)		
1585.7[§] *5*	(9/2+)		
1632.8?[‡] *7*	(5/2−)		
1687.8[§] *5*	(17/2−)	8.7 μs	Jπ: from 2003Ge04.
2419.1[§] *6*	(13/2−)		
2918.9?[‡] *4*	(5/2)		
3150.1[§] *5*	(13/2−)		
3183.9[§] *4*			
4578.9?[‡] *4*	(5/2−)		

[†] From least-squares fit to Eγ data, keeping energy of the 459-keV isomer as fixed.

[‡] Level populated by the 11/2−, 104-ms isomer (2009Ar04).

[§] Level possibly populated by the 3/2+, 242-ms isomer (2009Ar04,2013Ka08).

[#] From Adopted Levels.

γ(^{129}In)

Eγ[†]	E(level)	Iγ[†]
333.5 *5*	1687.8	13.0 *13*
[x]338.2 *5*		6.0 *12*
358.8 *5*	1354.0	50 *5*
400.5[‡§] *5*	858.8?	7.0 *14*
[x]439.7[§] *5*		7.0 *14*
[x]537.2 *5*		2.0 *4*
541.8 *5*	1632.8?	11.0 *11*
561.7[‡@] *5*	1020.5?	8.0 *16*
[x]589.1 *5*		5.2 *10*
[x]618.3 *5*		4.3 *9*
631.9 *5*	1091.0?	30 *3*
731.1 *5*	2419.1	8.5 *17*
[x]839.8 *5*		6.0 *12*
858.1[‡] *5*	858.8?	3.3 *7*
[x]863.1 *5*		5.5 *11*
995.0 *5*	995.1	100 *10*
1020.3[‡@] *5*	1020.5?	8.5 *17*
1065.2 *5*	2419.1	8.0 *16*
1103.4[‡@] *5*	1562.0?	5.0 *10*
[x]1234.1 *5*		5.0 *10*
1354.1 *5*	1354.0	21.0 *21*
1422.6 *5*	1422.8	20 *2*
1462.2 *5*	3150.1	11.0 *11*
[x]1499.4 *5*		7.0 *14*
[x]1554.8 *5*		5.0 *10*
[x]1557.9 *5*		5.0 *10*
1561.5[‡@] *5*	1562.0?	5.0 *10*
1585.7 *5*	1585.7	12.0 *12*
[x]1689.9 *5*		6.0 *12*
[x]1755.3 *5*		4.0 *8*
1760.9 *5*	3183.9	19.0 *19*
[x]1763.3 *5*		5.0 *10*
[x]1770.9 *5*		3.0 *6*
1796.1 *5*	3150.1	32 *3*
[x]1835.0[#] *4*		
[x]2087.9 *5*		5.5 *11*
2155.1 *5*	3150.1	9.0 *18*
[x]2216.7 *5*		8.0 *16*
[x]2330.9 *5*		5.0 *10*
2460.2[‡@] *5*	2918.9?	6.0 *12*
[x]2628.5 *5*		4.0 *8*
[x]2838.4 *5*		2.0 *4*
[x]2879.9 *5*		2.5 *5*
2918.5[‡@] *5*	2918.9?	1.0 *2*
[x]2999.0 *5*		2.0 *2*
3184.1 *5*	3183.9	3.0 *6*
[x]3348.0 *5*		4.0 *8*
[x]3388.9 *5*		2.0 *4*
3487.8 *5*	4578.9?	1.0 *2*
[x]3701.9 *5*		6.0 *12*
[x]3761.9 *5*		6.0 *12*
[x]3888.2 *5*		2.0 *4*
[x]3914.7 *5*		3.0 *6*
[x]3967.5 *5*		4.0 *8*
4119.9 *5*	4578.9?	2.0 *4*

[†] From 2009Ar04. The energy uncertainty is quoted by 2009Ar04 as ≈0.5 keV. Intensity uncertainty is 10% for strong peaks and 20% for weak lines. Evaluators assign 10% for Iγ≥10 and 20% for for Iγ<10.

[‡] Placement proposed by 2013Ka08 based on a difference of 458 keV between some of the unplaced γ rays in 2009Ar04. This placement is treated as tentative by the evaluators.

[§] Tentative placement by 2009Ar04 is either no longer valid or revised in view of adopted E(level)=459 *5* for (1/2−) β^{-} decaying isomer.

[#] A doublet from 2003DiZY only, not listed by 2009Ar04. Intensity is not available.

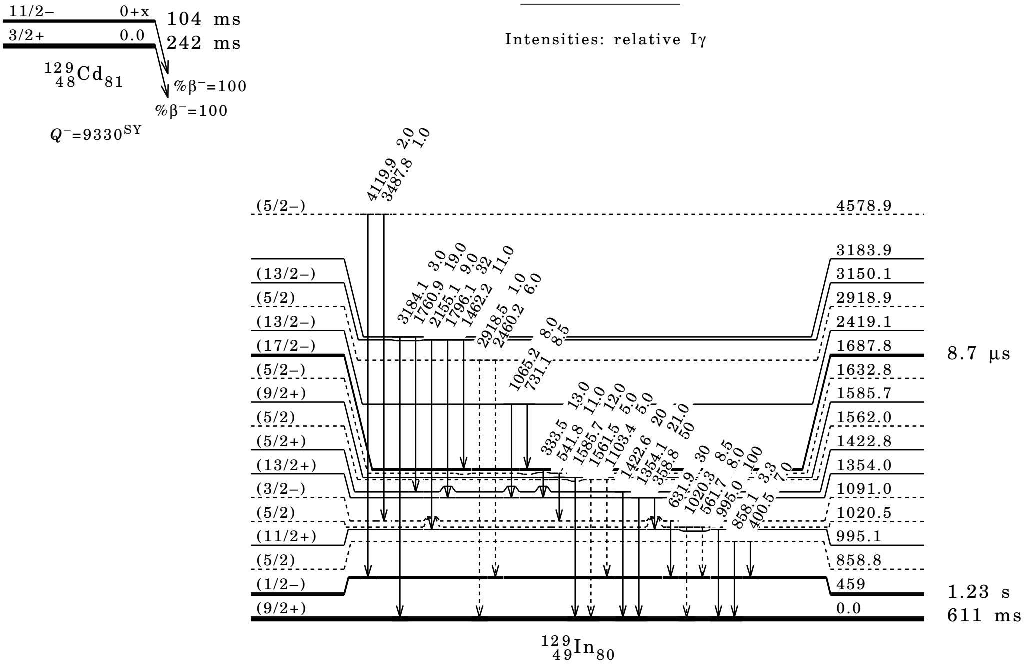
[@] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{129}Cd β^- Decay: Mixed 2009Ar04 (continued)

Decay Scheme

Intensities: relative Iγ



^{129}In IT Decay (8.7 μs) 2004Sc42,2003Ge04,2012Ka36

Parent ^{129}In: E=1687.97 *25*; Jπ=(17/2–); $T_{1/2}$=8.7 μs *7*; %IT decay=100.

2004Sc42, 2003Ge04, 2002Ge07: E(n)=thermal. Measured Eγ, Iγ, γγ, γ(t) using two large–volume Ge detectors and two cooled Si(Li) detectors after isotopic separation by the LOHENGRIN spectrometer.

2012Ka36: ^{238}U beam at E=345 MeV/nucleon provided by the RIBF accelerator complex at RIKEN facility. Fission fragments were separated and analyzed by BigRIPS separator, transported to focal plane of ZeroDegree spectrometer and finally implanted in an aluminum stopper. Particle identification was achieved by ΔE–tof–Bρ method. Delayed gamma rays from microsecond isomers were detected by three clover–type HPGe detectors. Measured Eγ, Iγ, γγ–coin, isomer half–life.

All data taken from 2003Ge04 unless otherwise stated.

^{129}In Levels

Configurations from figure 5(a) of 2004Sc42.

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0	(9/2+)		Configuration=$\nu h_{11/2}{}^{-2}\otimes\pi g_{9/2}{}^{-1}$.
995.17 *16*	(11/2+)		Configuration=$\nu h_{11/2}{}^{-2}\otimes\pi g_{9/2}{}^{-1}$.
1354.14 *16*	(13/2+)		Configuration=$\nu h_{11/2})^{-2}\otimes\pi g_{9/2}{}^{-1}$.
1687.97 *25*	(17/2–)	8.7 μs *7*	$T_{1/2}$: weighted average of 8.5 μs *5* (2003Ge04) and 11.3 μs *+22–16* (2012Ka36). Configuration=$\nu(d_{3/2})^{-1}(h_{11/2})^{-1}\otimes\pi g_{9/2}{}^{-1}$. M2 γ to (13/2+).

[†] From least–squares fit to Eγ data.

[‡] From Adopted Levels.

γ(^{129}In)

Iγ normalization: I(γ+ce)(333.8γ)=100.

Eγ[†]	E(level)	Iγ[‡]	Mult.	α	Comments
333.8 *2*	1687.97	100	M2	0.0816	Eγ: 333.8 5 (2012Ka36). α(K)=0.0697 *10*; α(L)=0.00968 *14*; α(M)=0.00190 *3*.

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^{129}In IT Decay (8.7 μs) 2004Sc42,2003Ge04,2012Ka36 (continued)

γ(^{129}In) (continued)

Eγ[†]	E(level)	Iγ[‡]	Comments
			α(N)=0.000348 *5*; α(O)=2.51×10^{-5} *4*. Mult.: from α(K)exp=0.08 *2* and half–life.
359.0 *2*	1354.14	83	Eγ: 359.0 5 (2012Ka36).
995.2 *2*	995.17	82	Eγ: 995.3 5 (2012Ka36).
1354.1 *2*	1354.14	28	Eγ: 1354.6 5 (2012Ka36).

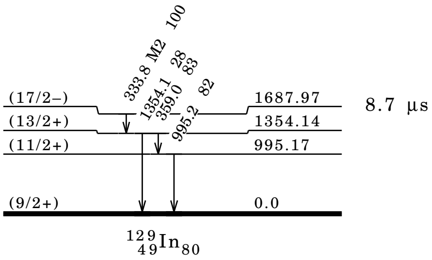
[†] Δ(Eγ) assigned as 0.2 keV based on a general statement by 2003Ge04.

[‡] For absolute intensity per 100 decays, multiply by 0.92.

^{129}In IT Decay (8.7 μs) 2004Sc42,2003Ge04,2012Ka36 (continued)

Decay Scheme

Intensities: relative Iγ
%IT=100



^{129}In IT Decay (110 ms) 2004Ga24,2004Sc42

Parent ^{129}In: E=1911 *56*; Jπ=(29/2+); $T_{1/2}$=110 ms *15*; %IT decay=100.

2004GA24: the ^{129}In isotope was obtained by thermal–neutron induced fission of a ^{235}U carbide target inside the combined target and ion source ANUBIS. During the measurements of singles data, surface ionization was used to select the element In and thereby suppress the daughter activities. Measured Eβ, Eγ, Iγ, γγ, βγ(coin), γγ(t), $T_{1/2}$ (isotope) with 3 Ge detectors of which one was a LEPS. Three Ge detectors were also used for the $Q_β$ measurement, where the LEPS detector was used as a β spectrometer.

^{129}In Levels

E(level)	Jπ†	$T_{1/2}$	Comments
1630 *56*	(23/2−)	0.67 s *10*	%β$^-$≈100. E(level),$T_{1/2}$: from 2004Ga24 by beta decay energy measurement.
1911 *56*	(29/2+)	110 ms *15*	E(level): from 2004Sc42. Configuration=$\nu h_{11/2}{}^{-2} \otimes \pi g_{9/2}{}^{-1}$.

† From Adopted Levels.

γ(^{129}In)

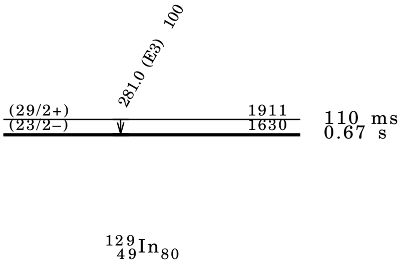
Eγ	E(level)	Iγ†	Mult.	α	I(γ+ce)†	Comments
281.0 *2*	1911	85.5	(E3)	0.1695	100	α(K)=0.1299 *19*; α(L)=0.0320 *5*; α(M)=0.00646 *10*. α(N)=0.001123 *17*; α(O)=5.14×10^{-5} *8*. Mult.: M2 or E3 from observation of K–x rays (2004Ga24,1998FoZY), with preference for E3 from systematics of neighboring nuclides.

† Absolute intensity per 100 decays.

^{129}In IT Decay (110 ms) 2004Ga24,2004Sc42 (continued)

Decay Scheme

Intensity: I(γ+ce) per
100 parent decays
%IT=100



^{130}Cd β⁻n Decay (162 ms) 2001Ha39,1986Kr17

Parent ^{130}Cd: E=0.0; Jπ=0+; $T_{1/2}$=162 ms *7*; Q(g.s.)=3200 *160*; %β⁻n decay=3.5 *10*.
^{130}Cd–Q(β⁻n): From 2012Wa38.
^{130}Cd–$T_{1/2}$: From ^{130}Cd Adopted Levels in ENSDF database.
^{130}Cd–%β⁻n decay: %β⁻n=3.5 *10* (2001Ha39,2002Pf04). Others: %β⁻n≈4 (1986Kr17), ≈5 (2003DiZZ).
2001Ha39: laser–ion source, measured delayed neutron emission probability, ISOLDE–CERN facility.
The details of the decay scheme are not known.

^{129}In Levels

E(level)	Jπ	Comments
0.0	(9/2+)	E(level): g.s. is assumed to be populated in this decay.

Adopted Levels, Gammas

Q(β^-)=4022 *29*; S(n)=5316 *26*; S(p)=13750 *150*; Q(α)=−9684 *20* 2012Wa38.

S(2n)=13279 *22*, S(2p)=26695 *23* (2012Wa38).

1962Ha16: ^{129}Sn produced and identified in 170–MeV proton irradiation of uranium target followed by chemical separation; measured half–life. Two activities were reported in this work with half–lives of 1.0 h and 8.8 min, the former has not been confirmed, the latter corresponds to 6.9–min isomer. A 1.8–h activity reported by 1960Al03 and assigned to ^{129}Sn decay has never been confirmed.

1962Dr01: ^{129}Sn produced and identified in thermal neutron fission fission of ^{235}U followed by chemical separation, measured half–life and gamma spectra. Only a 6.2–min activity identified. No longer–lived activity was found as reported in 1962Ha16.

Later decay studies: 1967Bi15, 1972Iz01, 1974Fo06, 1974Gr29, 1980De35, 1982Hu09,.

Precise mass measurement by Penning–trap system: 2005Si34.

^{129}Sn Levels

No levels are known from ^{130}In β^-n decays.

Cross Reference (XREF) Flags

A ^{129}In β^- Decay (611 ms)
B ^{129}In β^- Decay (1.23 s)
C ^{129}In β^- Decay (0.67 s)
D ^{129}Sn IT Decay (3.40 μs)
E ^{129}Sn IT Decay (2.22 μs)
F ^{129}Sn IT Decay (217 ns)
G ^{130}In β^-n Decay (0.29 s)
H ^{130}In β^-n Decay (0.54 s)
I ^{239}Pu(n,Fγ)

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
0.0	3/2+	ABC GHI	2.23 min *4*	%β^-=100. μ=+0.754 *3* (2005Le34,2014StZZ). Q=+0.05 *11* (2004Le13,2014StZZ). Evaluated rms charge radius=4.6934 fm *58* (2013An02). δ<r^2>(relative to ^{120}Sn)=+0.384 fm^2 *52*; charge radius=4.693 fm *5* (2005Le34). μ,Q: atomic beam laser fluorescence spectroscopy (2005Le34); 2004Le13 and 2002Le30 are conference articles from the same group as 2005Le34. 2004Le13 give Q_2=+0.05 *11*, but this value is not listed in authors' later publication 2005Le34. Jπ: agreement of measured μ with shell model calculations for semi–closed nucleus (2005Le34,2004Le13); 2$d_{3/2}$ neutron orbital. $T_{1/2}$: weighted average of 2.4 min *1* (1982Hu09), 2.16 min *4* (1980De35), 2.23 min *3* (1974Gr29), 2.5 min *3* (1974Fo06) and 2.52 min *12* (1972Iz01).
35.15 *5*	11/2−	ABCDEF I	6.9 min *1*	%β^-=100; %IT<2×10^{-3}. μ=−1.297 *5* (2005Le34,2014StZZ). Q=−0.18 *17* (2005Le34,2014StZZ). δ<r^2>(relative to ^{120}Sn)=+0.411 fm^2 *53*, charge radius=4.696 fm *6* (2005Le34). %IT: Calculated from the upper limit of B(M4)(W.u.)<30 recommended in Nuclear Data Sheets policies. μ,Q: atomic beam laser fluorescence spectroscopy (2005Le34); 2004Le13 and 2002Le30 are conference articles from the same group as 2005Le34. Jπ: agreement of measured μ with shell model calculations for semi–closed nucleus (2005Le34,2004Le13); 1$h_{11/2}$ neutron orbital. $T_{1/2}$: from 1982Hu09. Others: 6.7 min *4* (1980De35), 7.3 min *2* (1974Fo06), 8.9 min 6 (1974Gr29), 7.5 min *1* (1967Bi15), 6.2 min *12* (1962Dr01), 8.8 min *6* (1962Ha16).
315.406 *19*	(1/2)+	AB		Jπ: log *ft*=6.08 from (1/2−); E2(+M1) γ to 3/2+; shell model and odd tin systematics.
763.70 *5*	(9/2−)	AB		Jπ: three–quasiparticle systematics of odd tin isotopes.
769.07 *5*	(5/2+)	AB		Jπ: odd tin systematics (one phonon+$d_{3/2}$ multiplet); weak β feeding from (1/2−) and (9/2+) parents.
1043.66 *5*	(7/2−)	AB		Jπ: three–quasiparticle systematics of odd tin isotopes; weak β feeding from (1/2−) parent.
1047.35 *6*	(7/2+)	AB		Jπ: log *ft*=7.12 assuming β feeding from (9/2+) parent; gammas to 3/2+ and (5/2+).

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Adopted Levels, Gammas (continued)

^{129}Sn Levels (continued)

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
1054.21 *8*	(7/2+)	A		Jπ: log *ft*=6.34 from (9/2+); M1(+E2) γ to (5/2+); odd tin systematics (one phonon+d$_{3/2}$ multiplet).
1171.48 *7*	(15/2−)	CDEF I		Jπ: energy systematics arguments deduced from comparison with the known lighter Sn isotopes and shell model considerations (2000Pi03); $\nu h_{11/2}^{-1}\otimes$(2+ core) (2004Ga24).
1222.58 *5*	(3/2+)	B		Jπ: log *ft*=6.83 from (1/2−); gammas to (7/2+), 3/2+ and (1/2)+.
1288.70 *8*	(3/2+)	AB		Jπ: log *ft*=7.24 from (1/2−); odd tin systematics (one phonon+d$_{3/2}$ multiplet); gammas to (1/2)+, 3/2+ and (5/2+).
1359.40 *7*	(13/2−)	CDEF I		Jπ: based on the energy systematic arguments deduced from comparison with the known lighter Sn isotopes and shell model considerations (2000Pi03); $\nu h_{11/2}^{-1}\otimes$(2+ core) (2004Ga24).
1455.52 *9*	(5/2+)	A		Jπ: odd tin systematics (one phonon+d$_{3/2}$ multiplet); weak β feeding from (9/2+).
1534.35 *11*	(7/2−,9/2+)	A		Jπ: log *ft*=6.85 from (9/2+); gammas to (5/2+), (7/2+) and 11/2−.
1613.45 *15*	(1/2 to 7/2+)	B		Jπ: γ to 3/2+; 1/2 and 3/2 less likely from no detectable β feeding from (1/2−) parent.
1701.10 *11*	(7/2−)	AB		Jπ: log *ft*=7.08 from (9/2+); gammas to (5/2+), (7/2−) and (9/2−).
1741.89 *7*	(15/2+)	CDEF I		Jπ: three-quasiparticle systematics of odd tin isotopes.
1761.6 *10*	(19/2+)	CDEF I	3.40 μs *13*	%IT=100. $T_{1/2}$: weighted average of values in ^{129}In β^- decay (0.67 s), ^{129}Sn it decay (0.27 μs) and ^{239}Pu(n,Fγ). Jπ: (E2) γ from (23/2+); (E2) γ to (15/2+).
1802.6 *10*	(23/2+)	C EF I	2.22 μs *14*	%IT=100. $T_{1/2}$: weighted average of values in ^{129}In β^- decay (0.67 s), ^{129}Sn it decay (0.27 μs) and ^{239}Pu(n,Fγ). Jπ: energy systematic arguments deduced from comparison with the known lighter Sn isotopes and shell model considerations (2000Pi03).
1853.62 *15*	(7/2,9/2)	A		Jπ: log *ft*=6.53 from (9/2+); gammas to (7/2+) and (7/2−,9/2+).
1865.05 *4*	(7/2+)	A		Jπ: log *ft*=4.85 from (9/2+); gamma to 3/2+.
1906.24 *10*	(7/2)	A		Jπ: log *ft*=7.28 from (9/2+); γ to 3/2+.
2118.34 *5*	(7/2+)	A		Jπ: log *ft*=4.64 from (9/2+); γ to 3/2+; weak γ to 11/2−.
2276.5 *10*	(21/2)	C		Jπ: log *ft*=5.91 from (23/2−); gammas to (19/2+) and (23/2+).
2407.6 *11*	(23/2−)	F		Jπ: shell model and odd tin systematics.
2552.9 *11*	(27/2−)	F	217 ns *19*	%IT=100. $T_{1/2}$: from γ(t) in ^{129}Sn IT decay (2011Pi05). Other: 0.27 μs 7 (2008Lo07). Jπ: shell model and odd tin systematics.
2790.89 *20*	(7/2,9/2+)	A		Jπ: log *ft*=6.41 from (9/2+); gammas to (5/2+) and (7/2+).
2835.76 *9*	(7/2+,9/2+)	A		Jπ: log *ft*=5.62 from (9/2+); γ to (5/2+).
2981.81 *17*	(7/2+)	A		Jπ: log *ft*=6.14 from (9/2+); γ to 3/2+.
3079.3 *3*	(3/2−)	B		Jπ: log *ft*=6.79 from (1/2−); gammas to (1/2)+, (7/2−).
3140.32 *17*	(7/2+)	A		Jπ: log *ft*=6.12 from (9/2+); γ to 3/2+.
3394.3 *3*	(1/2,3/2)	B		Jπ: log *ft*=6.95 from (1/2−).
3590.51 *7*	(3/2−)	AB		Jπ: log *ft*=5.51 from (1/2−); γ to (7/2−). Eγ and Iγ for all the transitions are from ^{129}In β^- decay (1.23 s).
3992.5 *10*	(21/2−)	C		Jπ: fed by main GT β branch from (23/2−) parent, however lack of γ transition to 15/2− unlike in case of ^{127}Sn.

† From least-squares fit to the adopted Eγ data.

γ(^{129}Sn)

E(level)	Eγ†	Iγ†	Mult.	α	Comments
315.406	315.42 *2*	100	E2(+M1)	0.028 *3*	α(K)=0.0236 *19*; α(L)=0.0033 *6*; α(M)=0.00064 *12*. α(N)=0.000120 *21*; α(O)=9.3×10^{-6} *7*. Mult.: from α(K)exp and K/L (1980De35).
763.70	728.53 *3*	100			
769.07	769.31 *18*	100			
1043.66	279.93 *11*	4.2‡ *6*			

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Adopted Levels, Gammas (continued)

γ(^{129}Sn) (continued)

E(level)	Eγ†	Iγ†	Mult.	α	Comments
1043.66	1008.53 *3*	100‡ *5*			
1047.35	278.18 *9*	68 *16*			Iγ: from ^{129}In β^- decay (611 ms).
	1047.41 *10*	100 *8*			Iγ: from ^{129}In β^- decay (611 ms).
1054.21	285.24 *12*	33 *2*	M1(+E2)	0.037 *5*	α(K)=0.032 *4*; α(L)=0.0045 *10*; α(M)=0.00089 *21*. α(N)=0.00016 *4*; α(O)=1.26×10^{-5} *14*. Mult.: from α(K)exp (1980De35).
	1054.30 *16*	100 *7*			
1171.48	1136.31 *5*	100			Eγ: from ^{129}In β^- decay (0.67 s).
1222.58	175.13 *12*	2.2 *13*			
	907.34 *8*	74 *5*			
	1222.51 *8*	100 *7*			
1288.70	519.5 *6*	36‡ *6*			
	973.5 *2*	80‡ *5*			
	1288.64 *11*	100‡ *6*			
1359.40	1324.25 *5*	100			Eγ: from ^{129}In β^- decay (0.67 s).
1455.52	1455.53 *11*	100			
1534.35	480.29 *13*	100 *9*			
	765.4 *5*	69 *6*			
	1499.00 *17*	99 *7*			
1613.45	1613.4 *2*	100			
1701.10	657.7 *3*	75‡ *6*			
	931.96 *19*	100‡ *9*			
	937.54 *19*	95‡ *9*			
1741.89	382.49 *2*	75 *4*			Eγ: from ^{129}In β^- decay (0.67 s). Iγ: weighted average of values in ^{129}In β^- decay (0.67 s) and ^{129}Sn it decay:0.27 μs.
	570.41 *3*	100 *6*			Eγ: from ^{129}In β^- decay (0.67 s). Iγ: weighted average of values in ^{129}In β^- decay (0.67 s) and ^{129}Sn it decay:0.27 μs.
1761.6	19.7 *10*		(E2)	1.0×10^{3} *3*	α(L)=7.8E2 23; α(M)=1.6E2 5; α(N)=27 *9*; α(O)=0.58 *17*. Eγ: from ^{129}In β^- decay (0.67 s). Mult.: half–life is characteristic of an E2 transition (2002Ge07). B(E2)(W.u.)=1.4 *6*.
1802.6	41.0 *2*		(E2)	39.9 *10*	α(K)=13.64 *23*; α(L)=21.1 *6*; α(M)=4.37 *12*. α(N)=0.756 *21*; α(O)=0.0195 *5*. Mult.: from K x ray intensity and L–conversion intensity in ^{239}Pu(f,nγ). Eγ: from ^{129}In β^- decay (0.67 s). B(E2)(W.u.)=1.39 *10*.
1853.62	319.3 *4*	32 *4*			
	799.41 *14*	100 *8*			
1865.05	330.8 *3*	0.66 *5*			
	409.3 *3*	0.34 *4*			
	576.1 *5*	0.39 *3*			
	821.4 *2*	2.22 *1*			
	1096.00 *4*	8.5 *11*			
	1101.39 *6*	5.7 *4*			
	1830.1 *5*	0.32 *7*			
	1864.89 *6*	100 *7*			
1906.24	1906.32 *15*	100			
2118.34	212.17 *12*	0.64 *5*			
	252.99 *16*	0.08 *2*			
	265.0	0.35 *5*			
	662.92 *16*	1.22 *8*			
	830.0 *3*	0.60 *10*			
	1071.0 *12*	0.2 *10*			
	1074.71 *3*	6.1 *4*			
	1349.29 *7*	4.6 *3*			
	1354.41 *8*	2.9 *3*			
	2082.9 *4*	0.42 *4*	[M2]		
	2118.26 *10*	100 *7*			
2276.5	473.99 *16*	100 *8*			

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Adopted Levels, Gammas (continued)

γ(^{129}Sn) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.	α	Comments
2276.5	515.1 *6*	30 *3*			
2407.6	605.0 *3*				
2552.9	145.3 *3*		[E2]	0.425 *7*	α(K)=0.334 *6*; α(L)=0.0733 *12*; α(M)=0.01478 *25*. α(N)=0.00265 *5*; α(O)=0.0001420 *23*. Eγ: from ^{129}Sn IT decay. B(E2)(W.u.)=0.73 *6*.
2790.89	1736.7 *6*	36 *24*			
	2021.8 *2*	100 *7*			
2835.76	1301.7 *4*	10.2 *8*			
	1781.54 *13*	100 *7*			
	1791.9 *5*	7.2 *7*			
	2066.64 *11*	57 *4*			
	2072.3 *5*	3.5 *9*			
2981.81	2212.70 *17*	100 *6*			
	2982.1 *6*	9.2 *18*			
3079.3	2035.5 *5*	90 *9*			
	2763.9 *4*	100 *8*			
3140.32	2371.5 *9*	16.2 *18*			
	2376.6 *6*	30 *3*			
	3140.27 *18*	100 *8*			
3394.3	3078.9 *3*				
3590.51	1889.6 *2*	23 *2*			
	1977.0 *2*	21 *2*			
	2301.7 *2*	30 *2*			
	2368.15 *17*	51 *4*			
	2546.61 *11*	100 *7*			
	3275.16 *15*	63 *4*			
	3590.8 *4*	12.6 *11*			
3992.5	1716.1 *3*	16.4 *14*			
	2189.92 *10*	100 *7*			
	2230.88 *18*	41 *2*			

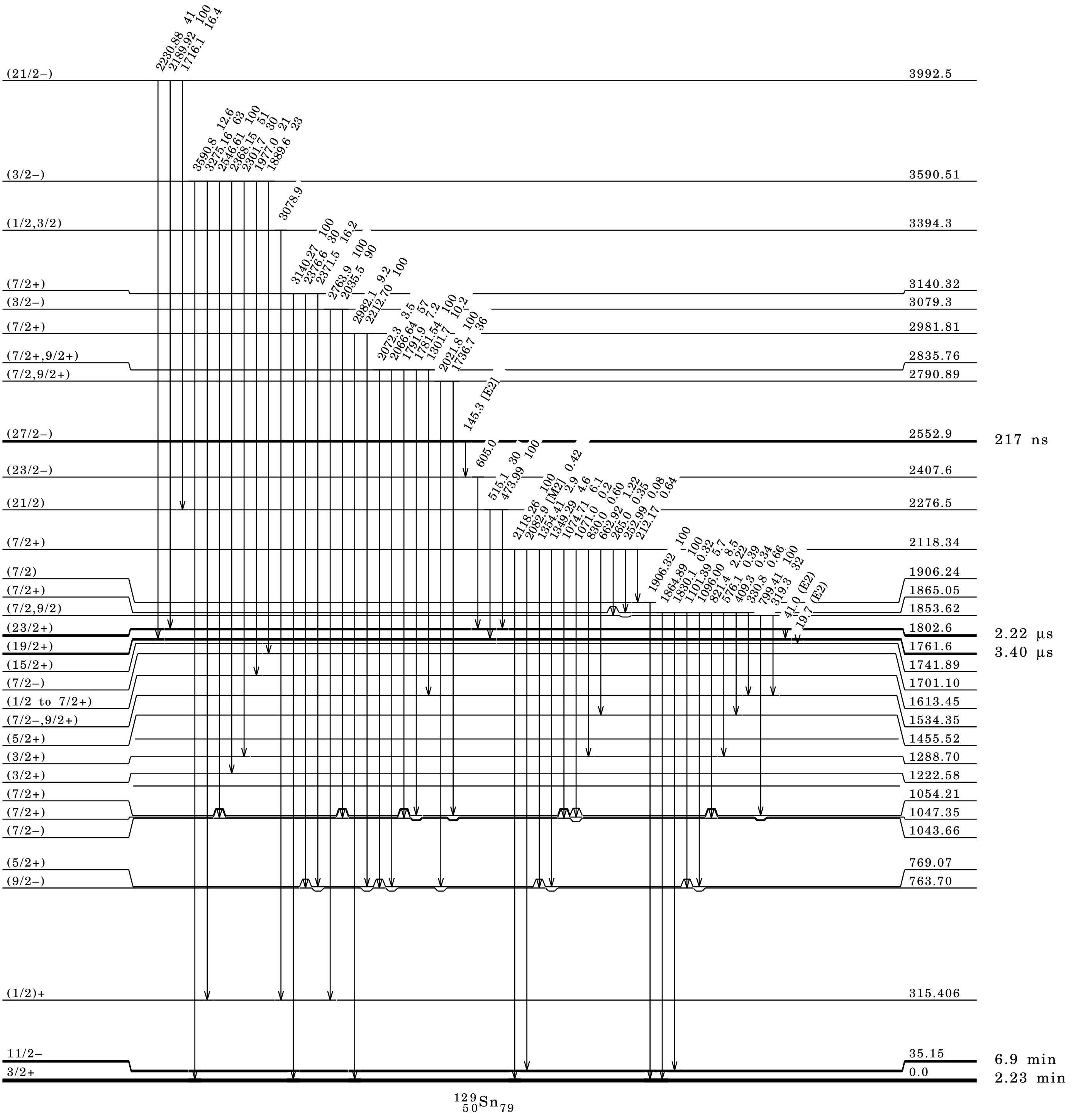
[†] From β⁻ decay datasets, unless otherwise stated.

[‡] weighted average of values in ^{129}In β⁻ decay (611 ms) and ^{129}In β⁻ decay (1.23 ms).

Adopted Levels, Gammas (continued)

Level Scheme

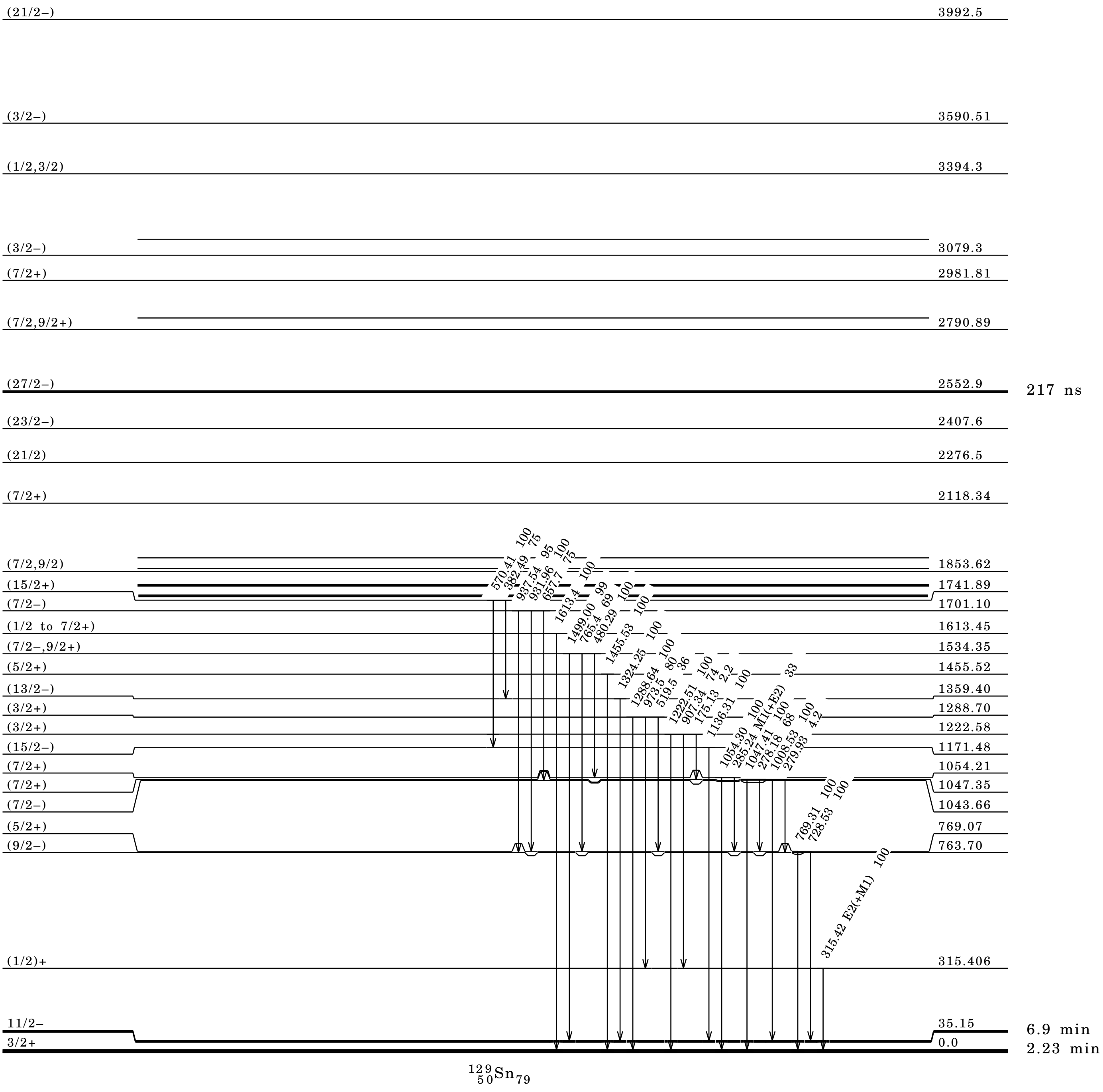
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



^{129}In β^- Decay (611 ms) 2004Ga24,1980De35

Parent ^{129}In: E=0.0; Jπ=(9/2+); $T_{1/2}$=611 ms *5*; Q(g.s.)=7769 *19*; %β^- decay=100.

^{129}In–J: From shell model systematics.

^{129}In–$T_{1/2}$: Average value of 611 *5* (1993Ru01) and 610 *10* (1986Wa17).

^{129}In–Q(β^-): From 2012Wa38.

1980De35: ^{235}U(n,F) E=th, on–line ms; semi, scin β, γ, ce, γγ–, βγ–coin.

1978Al18: ^{235}U(n,F) E=th, on–line ms; semi, scin β, γ, βγ–coin.

1987Sp09: ^{235}U(n,F) E=th, on–line ms; HPGE, β, γ, βγ–coin.

2004Ga24: The ^{129}In isotope was obtained by thermal–neutron induced fission of a ^{235}U carbide target inside the combined target and ion source ANUBIS. During the measurements of singles data, surface ionization was used to select the element In and thereby suppress the daughter activities. Measured Eβ, Eγ, Iγ, γγ, βγ(coin), γγ(t), $T_{1/21/2}$(isotope) with 3 Ge detectors of which one was a low energy photon (LEP). Three Ge detectors were also used for the Q_β measurement, where the LEP detector was used as a β spectrometer.

^{129}Sn Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[‡]	Comments
0.0	3/2+	2.23 min *4*	
35.11 *6*	11/2−	6.9 min *1*	%β^-=100.
315.418 *20*	(1/2)+		
763.67 *6*	(9/2−)		
769.04 *5*	(5/2+)		
1043.62 *5*	(7/2−)		
1047.31 *7*	(7/2+)		
1054.18 *8*	(7/2+)		
1288.68 *9*	(3/2+)		
1455.51 *9*	(5/2+)		
1534.31 *11*	(7/2−,9/2+)		
1701.14 *13*	(7/2−)		
1853.55 *14*	(7/2,9/2)		
1865.02 *4*	(7/2+)		
1906.21 *10*	(7/2)		
2118.31 *5*	(7/2+)		
2790.86 *20*	(7/2,9/2+)		
2835.73 *10*	(7/2+,9/2+)		
2981.79 *17*	(7/2+)		
3140.32 *17*	(7/2+)		
3589.6 *10*	(3/2−)		E(level): only from 1980De35.

[†] From least–squares fit by evaluators to the Eγ data from 2004Ga24; level scheme is also from 2004Ga24, except as noted.

[‡] From Adopted Levels.

β^- radiations

Eβ^-	E(level)	Iβ^-[†]	Log *ft*	Comments
(4179 *19*)	3589.6	1.6 *2*	5.54 *6*	av Eβ=1800.0 *90*. Iβ^-: from 1980De35.
(4629 *19*)	3140.32	0.67 *4*	6.11 *3*	av Eβ=2012.7 *90*.
(4787 *19*)	2981.79	0.74 *4*	6.14 *3*	av Eβ=2087.8 *90*.
(4933 *19*)	2835.73	3.36 *15*	5.54 *2*	av Eβ=2157.0 *90*.
(4978 *19*)	2790.86	0.47 *9*	6.4 *1*	av Eβ=2178.3 *90*.
5480 *120*	2118.31	49 *3*	4.63 *3*	av Eβ=2497.2 *91*. Eβ^-: from 1978Al18.
(5863 *19*)	1906.21	0.13 *3*	7.3 *1*	av Eβ=2597.8 *91*.
(5904 *19*)	1865.02	36 *2*	4.85 *3*	av Eβ=2617.4 *91*.
(5915 *19*)	1853.55	0.76 *6*	6.53 *4*	av Eβ=2622.8 *91*.
(6068 *19*)	1701.14	0.24 *2*	7.08 *4*	av Eβ=2695.1 *91*.
(6235 *19*)	1534.31	0.46 *6*	6.85 *6*	av Eβ=2774.2 *90*.
(6313[‡] *19*)	1455.51	<0.3	>7.1	av Eβ=2811.6 *90*.
(6715 *19*)	1054.18	2.1 *3*	6.33 *7*	av Eβ=3001.8 *90*.
(6722 *19*)	1047.31	0.35 *6*	7.1 *1*	av Eβ=3005.1 *90*.
(6725 *19*)	1043.62	2.0 *4*	6.4 *1*	av Eβ=3006.8 *90*.
(7000[‡] *19*)	769.04	<2	>6.4	av Eβ=3136.9 *90*.
(7005 *19*)	763.67	2.1 *4*	6.4 *1*	av Eβ=3139.5 *90*.

Continued on next page (footnotes at end of table)

^{129}In β^{-} Decay (611 ms) 2004Ga24,1980De35 (continued)

β^{-} radiations (continued)

Eβ^{-}	E(level)	Iβ$^{-\dagger}$	Log *ft*	Comments
(7734‡ *19*)	35.11	<10	>5.9	av Eβ=3484.3 *90*. Iβ^{-}: from log *ft*>5.9; 2004Ga24 give <15 which gives log?Ift>5.7.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{129}Sn)

Most of the unplaced γ rays belong to activities $T_{1/2}$≤10 s in the mass 129 isobaric chain (1980De35) and are tentatively assigned to ^{129}In β^{-} decay by the evaluators.

Iγ normalization: from 2004Ga24. Uncertainty estimated by the evaluators. %β^{-}n=0.331 *32* (1993Ru01).

Eγ†	E(level)	Iγ$^{§\#}$	Mult.	α	Comments
212.17 *12*	2118.31	0.64 *5*			
252.99 *16*	2118.31	0.08 *2*			
265.0 *3*	2118.31	0.35 *5*			
278.18 *9*	1047.31	0.42 *10*			
279.93 *11*	1043.62	0.53 *11*			
285.24 *12*	1054.18	3.1 *2*	M1(+E2)	0.037 *5*	α(K)=0.032 *4*; α(L)=0.0045 *10*; α(M)=0.00089 *21*. α(N)=0.00016 *4*; α(O)=1.26×10^{-5} *14*. Mult.: α(K)exp=0.03 *1* (1980De35). E2 mixing is very small. α: value for pure M1.
315.42 *2*	315.418	0.33 *3*			
319.3 *4*	1853.55	0.53 *6*			
330.8 *3*	1865.02	0.49 *4*			
^{x}382.5‡ *3*		2.8 *3*			
409.3 *3*	1865.02	0.25 *3*			
^{x}417.1 *3*		0.2 *1*			
^{x}473.9 *3*		0.6 *1*			
480.29 *13*	1534.31	0.97 *9*			
^{x}501.2 *3*		0.8 *1*			
519.5 *6*	1288.68	0.15 *4*			
^{x}570.2‡ *3*		3.8 *4*			
576.1 *5*	1865.02	0.29 *2*			
657.7 *3*	1701.14	0.17 *2*			
662.92 *16*	2118.31	1.22 *9*			
728.53 *3*	763.67	13.4 *9*			
765.4 *5*	1534.31	0.67 *6*			
769.31 *18*	769.04	24.3 *17*			
799.41 *14*	1853.55	1.66 *13*			
821.4 *2*	1865.02	1.65 *1*			
830.0 *3*	2118.31	0.60 *10*			
931.96 *19*	1701.14	0.22 *3*			
937.54 *19*	1701.14	0.21 *3*			
973.5 *2*	1288.68	0.33 *3*			
1008.53 *3*	1043.62	12.4 *9*			
^{x}1045.2 *3*		0.1 *1*			
1047.41 *10*	1047.31	0.62 *5*			
1054.30 *16*	1054.18	9.4 *7*			
^{x}1063.5 *3*		0.3 *1*			
1071.0 *12*	2118.31	0.2 *10*			
1074.71 *3*	2118.31	6.1 *4*			
1096.00 *4*	1865.02	6.3 *8*			
1101.39 *6*	1865.02	4.2 *3*			
^{x}1136.0‡ *3*		4.2 *4*			
^{x}1172.8 *3*		0.3 *1*			
1288.64 *11*	1288.68	0.41 *4*			
1301.7 *4*	2835.73	0.47 *4*			
^{x}1308.7 *3*		0.5 *1*			
^{x}1323.7‡ *3*		3.4 *3*			
1349.29 *7*	2118.31	4.6 *3*			
1354.41 *8*	2118.31	2.9 *3*			

Continued on next page (footnotes at end of table)

^{129}In β^- Decay (611 ms) 2004Ga24,1980De35 (continued)

γ(^{129}Sn) (continued)

Eγ[†]	E(level)	Iγ[§#]	Comments
[x]1427.3 *3*		1.0 *1*	
1455.53 *11*	1455.51	1.91 *13*	
1499.00 *17*	1534.31	0.96 *7*	
[x]1577.5 *3*		0.6 *1*	
[x]1716.1 *3*		0.5 *1*	
1736.7 *6*	2790.86	0.3 *2*	
1781.54 *13*	2835.73	4.6 *3*	
1791.9 *5*	2835.73	0.33 *3*	
1830.1 *5*	1865.02	0.24 *5*	
1864.89 *6*	1865.02	74 *5*	
[x]1906.3 *3*		0.9 *1*	
1906.32 *15*	1906.21	0.96 *6*	
[x]1977.0 *3*		1.0 *1*	
2021.8 *2*	2790.86	0.84 *6*	
2066.64 *11*	2835.73	2.6 *2*	
2072.3 *5*	2835.73	0.16 *4*	
2082.9 *4*	2118.31	0.42 *4*	
2118.26 *10*	2118.31	100 *7*	
[x]2189.5 *3*		3.7 *4*	
2212.70 *17*	2981.79	1.64 *10*	
[x]2302 *1*		1.2 *2*	
[x]2367 *1*		1.5 *2*	
2371.5 *9*	3140.32	0.18 *2*	
2376.6 *6*	3140.32	0.33 *3*	
2546 *1*	3589.6	3.5 *4*	Eγ,Iγ: from 1980De35.
2982.1 *6*	2981.79	0.15 *3*	
3140.27 *18*	3140.32	1.11 *9*	

[†] From 2004Ga24, except as noted.

[‡] Possibly correspond to γ rays which 1977He24 regarded as deexciting the 1703–keV isomer (3 μs) in ^{129}Sb (1980De35).

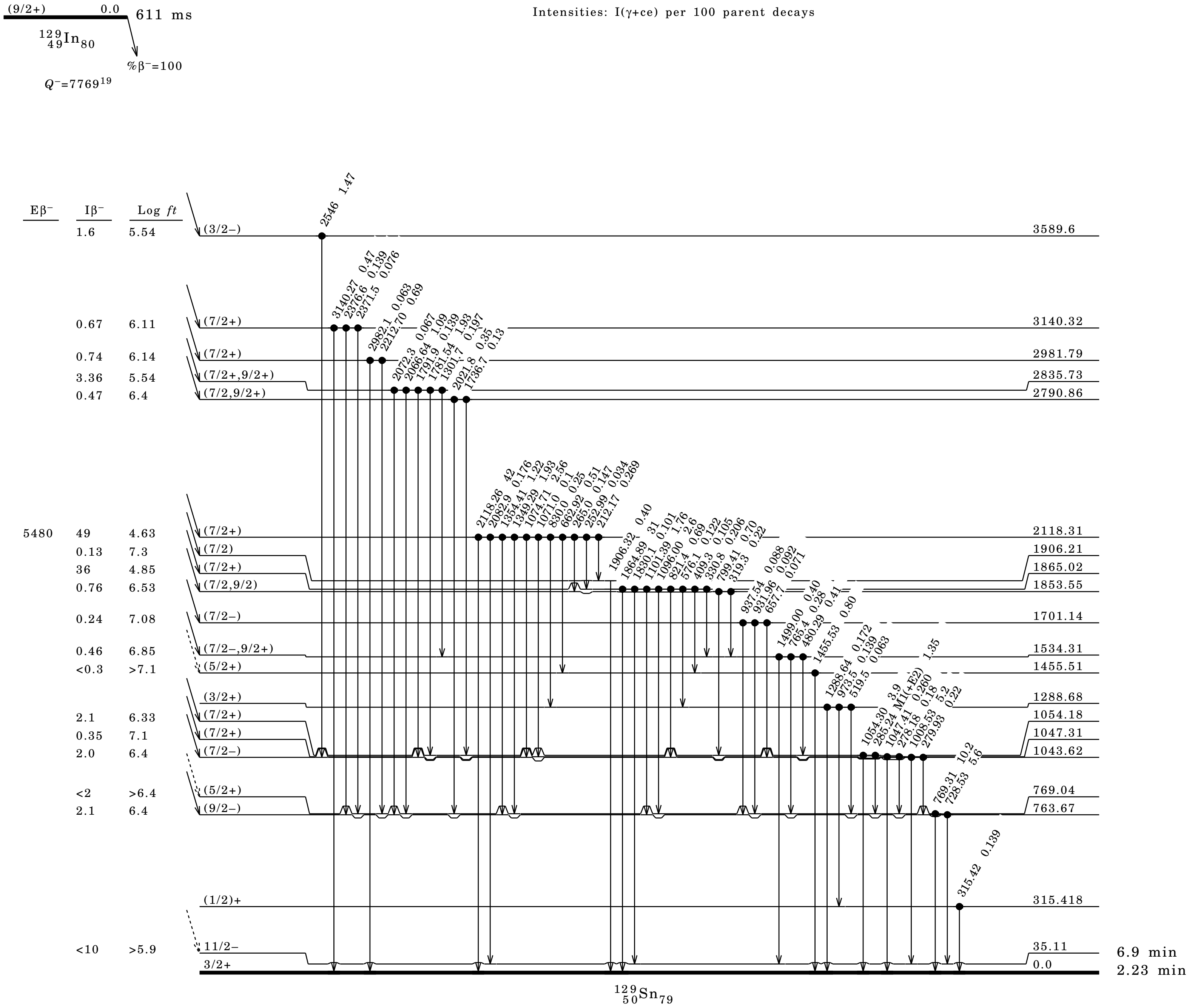
[§] from 2004Ga24, except for unplaced gammas which come from 1980De35.

[#] For absolute intensity per 100 decays, multiply by 0.42 *2*.

[x] γ ray not placed in level scheme.

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



From NNDC(BNL)
program ENSDAT

^{129}In β^- Decay (1.23 s) 2004Ga24,1980De35

Parent ^{129}In: E=459 *5*; Jπ=(1/2–); $T_{1/2}$=1.23 s *3*; Q(g.s.)=7769 *19*; %β^- decay=100.

^{129}In–E,J,$T_{1/2}$: From ^{129}In Adopted Levels.

^{129}In–Q(β^-): From 2012Wa38.

1980De35: ^{235}U(n,F) E=th, on-line ms; semi, scin β, γ, ce, γγ–, βγ-coin.

1987Sp09: ^{235}U(n,F) E=th, on-line ms; HPGE, β, γ, βγ-coin.

2004Ga24: The ^{129}In isotope was obtained by thermal-neutron induced fission of a ^{235}U carbide target inside the combined target and ion source ANUBIS. During the measurements of singles data, surface ionization was used to select the element In and thereby suppress the daughter activities. Measured Eβ, Eγ, Iγ, γγ, βγ(coin), γγ(t), $T_{1/2}$ (isotope) with 3 Ge detectors of which one was a LEPS. Three Ge detectors were also used for the Q_β measurement, where the LEPS detector was used as a β spectrometer.

^{129}Sn Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0	3/2+	2.23 min *4*	$T_{1/2}$: from 1980De35.
35.35 *13*	11/2–	6.9 min *1*	%β^-=100. $T_{1/2}$: from 1980De35. %β^-: γ transition not expected from RUL and not observed in experiments.
315.410 *20*	(1/2)+		
763.89 *13*	(9/2–)		
769.28 *9*	(5/2+)		
1043.89 *13*	(7/2–)		
1047.45 *7*	(7/2+)		
1222.61 *5*	(3/2+)		
1288.74 *9*	(3/2+)		
1613.51 *15*			
1701.28 *13*	(7/2–)		
3079.4 *3*	(3/2–)		
3394.3 *3*	(1/2,3/2)		
3590.62 *9*	(3/2–)		

[†] Based on a least-squares fit to the Eγ data from 2004Ga24; level scheme is also from 2004Ga24.

[‡] From Adopted Levels.

β^- radiations

$E\beta^-$	E(level)	$I\beta^-$[†]	Log *ft*	Comments
(4637 *20*)	3590.62	5.10 *17*	5.54 *2*	av Eβ=2016.8 *93*.
(4834 *20*)	3394.3	0.22 *2*	6.98 *5*	av Eβ=2109.8 *94*.
(5149 *20*)	3079.4	0.42 *3*	6.82 *4*	av Eβ=2259.1 *94*.
(6939 *20*)	1288.74	0.58 *7*	7.26 *6*	av Eβ=3108.2 *93*.
(7005 *20*)	1222.61	1.56 *14*	6.85 *4*	av Eβ=3139.5 *93*.
(7913 *20*)	315.410	15.1 *13*	6.10 *4*	av Eβ=3568.8 *93*.
(8228 *20*)	0.0	77 *15*	5.47 *9*	av Eβ=3717.9 *93*.

[†] Absolute intensity per 100 decays.

γ(^{129}Sn)

Iγ normalization: From 2004Ga24. %IT<0.3; %β^-n=3.92 *19* (1993Ru01).

Eγ[†][‡]	E(level)	Iγ[§]	Mult.	α	Comments
175.13 *12*	1222.61	0.17 *10*			
278.18 *9*	1047.45	0.07 *3*			
279.93 *11*	1043.89	0.45 *9*			
315.42 *2*	315.410	100 *7*	E2(+M1)	0.028 *3*	α(K)exp=0.025 *2*. α(K)=0.0236 *19*; α(L)=0.0033 *6*; α(M)=0.00064 *12*. α(N)=0.000120 *21*; α(O)=9.3×10^{-6} *7*. Mult.: from α(K)exp. M1 mixing is very small. α: value for pure E2.
519.5 *6*	1288.74	1.0 *2*			
657.7 *3*	1701.28	0.61 *6*			
728.53 *3*	763.89	1.23 *13*			

Continued on next page (footnotes at end of table)

^{129}In β^- Decay (1.23 s) 2004Ga24,1980De35 (continued)

γ(^{129}Sn) (continued)

Eγ[†][‡]	E(level)	Iγ[§]
769.31 *18*	769.28	1.9 *2*
907.34 *8*	1222.61	5.7 *4*
931.96 *19*	1701.28	0.82 *9*
937.54 *19*	1701.28	0.78 *9*
973.5 *2*	1288.74	2.2 *2*
1008.53 *3*	1043.89	10.6 *8*
1047.41 *10*	1047.45	0.10 *3*
1222.51 *8*	1222.61	7.7 *5*
1288.64 *11*	1288.74	2.8 *2*
1613.4 *2*	1613.51	2.0 *3*
1889.6 *2*	3590.62	2.2 *2*
1977.0 *2*	3590.62	1.98 *16*
2035.5 *6*	3079.4	1.11 *11*
2301.7 *2*	3590.62	2.8 *2*
2368.15 *17*	3590.62	4.8 *4*
2546.61 *11*	3590.62	9.4 *7*
2763.9 *4*	3079.4	1.23 *10*
3078.9 *3*	3394.3	1.24 *10*
3275.16 *15*	3590.62	5.9 *4*
3590.8 *4*	3590.62	1.18 *10*

[†] From 2004Ga24.

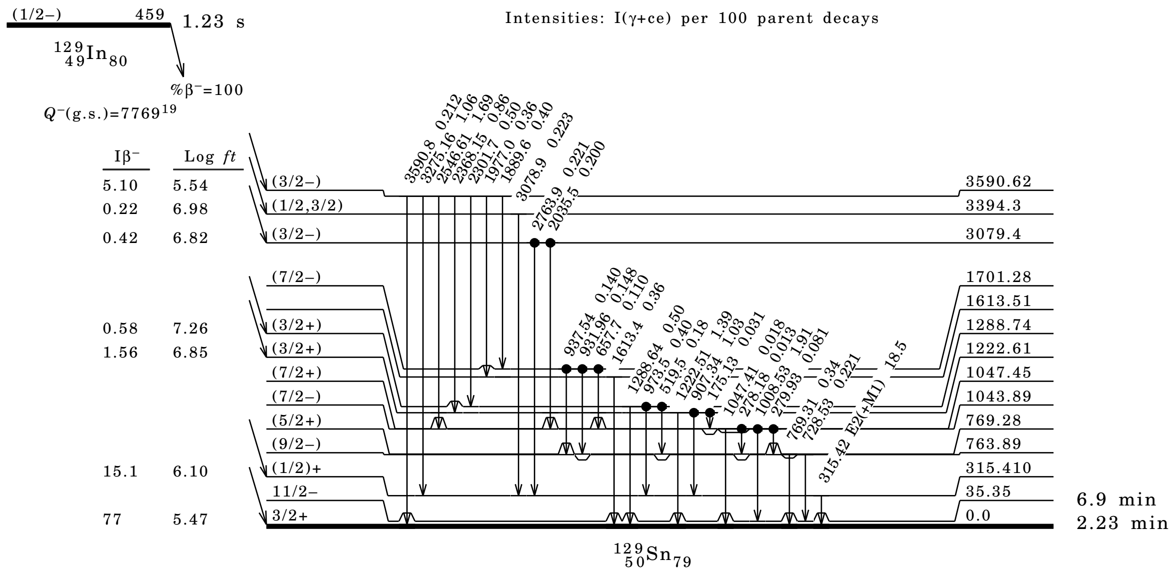
[‡] As for unplaced γ rays, see comments under ^{129}In β^- decay (0.61 s).

[§] For absolute intensity per 100 decays, multiply by 0.18.

^{129}In β^- Decay (1.23 s) 2004Ga24,1980De35 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{129}In β^- Decay (0.67 s) 2004Ga24

Parent ^{129}In: E=1630 *56*; Jπ=(23/2−); $T_{1/2}$=0.67 s *10*; Q(g.s.)=7769 *19*; %β⁻ decay=100.

^{129}In–E,J,$T_{1/2}$: From Adopted Levels of ^{129}In.

^{129}In–Q(β⁻): From 2012Wa38.

2004Ga24: The ^{129}In isotope was obtained by thermal–neutron induced fission of a ^{235}U carbide target inside the combined target and ion source ANUBIS. During the measurements of singles data, surface ionization was used to select the element In and thereby suppress the daughter activities.

Measured Eβ, Eγ, Iγ, γγ, βγ(coin), γγ(t), T (isotope) with 3 Ge detectors of which one was a LEPS. Three Ge detectors were also used for the Q_β measurement, where the LEPS detector was used as a β spectrometer.

^{129}Sn Levels

E(level)[†]	Jπ[§]	$T_{1/2}$[§]
0.0	3/2+	2.23 min *4*
35.5 *1*	11/2−	6.9 min *1*
1171.82[‡] *4*	(15/2−)	
1359.75[‡] *4*	(13/2−)	
1742.24 *4*	(15/2+)	
1762.0 *10*	(19/2+)	3.2 μs *2*
1803.0 *11*	(23/2+)	2.0 μs *2*
2276.9 *11*	(21/2)	
3992.9 *11*	(21/2−)	

[†] From least–squares fit to Eγ data.

[‡] 2004Ga24 notes that an imbalance of the γ–ray intensities for transitions feeding and depopulating this level has been observed. The authors indicate that unobserved γ feeding is most likely the cause of the apparent β feeding and that true β feeding is assumed to be zero for this level.

[§] From Adopted Levels.

β⁻ radiations

Eβ⁻	E(level)	Iβ⁻	Log *ft*	Comments
(5410 *60*)	3992.9	75 *4*	4.4 *1*	av Eβ=2381 *28*.
(7120 *60*)	2276.9	8.0 *12*	5.9 *1*	av Eβ=3195 *28*.

Continued on next page (footnotes at end of table)

^{129}In β^- Decay (0.67 s) 2004Ga24 (continued)

β^- radiations (continued)

Eβ^-	E(level)	Iβ^-	Log *ft*	Comments
(7600 *60*)	1803.0	14[†] *4*	5.8 *2*	av Eβ=3419 *28*.

[†] Total feeding for 1761.9 and 1802.9 levels; but most of this feeding is expected to be for 1802.9 level. The feeding for the 1761.9 level is expected to be much weaker in view of first– forbidden transition involved.

$\gamma(^{129}$Sn)

Iγ normalization: From 2004Ga24.

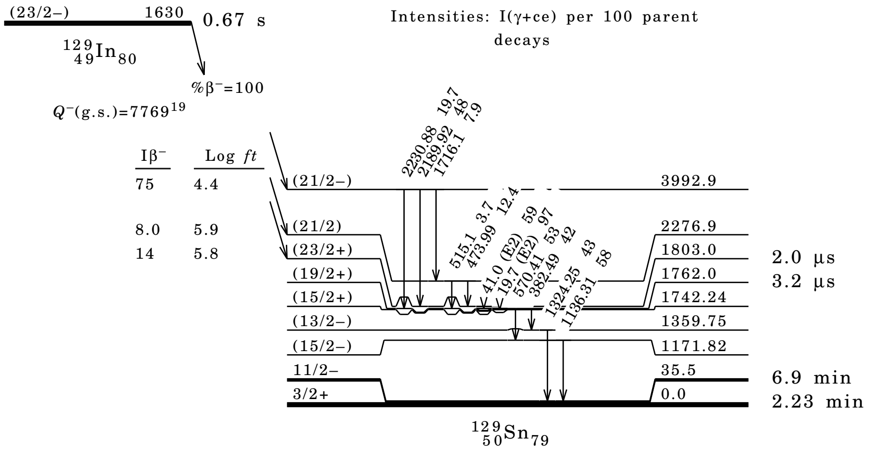
Eγ	E(level)	Iγ[‡]	Mult.[†]	α	I(γ+ce)[‡]	Comments
19.7 *10*	1762.0		(E2)		168	I(γ+ce): from the level scheme by 2004Ga24.
41.0 *2*	1803.0	2.5 *8*	(E2)	39.9 *10*		α(K)=13.64 *23*; α(L)=21.1 *6*; α(M)=4.37 *12*. α(N)=0.756 *21*; α(O)=0.0195 *5*. B(E2)(W.u.)=1.54 *17*.
382.49 *2*	1742.24	72 *5*				
473.99 *16*	2276.9	21.3 *16*				
515.1 *6*	2276.9	6.3 *7*				
570.41 *3*	1742.24	92 *7*				
1136.31 *5*	1171.82	100 *7*				
1324.25 *5*	1359.75	74 *5*				
1716.1 *3*	3992.9	13.6 *12*				
2189.92 *10*	3992.9	83 *6*				
2230.88 *18*	3992.9	34 *2*				

[†] From Adopted Gammas.

[‡] For absolute intensity per 100 decays, multiply by 0.58.

^{129}In β^- Decay (0.67 s) 2004Ga24 (continued)

Decay Scheme



^{129}Sn IT Decay (3.40 µs) 2002Ge07

Parent ^{129}Sn: E=1761.6 *10*; Jπ=(19/2+); $T_{1/2}$=3.40 µs *13*; %IT decay=100.

^{129}Sn Levels

E(level)[†]	Jπ[†]	$T_{1/2}$[†]	Comments
35.15 *5*	11/2−	6.9 min *1*	%β⁻=100; %IT<2×10⁻³.
1171.48 *7*	(15/2−)		
1359.40 *7*	(13/2−)		
1741.89 *7*	(15/2+)		
1761.6 *10*	(19/2+)	3.40 µs *13*	%IT=100.

[†] From Adopted Levels.

γ(^{129}Sn)

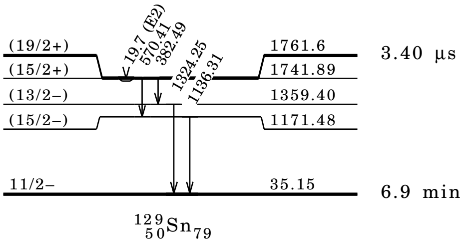
Eγ[†]	E(level)	Mult.[†]	α	Comments
19.7 *10*	1761.6	(E2)	1.0×10³ *3*	α(L)=7.8E2 23; α(M)=1.6E2 5; α(N)=27 *9*; α(O)=0.58 *17*. Mult.: half-life is characteristic of an E2 transition (2002Ge07).
382.49 *2*	1741.89			
570.41 *3*	1741.89			
1136.31 *5*	1171.48			
1324.25 *5*	1359.40			

[†] From Adopted Gammas.

^{129}Sn IT Decay (3.40 μs) 2002Ge07 (continued)

Decay Scheme

%IT=100



^{129}Sn IT Decay (2.22 μs) 2002Ge07

Parent ^{129}Sn: E=1802.6 *10*; Jπ=(23/2+); $T_{1/2}$=2.22 μs *14*; %IT decay=100.

^{129}Sn Levels

E(level)†	Jπ†	$T_{1/2}$†	Comments
35.15 *5*	11/2−	6.9 min *1*	%β^-=100; %IT<2×10^{-3}.
1171.48 *7*	(15/2−)		
1359.40 *7*	(13/2−)		
1741.89 *7*	(15/2+)		
1761.6 *10*	(19/2+)	3.40 μs *13*	%IT=100.
1802.6 *10*	(23/2+)	2.22 μs *14*	%IT=100.

† From Adopted Levels.

γ(^{129}Sn)

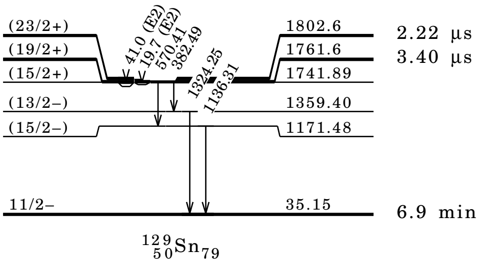
Eγ†	E(level)	Mult.†	α	Comments
19.7 *10*	1761.6	(E2)	1.0×10^3 *3*	α(L)=7.8E2 23; α(M)=1.6E2 5; α(N)=27 *9*; α(O)=0.58 *17*.
41.0 *2*	1802.6	(E2)	39.9 *10*	α(K)=13.64 *23*; α(L)=21.1 *6*; α(M)=4.37 *12*. α(N)=0.756 *21*; α(O)=0.0195 *5*. Mult.: from K x ray intensity and L−conversion intensity in ^{239}Pu(f,nγ). Eγ: from ^{129}In β^- decay (0.67 s).
382.49 *2*	1741.89			
570.41 *3*	1741.89			
1136.31 *5*	1171.48			
1324.25 *5*	1359.40			

† From Adopted Gammas.

^{129}Sn IT Decay (2.22 μs) 2002Ge07 (continued)

Decay Scheme

%IT=100



^{129}Sn IT Decay (217 ns) 2008Lo07,2011Pi05

Parent ^{129}Sn: E=2552.6 *15*; Jπ=(27/2–); $T_{1/2}$=217 ns *19*; %IT decay=100.

^{129}Sn–J: from shell model and odd tin systematics.

2008Lo07: ^{129m}Sn produced in the reactions: ^{9}Be(^{238}U,X) E=750 MeV/ nucleon and ^{9}Be(^{136}Xe,X) E=600 MeV/nucleon. Measured delayed γ, Eγ, Iγ, γγ, (ion)γ coin using eight Cluster Ge detectors of RISING array with BGO Compton and bremsstrahlung suppression. Particles identified using FRS fragment separator, time–of–flight and energy loss measurements.

2011Pi05: ^{136}Xe beam with E=750 MeV/nucleon impinged on a 4 g/cm^2 thick ^{9}Be target within the RISING campaign at GSI using 15 large–volume Ge cluster detectors. Measured Eγ, Iγ, γγ, γγ(t). Comparison with shell model–calculations.

^{129}Sn Levels

E(level)[†]	Jπ[@]	$T_{1/2}$[‡@]	Comments
35.1 *1*	11/2–	6.9 min *1*	%β$^-$=100.
1171.2 *3*	(15/2–)		
1359.5 *3*	(13/2–)		
1741.6 *3*	(15/2+)		
1761.3[#] *11*	(19/2+)	3.4 μs *4*	%IT=100.
1802.3[#] *15*	(23/2+)	2.4 μs *4*	%IT=100.
2407.3[§] *15*	(23/2–)		
2552.6[§] *15*	(27/2–)	217 ns *19*	%IT=100. $T_{1/2}$: from γ(t) (2011Pi05). Other: 0.27 μs *7* (2008Lo07).

[†] From least–squares fit to Eγ data.

[‡] Measured by 2008Lo07 using delayed coin technique (γ(t)).

[§] Member of $h_{11/2}^{-3}$ multiplet.

[#] Member of $d_{3/2}^{-1}h_{11/2}^{-2}$ multiplet.

[@] From Adopted Levels, unless otherwise specified.

γ(^{129}Sn)

Eγ[†]	E(level)	Iγ[†#]	Mult.[§]	α	I(γ+ce)[#]	Comments
(19.7[‡])	1761.3		(E2)	963		α(L)=776 *11*; α(M)=159.7 *23*; α(N)=27.4 *4*; α(O)=0.578 *8*. B(E2)=0.0059 *7* (2008Lo07).
(41.0[‡])	1802.3		(E2)	39.9		α(K)=13.64 *19*; α(L)=21.1 *3*; α(M)=4.37 *7*; α(N)=0.756 *11*; α(O)=0.0195 *3*. B(E2)=0.0050 *9* (2008Lo07).
145.3 *3*	2552.6	70.2	(E2)	0.425 *7*	100	α(K)=0.334 *6*; α(L)=0.0733 *12*; α(M)=0.01478 *25*. α(N)=0.00265 *5*; α(O)=0.0001420 *23*. B(E2)=0.0031 *12* (2008Lo07).
382.1 *3*	1741.6	69 *7*				
570.3 *3*	1741.6	100 *10*				

Continued on next page (footnotes at end of table)

^{129}Sn IT Decay (217 ns) 2008Lo07,2011Pi05 (continued)

γ(^{129}Sn) (continued)

Eγ[†]	E(level)	Iγ[†][#]
605.0 *3*	2407.3	97 *10*
1136.1 *3*	1171.2	88 *9*
1324.4 *3*	1359.5	65 *7*

[†] Uncertainties assigned as 0.3 keV for Eγ and 10% for Iγ based on a general statement by 2008Lo07.

[‡] From 2002Ge07, not detected by 2008Lo07 due to energy limitations of the recorded γ–ray spectra.

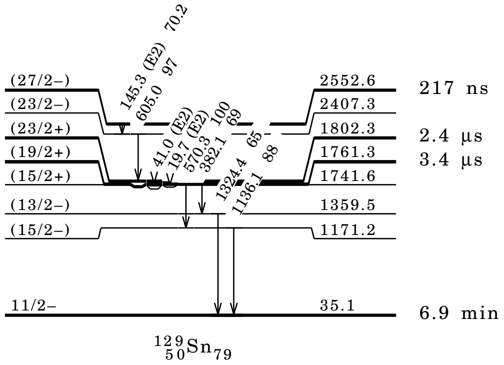
[§] From Adopted Gammas.

[#] Absolute intensity per 100 decays.

^{129}Sn IT Decay (217 ns) 2008Lo07,2011Pi05 (continued)

Decay Scheme

Intensities: relative Iγ
%IT=100



^{130}In β⁻n Decay (0.29 s) 1993Ru01,1986Wa17

Parent ^{130}In: E=0.0; Jπ=1(–); $T_{1/2}$=0.29 s *2*; Q(g.s.)=2650 *40*; %β⁻n decay=0.93 *13*.
^{130}In–Q(β⁻n): From 2012Wa38.
^{130}In–J,$T_{1/2}$: From ^{130}In Adopted Levels in ENSDF database.
^{130}In–%β⁻n decay: %β⁻n=0.93 *13*; weighted average of 1.49 *22* (1993Ru01) and 0.90 *5* (1986Wa17). 1993Ru01 and 2002Pf04 recommend 1.01 *22*.
1993Ru01, 1986Wa17: measured delayed neutron emission probability and half–life.
The details of the decay scheme are not known.

^{129}Sn Levels

E(level)	Jπ	Comments
0.0	3/2+	Assumed that g.s. is populated in this decay.

^{130}In β⁻n Decay (0.54 s) 1993Ru01,1986Wa17,1981En05

Parent ^{130}In: E=50 *50*; Jπ=(10–); $T_{1/2}$=0.54 s *1*; Q(g.s.)=2650 *40*; %β⁻n decay=1.65 *15*.
Parent ^{130}In: E=400 *60*; Jπ=(5+); $T_{1/2}$=0.54 s *1*; Q(g.s.)=2650 *40*; %β⁻n decay=1.65 *15*.
^{130}In(50)–Q(β⁻n): From 2012Wa38.
^{130}In(50)–J,$T_{1/2}$: From ^{130}In Adopted Levels in ENSDF database.
^{130}In(400)–Q(β⁻n): From 2012Wa38.
^{130}In(400)–J,$T_{1/2}$: From ^{130}In Adopted Levels in ENSDF database.
^{130}In(400)–%β⁻n decay: %β⁻n=1.65 *15*; combined for (10–) isomer at 50 *50* and (5+) isomer at 400. Weighted average of 2.03 *12* (1993Ru01), 1.67 *9* (1986Wa17), 4.3 *15* (1981En05), 1.40 *9* (1980Lu04). 1993Ru01 and 2002Pf04 recommend 1.65 *18*, combined for both isomers.
1993Ru01, 1986Wa17, 1981En05: measured delayed neutron emission probability and half–life.
The details of the decay scheme are not known.

^{129}Sn Levels

E(level)	Jπ	Comments
0.0	3/2+	Assumed that g.s. is populated in this decay.

^{239}Pu(n,Fγ) 2002Ge07,2000Pi03

Includes ^{241}Pu(n,Fγ).

2002Ge07, 2000Pi03: Measured Eγ, Iγ, γγ, lifetimes using LOHENGRIN spectrometer, Ge and Si(Li) detectors.

All data are from 2002Ge07 unless otherwise stated.

^{129}Sn Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
0.0[§]	3/2+[§]		
35.2[§] *3*	11/2−[§]	6.9 min *1*	%β$^-$=100.
1171.2 *3*	(15/2−)		
1359.0 *3*	(13/2−)		
1741.3 *3*	(15/2+)		
1761.0 *4*	(19/2+)	3.6 μs *2*	%IT=100.
1802.0 *5*	(23/2+)	2.4 μs *2*	%IT=100.

[†] From Eγ data assuming Δ(Eγ)=0.2 keV as suggested in 2000Pi03.

[‡] Based on the energy systematic arguments deduced from comparison with the known lighter Sn isotopes and shell model theory considerations, unless otherwise stated (2000Pi03).

[§] from Adopted Levels.

[#] From 2002Ge07.

γ(^{129}Sn)

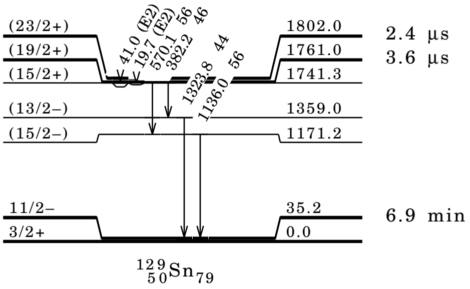
Eγ	E(level)	Iγ[†]	Mult.	α	Comments
19.7	1761.0		(E2)	963	α(L)=776 *11*; α(M)=159.7 *23*; α(N)=27.4 *4*; α(O)=0.578 *8*. Mult.: half–life is characteristic of an E2 transition (2002Ge07).
41.0	1802.0		(E2)	39.9	α(K)=13.64 *19*; α(L)=21.1 *3*; α(M)=4.37 *7*; α(N)=0.756 *11*; α(O)=0.0195 *3*. Mult.: from K x ray intensity and L–conversion intensity.
382.2	1741.3	46			
570.1	1741.3	56			
1136.0	1171.2	56			
1323.8	1359.0	44			

[†] From 2000Pi03.

^{239}Pu(n,Fγ) 2002Ge07,2000Pi03 (continued)

Level Scheme

Intensities: relative Iγ



Adopted Levels, Gammas

Q(β^-)=2376 *21*; S(n)=8070 *29*; S(p)=8556 *28*; Q(α)=−6580 *30* 2012Wa38.
S(2n)=14072 *22*, S(2p)=22309 *30* (2012Wa38).
1939Ab02: ^{129}Sb produced and identified in irradiation of uranium with high−energy neutrons produced in a cyclotron, followed by chemical separation; measured half−life and absorption curves.
Later decay studies: 1962Uh01, 1966Ta05, 1967Ha27, 1974Fo06, 1982Hu09, 1987St03, 1987StZO.
1981Sa15: particle−core coupling and shell−model calculations of level energies and Jπ values.
Inclusion of detailed decay data from 1987StZO in the 2014 update of ^{129}Sb has resulted in extensive revision of data for levels and γ rays. In the opinion of the evaluators, decay of 6.9−min ^{129}Sn decay is incomplete and is worthy of further study.

^{129}Sb Levels

Cross Reference (XREF) Flags

A ^{129}Sn β^- Decay (2.23 min)
B ^{129}Sn β^- Decay (6.9 min)
C ^{129}Sb IT Decay (17.7 min)
D ^{129}Sb IT Decay (2.2 μs)
E ^{129}Sb IT Decay (1.1 μs)
F ^{130}Te(d,^{3}He)
G ^{130}Te(t,α)
H ^{241}Pu(n,Fγ) E=thermal

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
0.0	7/2+	ABCDEFGH	4.366 h *26*	%β^-=100. μ=2.79 *2* (1997St06,2014StZZ). Jπ: L(t,α)=L(d,^{3}He)=4; log *ft*=7.78 to 5/2+. $T_{1/2}$: weighted average (LRSW method) of 4.41 h *1* (1974Fo06), 4.31 h *3* (1967Ha27), 4.35 h *5* (1966Ta05), 4.34 h *7* (1962Uh01). Others: 4.6 h 1 (1953Pa25), 4.2 h (1939Ab02). Uncertainty in LRSW method was increased to 0.024 h in 1974Fo06. Reduced χ^2=2.35. μ: NMR on oriented nuclei (1997St06,1996Li01).
645.14 *5*	(5/2)+	A FG		Jπ: L(t,α)=L(d,^{3}He)=2; log *ft*=5.86 from (3/2+); shell model predictions; systematics of odd Sb nuclides (1981Sa15).
913.58 *5*	(3/2)+	A FG		Jπ: L(t,α)=2. Shell−model calculation (1981Sa15) predicts 3/2+.
1128.63 *4*	(11/2+)	BCDE H		Jπ: odd Sb systematics. Shell model calculations (1981Sa15).
1161.39 *4*	(9/2+)	AB D		Jπ: γ to 7/2+; odd Sb systematics. Shell model calculations (1981Sa15).
1252.25 *5*	(3/2+,5/2,7/2−)	A		Jπ: γ to 7/2+; log *ft*=8.0 from (3/2+).
1493.33 *7*	(1/2+)	A FG		XREF: F(1450)G(1450). Jπ: L(d,^{3}He)=(0); log *ft*=6.8 from (3/2+). Shell−model calculation (1981Sa15) predicts 1/2+ near 1.1 MeV.
1503.61 *7*	(5/2+)	A		Jπ: log *ft*=7.1 from (3/2+); γ to 9/2+.
1762.17 *9*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.8 from (3/2+).
1842.13 *7*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.5 from (3/2+).
1848.97 *9*	(5/2+)	A		Jπ: log *ft*=7.1 from (3/2+); γ to (9/2+).
1851.31 *6*	(19/2−)	BCDE H	17.7 min *1*	%β^-=85; %IT=15. E(level): assigned as isomer by 1987St23. 1982Hu09 also report a 17−min isomer with excitation energy unknown. $T_{1/2}$: from 1982Hu09. Other: 17.1 min (1987St23). Jπ: (M4) γ to (11/2+); shell model systematics; possible configuration=$\pi g_{7/2}\otimes\nu h_{11/2}\otimes\nu d_{3/2}$.
1861.06 *5*	(15/2−)	B D H	2.2 μs *2*	%IT=100. Jπ: gammas to (9/2+) and (19/2−); no β feeding from (11/2−); comparison to ^{131}Sb and shell−model calculations. $T_{1/2}$: γ(t) in (n,Fγ) (2003Ge04,1998GeZX). Other: >2 μs (1987St23).
1911.21 *5*	(13/2−)	B		Jπ: log *ft*=6.6 from (11/2−); γ to (15/2−) is possibly M1.
1913.81 *22*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.7 from (3/2+).
1922.32 *6*	(11/2−)	B		Jπ: log *ft*=6.6 from (11/2−); γ to (9/2+); γ from (13/2−) possibly M1.
1928.63 *5*	(17/2−)	B		Jπ: gammas to (15/2−) and (19/2−) possibly M1; no β feeding from (11/2−).
1940.37 *8*	(15/2−,17/2−)	B		Jπ: γ to (15/2−) possibly M1; no β feeding from (11/2−).
1972.75 *5*	(13/2−)	B		Jπ: log *ft*=6.4 from (11/2−); γ to (15/2−) possibly M1.
1991.95 *5*	(13/2−)	B		Jπ: log *ft*=7.3 from (11/2−); γ to (15/2−) possibly M1.
2031.06 *5*	(11/2−,13/2−)	B		Jπ: log *ft*=6.7 from (11/2−); γ to (13/2−) possibly M1.
2040.81 *21*	(19/2+)	E H		Jπ: comparison to shell model calculations.
2115.09 *11*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.1 from (3/2+).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Sb Levels (continued)

E(level)†	Jπ	XREF	$T_{1/2}$	Comments
2139.4 *3*	(23/2+)	E H	1.1 μs *1*	%IT=100. Jπ: E2 γ to (19/2+). $T_{1/2}$: γ(t) in (n,Fγ) (2003Ge04).
2148.12 *5*	(15/2−)	B		Jπ: gammas to (13/2−) and (17/2−); no β feeding from (11/2−).
2148.46 *7*	(9/2,11/2,13/2)	B		Jπ: log *ft*=7.0 from (11/2−).
2155.05 *11*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.9 from (3/2+).
2181.09 *9*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.0 from (3/2+).
2221.32 *12*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.7 from (11/2−).
2232.16 *11*	(9/2−,11/2,13/2)	B		Jπ: log *ft*=6.8 from (11/2−); γ to (13/2−).
2247.35 *7*	(13/2−,15/2+)	B		Jπ: log *ft*=7.7 from (11/2−); gammas to (13/2−) and (15/2−,17/2−).
2259.75 *11*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.4 in (3/2+).
2271.56 *7*	(15/2−)	B		Jπ: γ to (15/2−) possibly M1; 296γ between 2568 and 2272 levels disfavors 17/2; no β feeding from (11/2−).
2294.69 *8*	(9/2− to 15/2+)	B		Jπ: log *ft*=7.5 from (11/2−); γ to (13/2−).
2297.23 *10*	(13/2−,15/2+)	B		Jπ: log *ft*=7.8 from (11/2−); γ to (17/2−).
2303.35 *7*	(9/2−,11/2,13/2+)	B		Jπ: log *ft*=7.0 from (11/2−); gammas to (9/2+) and (13/2−).
2317.08 *7*	(9/2,11/2,13/2+)	B		Jπ: log *ft*=7.2 from (11/2−); γ to (9/2+).
2329.85 *21*	(13/2−)	B		Jπ: log *ft*=7.4 from (11/2−); γ to (15/2−) possibly M1.
2369.21 *10*	(9/2,11/2,13/2+)	B		Jπ: log *ft*=6.4 from (11/2−); γ to (9/2+).
2377.5 *6*	(9/2,11/2,13/2)	B		Jπ: log *ft*=7.1 from (11/2−).
2383.63 *22*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.4 from (3/2+).
2392.89 *10*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.4 from (3/2+).
2430.24 *6*	(11/2−,13/2+)	B		Jπ: log *ft*=7.5 from (11/2−); gammas to (9/2+) and (15/2−).
2434.44 *8*	(13/2−,15/2+)	B		Jπ: log *ft*=8.3 from (11/2−); γ to (17/2−).
2564.80 *10*	(11/2−,13/2)	B		Jπ: log *ft*=6.3 from (11/2−); γ to (15/2−).
2568.28 *8*	(11/2−,13/2+)	B		Jπ: log *ft*=6.7 from (11/2−); gammas to (9/2+) and (15/2−).
2611.26 *8*	(11/2−,13/2+)	B		Jπ: log *ft*=6.2 from (11/2−); gammas to (9/2+) and (15/2−).
2665.03 *8*	(9/2,11/2,13/2+)	B		Jπ: log *ft*=6.4 from (11/2−); γ to (9/2+).
2678.29 *9*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.8 from (11/2−).
2698.46 *21*	(11/2−,13/2)	B		Jπ: log *ft*=6.8 from (11/2−); γ to (15/2−).
2710 *10*	7/2+,9/2+	FG		Jπ: L(t,α)=4.
2722.8 *3*	(11/2−,13/2)	B		Jπ: log *ft*=6.5 from (11/2−); γ to (15/2−).
2726.45 *7*	(9/2,11/2,13/2)	B		Jπ: log *ft*=5.5 from (11/2−).
2747.9 *3*	(1/2,3/2,5/2)	A		Jπ: log *ft*=5.8 from (3/2+).
2766.90 *10*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.8 from (11/2−).
2785.4 *4*	(1/2,3/2,5/2)	A		Jπ: log *ft*=5.9 from (3/2+).
2796.80 *21*	(9/2,11/2,13/2+)	B		Jπ: log *ft*=6.6 from (11/2−); γ to (9/2+).
2822.71 *19*	(9/2−,11/2,13/2)	B		Jπ: log *ft*=5.7 from (11/2−); γ to (13/2−).
2831.30 *11*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.1 from (3/2+).
2864.40 *19*	(11/2−,13/2)	B		Jπ: log *ft*=5.9 from (11/2−); γ to (15/2−).
2882.08 *15*	(9/2,11/2,13/2+)	B		Jπ: log *ft*=6.0 from (11/2−); γ to (9/2+).
2884.43 *15*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.2 from (11/2−).
2948.25 *21*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.8 from (11/2−).
2960.5 *4*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.3 from (11/2−).
3013.8 *4*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.8 from (11/2−).
3031.95 *21*	(9/2−,11/2,13/2)	B		Jπ: log *ft*=6.4 from (11/2−); γ to (13/2−).
3070.02 *8*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.2 from (11/2−).
3071 *10*	1/2−,3/2−	FG		Jπ: L(t,α)=1.
3094.1 *5*	(1/2,3/2,5/2)	A		Jπ: log *ft*=5.9 from (3/2+).
3097.03 *20*	(9/2−,11/2,13/2)	B		Jπ: log *ft*=6.0 from (11/2−); γ to (13/2−).
3110 *10*		G		
3130.8 *8*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.3 from (11/2−).
3148.13 *8*	(9/2,11/2,13/2)	B		Jπ: log *ft*=5.6 from (11/2−).
3164.05 *11*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.3 from (11/2−).
3208.68 *12*	(9/2,11/2,13/2)	B		Jπ: log *ft*=6.1 from (11/2−).
3274.16 *12*	(9/2−,11/2,13/2)	B		Jπ: log *ft*=5.3 from (11/2−); γ to (13/2−).
3280.71 *8*	(13/2−)	B		Jπ: log *ft*=5.5 from (11/2−); γ to (17/2−).
3291 *10*		G		
3410 *10*	1/2−,3/2−	G		Jπ: L(t,α)=1.
3484 *10*	5/2−,7/2−	G		Jπ: L(t,α)=3.

Footnotes continued on next page

Adopted Levels, Gammas (continued)

^{129}Sb Levels (continued)

† From least–squares fit to Eγ data by leaving out 408γ from 2726 level and doubling the uncertainties of the following γ rays: 579γ from 1493 level, 862γ and 1470γ from 2115 level, 1174γ from 2303 level, 159γ from 2430 level, 445γ from 2678 level, 295γ, 408γ and 422γ from 2726 level. Reduced χ^2=2.1 instead of 4.6 without making these adjustments as compared to critical χ^2=1.5.

γ(^{129}Sb)

E(level)	Eγ†	Iγ†	Mult.	α	I(γ+ce)	Comments
645.14	645.19 *5*	100				
913.58	913.54 *5*	100				
1128.63	1128.60 *5*	100				
1161.39	1161.42 *5*	100				
1252.25	1252.21 *5*	100				
1493.33	579.30 *8*	98 *4*				
	848.27 *6*	100.0 *21*				
1503.61	251.7 *4*	31.1 *11*				
	342.2 *2*	48.4 *11*				
	858.2 *2*	89.5 *16*				
	1503.63 *8*	100.0 *26*				
1762.17	1117.06 *8*	100				
1842.13	349.0 *2*	23.2 *7*				
	1196.98 *5*	100.0 *17*				
1848.97	688.0 *3*	36.0 *17*				
	1203.8 *1*	100.0 *17*				
1851.31	722.69 *5*	100	(M4)	0.0547		α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*. Mult.: from α(K)exp=0.049 *9* (1987St23). B(M4)(W.u.)=0.0317 *2*.
1861.06	(9.76 *8*)	0.033 *2*	[E2]	33900	1130 *60*	α(L)=2.72E4 4; α(M)=5.59E3 8. α(N)=989 *14*; α(O)=63.6 *9*. B(E2)(W.u.)=1.96 *25*.
	699.64 *6*	100.0 *22*	[E3]			B(E3)(W.u.)=0.53 *6*.
	732.48 *5*	47.4 *4*	[M2]			B(M2)(W.u.)=9.7×10^{-5} *10*.
1911.21	50.13 *5*	10.19 *9*	[M1]	4.53		
	782.59 *5*	100 *3*				
1913.81	410.2 *2*	100				
1922.32	761.0 *1*	100				
1928.63	67.47 *5*	31 *3*	[M1]	1.91		
	77.34 *5*	100 *3*	[M1]	1.29		
1940.37	79.4 *1*	100	[M1]	1.20		
1972.75	44.04 *5*	35.8 *17*	[E2]	31.9		
	61.55 *5*	68.2 *22*	[M1]	2.49		
	111.78 *5*	100.0 *11*	[M1]	0.452		
1991.95	69.67 *5*	100 *3*	[M1]	1.742		
	80.68 *5*	65 *9*	[M1]	1.142		
	130.91 *5*	11.7 *9*	[M1]	0.290		
2031.06	39.04 *5*	0.87 *5*	[M1]	9.40		
	108.81 *5*	15.7 *5*	[M1]	0.49		
	119.92 *5*	53.0 *9*	[M1]	0.37		
	902.39 *5*	100 *9*				
2040.81	189.5 *2*					
2115.09	266.1 *2*	76.6 *12*				
	353.1 *2*	26.3 *12*				
	862.2 *1*	38.3 *12*				Eγ: level–energy difference=862.8.
	1470.4 *1*	100.0 *24*				
2139.4	98.6 *2*		E2	1.73 *3*		B(E2)(W.u.)=0.52 *5*. α(K)=1.226 *19*; α(L)=0.406 *7*; α(M)=0.0838 *14*. α(N)=0.0153 *3*; α(O)=0.001138 *19*. Mult.: α(K)exp is compatible only with E2 character (2003Ge04).
2148.12	156.18 *5*	14.4 *4*				
	175.36 *5*	12.5 *3*				
	219.48 *5*	100.0 *10*				
	236.96 *5*	43.6 *4*				

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Adopted Levels, Gammas (continued)

γ(^{129}Sb) (continued)

E(level)	Eγ†	Iγ†	Mult.	α	Comments
2148.46	117.40 *5*	100			
2155.05	1509.9 *1*	100			
2181.09	332.2 *2*	13.8 *9*			
	339.1 *2*	30.4 *23*			
	928.8 *2*	100.0 *18*			
	1535.9 *1*	66.8 *14*			
2221.32	299.0 *1*	100			
2232.16	320.9 *1*	100			
2247.35	307.00 *5*	52 *26*			
	336.12 *5*	100 *5*			
2259.75	1614.6 *1*	100			
2271.56	123.44 *5*	100.0 *6*	[M1]	0.34	
	279.6 *1*	8 *4*			
2294.69	322.03 *8*	100			
2297.23	368.6 *1*	100 *10*			
	386.0 *2*	59 *5*			
2303.35	311.47 *5*	100.0 *12*			
	1141.5 *8*	88 *8*			
	1174.42 *5*	28.9 *18*			
2317.08	285.98 *6*	8.6 *12*			
	1155.72 *9*	100.0 *4*			
	1188.6 *5*	36 *6*			
2329.85	82.5 *2*	100	[M1]	1.07	
2369.21	1207.7 *2*	100.0 *9*			
	1240.6 *1*	25.0 *13*			
2377.5	145.3 *6*	100			
2383.63	890.3 *2*	100			
2392.89	1140.6 *2*	100 *10*			
	1479.3 *1*	27 *9*			
2430.24	135.7 *1*	8.8 *12*			
	159.4 *2*	37.6 *8*			
	507.84 *7*	100 *8*			
	519.04 *6*	79.2 *24*			
	1268.6 *2*	68 *4*			
2434.44	505.80 *5*	100			
2564.80	417.0 *2*	34.6 *9*			
	1436.1 *1*	100.0 *13*			
2568.28	296.2 *5*	31 *3*			
	1406.89 *7*	100.0 *13*			
2611.26	339.6 *2*	11.9 *24*			
	618.6 *4*	100.0 *17*			
	688.5 *2*	60.6 *14*			
	1449.97 *8*	28.0 *10*			
2665.03	1503.63 *7*	100			
2678.29	445.2 *2*	100 *4*			
	1549.69 *8*	36 *3*			
2698.46	426.9 *2*	100			
2722.8	425.4 *5*	57 *14*			
	451.4 *5*	100 *14*			
	574.7 *5*	51 *5*			
2726.45	295.0 *3*	100.0 *7*			
	408.0 *2*	98 *10*			Eγ: poor fit. Level–energy difference=409.4.
	422.3 *2*	48.4 *7*			
	695.43 *5*	86.9 *9*			
	1597.4 *2*	59.1 *9*			
2747.9	2102.7 *3*	100			
2766.90	844.58 *8*	100			
2785.4	1281.8 *4*	100			
2796.80	1635.4 *2*	100			
2822.71	258.2 *4*	0.75 *8*			
	505.5 *2*	100.0 *23*			
	851.3 *9*	2.63 *15*			
2831.30	1327.69 *8*	100			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Sb) (continued)

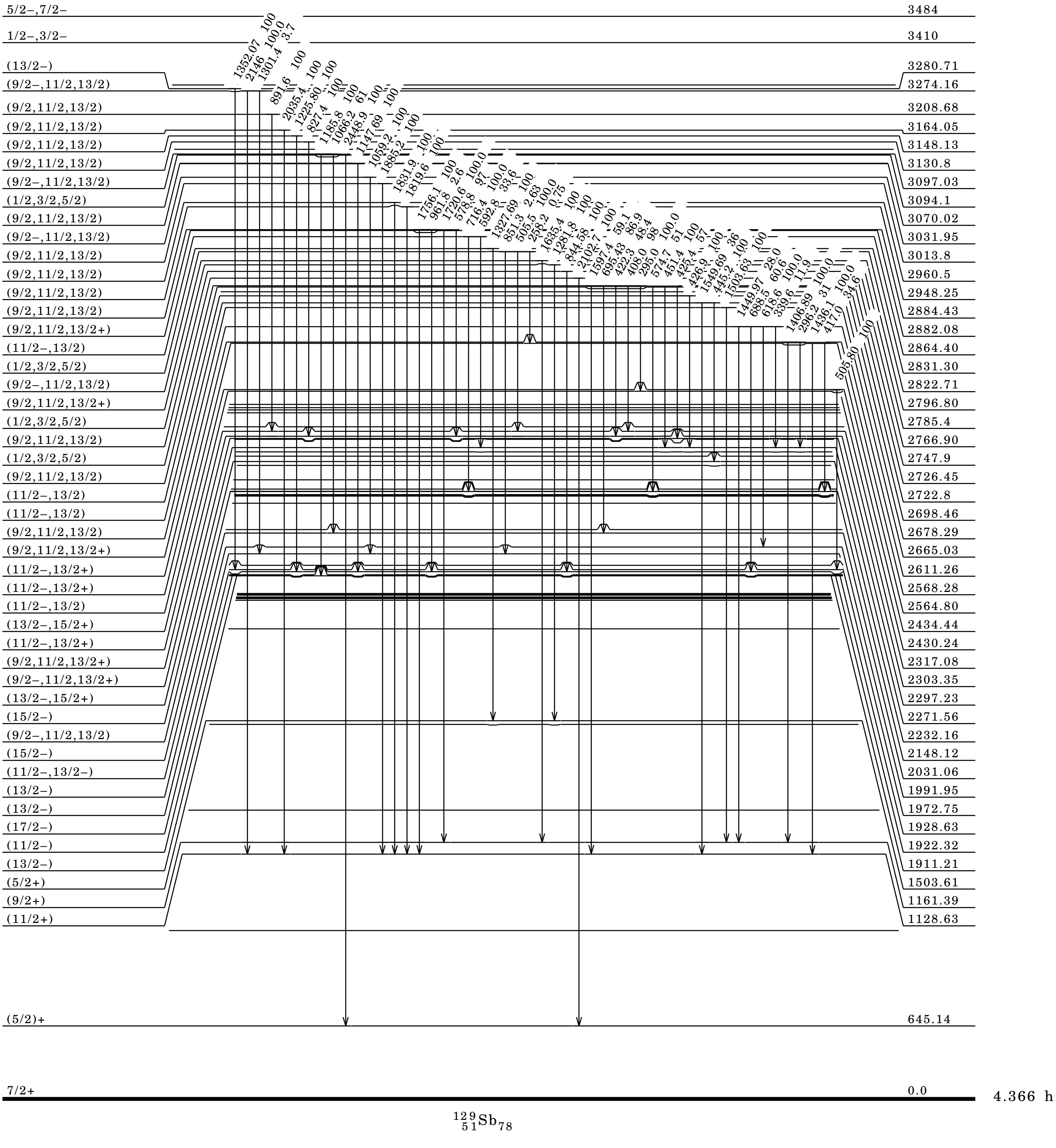
E(level)	Eγ[†]	Iγ[†]
2864.40	592.8 *2*	33.6 *9*
	716.4 *4*	100.0 *10*
2882.08	578.8 *2*	97 *16*
	1720.6 *2*	100.0 *13*
2884.43	961.8 *2*	2.6 *3*
	1756.1 *2*	100 *3*
2948.25	1819.6 *2*	100
2960.5	1831.9 *4*	100
3013.8	1885.2 *4*	100
3031.95	1059.2 *2*	100
3070.02	1147.69 *6*	100
3094.1	2448.9 *5*	100
3097.03	1066.2 *7*	61 *3*
	1185.8 *2*	100 *4*
3130.8	827.4 *8*	100
3148.13	1225.80 *5*	100
3164.05	2035.4 *1*	100
3208.68	891.6 *1*	100
3274.16	1301.4 *1*	3.7 *6*
	2146 *1*	100.0 *10*
3280.71	1352.07 *5*	100

[†] From either 2.23–min ^{129}Sn decay or 6.9–min ^{129}Sn decay. A few high–spin levels are populated only in ^{241}Pu(n,Fγ).

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

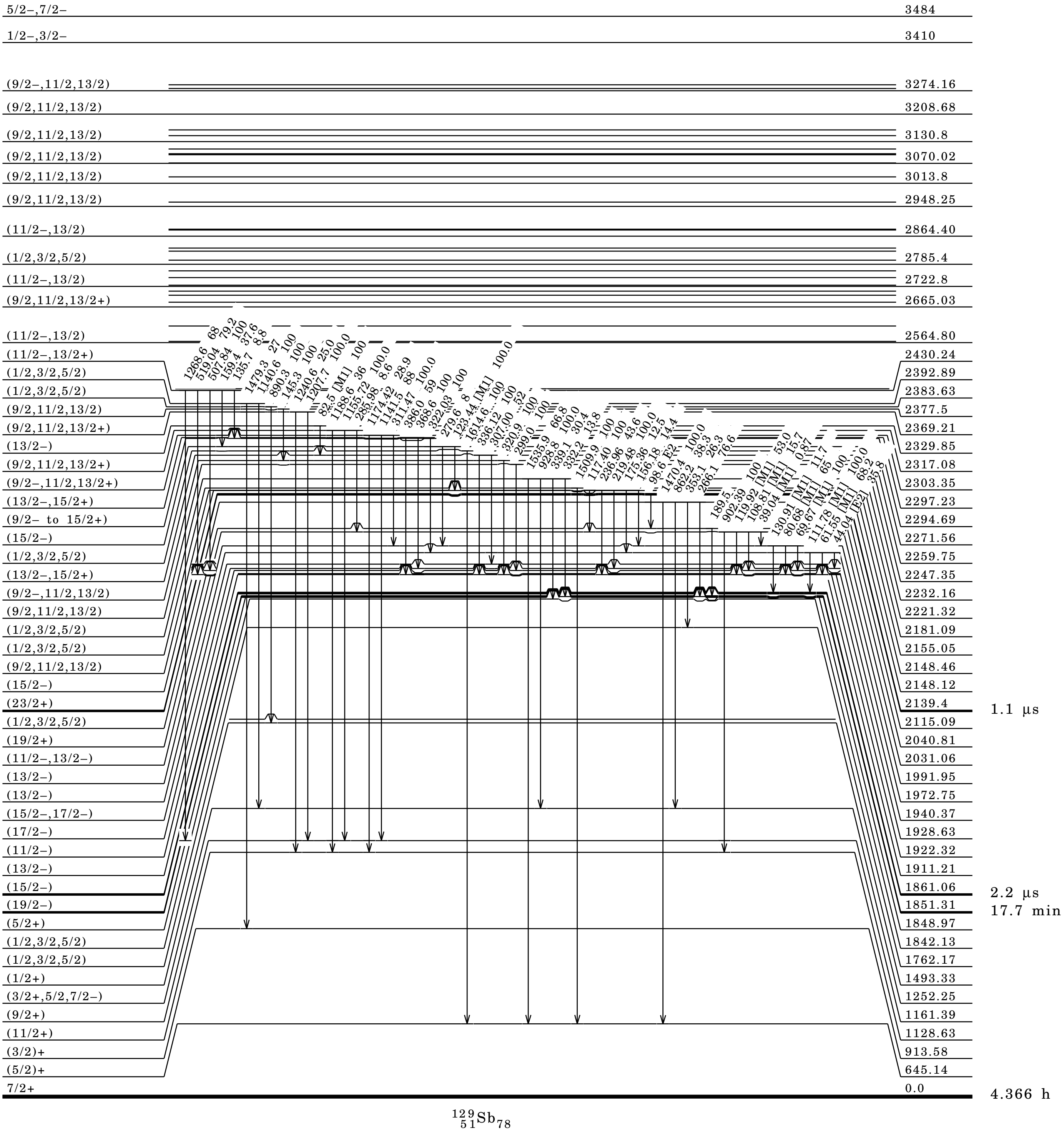


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level

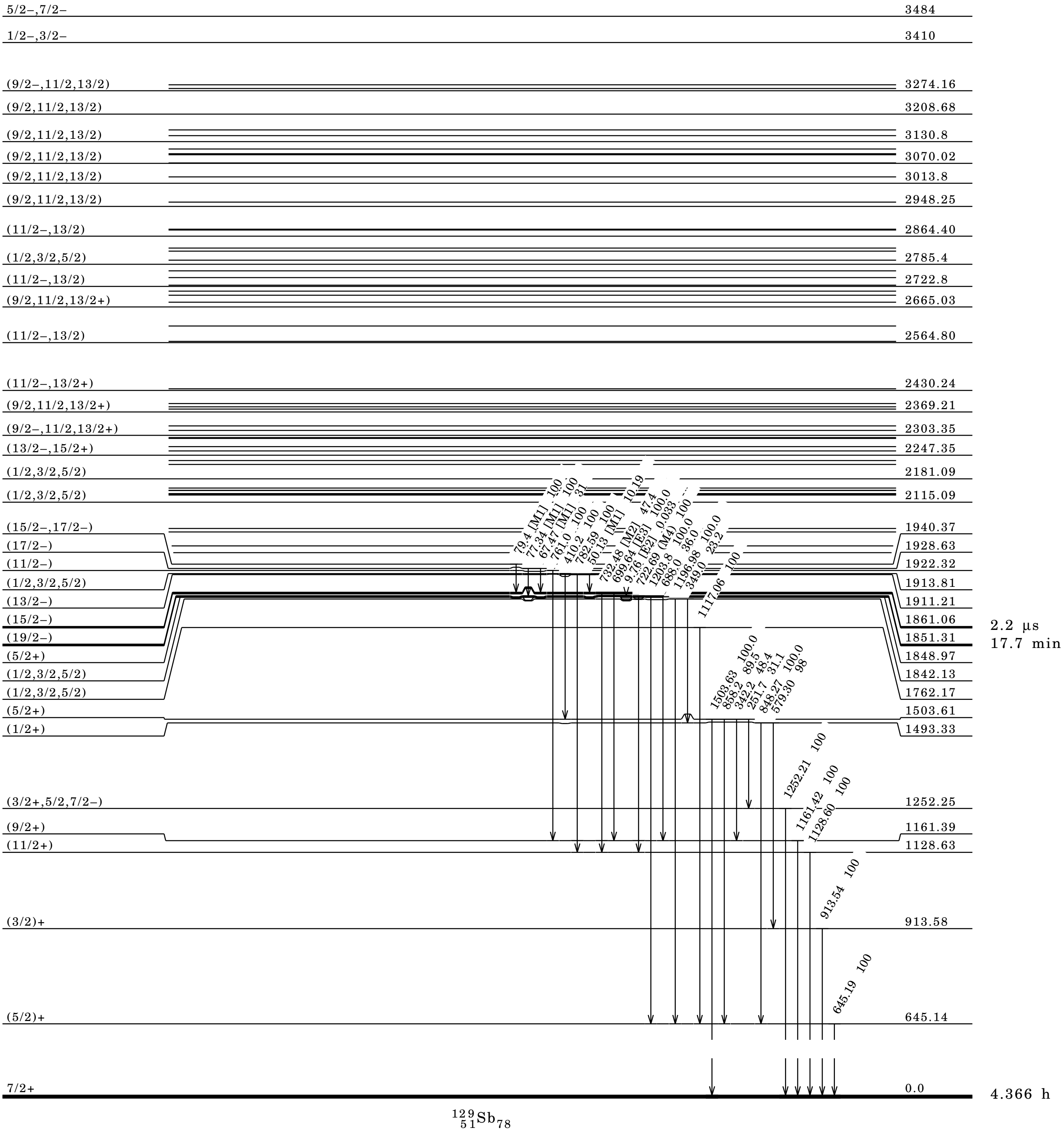


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



^{129}Sn β^- Decay (2.23 min) 1995St28,1987StZO

Parent ^{129}Sn: E=0.0; Jπ=3/2+; $T_{1/2}$=2.23 min *4*; Q(g.s.)=4022 *29*; %β^- decay=100.

^{129}Sn–Q(β^-): From 2012Wa38.

^{129}Sn–J,$T_{1/2}$: From Adopted Levels of ^{129}Sn.

1995St28, 1987StZO (thesis by the first author of 1995St28): ^{235}U(n,F) E=th, on–line mass separator; Ge detector, ce, γγ–coin, $T_{1/2}$.

1982Hu09: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, γγ–coin, $T_{1/2}$. A total of 57 γ rays up to 1951 keV are reported in this study, but only 14 γ rays are common with those in 1987StZO and 1995St28. Only 17 γ rays were placed in a level scheme with 12 excited states. Following levels are not confirmed in 1987StZO: 1448.2, 1755.8, 2018.1, 2148.6 and 2463.8. Placements of several γ rays are different from those in 1987StZO and 1995St28.

Others: prior to work of 1982Hu09, only one γ ray at 645 was known.

1980De35: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, scin γ, β, ce, γγ–, βγ–coin.

1974Fo06: ^{235}U(n,F) E=th, chem; pc β, Ge detector.

1972Iz01: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, γγ–coin.

The decay scheme given here is from 1987StZO and 1995St28. Note that 1982Hu09 proposed a decay scheme with 12 levels, 7 of which are confirmed in 1987StZO.

^{129}Sb Levels

Following levels proposed in 1982Hu09 are not confirmed in 1987StZO. The gamma rays assigned in 1982Hu09 either have been placed elsewhere or not seen in 1987StZO: 1448.2, 1755.8, 2018.1(?), 2148.6, 2463.8(?). These are omitted here.

E(level)†	Jπ‡	$T_{1/2}$‡	Comments
0.0	7/2+	4.366 h *26*	
644.96 *7*	(5/2)+		
913.61 *5*	(3/2)+		
1161.41 *5*	(9/2+)		Gamma–intensity balance gives non–physical β feeding of −0.56% *7*.
1252.24 *5*	(3/2+,5/2,7/2−)		Jπ: 1995St28 (also 1987StZO) suggest 5/2+.
1493.11 *7*	(1/2+)		
1503.59 *7*	(5/2+)		Jπ: 1995St28 (also 1987StZO) suggest 7/2+.
1762.00 *10*	(1/2,3/2,5/2)		Jπ: 1995St28 suggest 3/2+.
1841.95 *8*	(1/2,3/2,5/2)		1995St28 suggest 5/2+.
1848.82 *10*	(5/2+)		Jπ: 1995St28 (also 1987StZO) suggest 7/2+.
1913.79 *22*	(1/2,3/2,5/2)		
2114.96 *12*	(1/2,3/2,5/2)		
2154.87 *12*	(1/2,3/2,5/2)		
2180.94 *10*	(1/2,3/2,5/2)		
2259.57 *12*	(1/2,3/2,5/2)		
2383.41 *22*	(1/2,3/2,5/2)		
2392.91 *10*	(1/2,3/2,5/2)		
2747.7 *3*	(1/2,3/2,5/2)		
2785.4 *4*	(1/2,3/2,5/2)		
2831.29 *11*	(1/2,3/2,5/2)		
3093.9 *5*	(1/2,3/2,5/2)		

† From least–squares fit to the Eγ data with double the quoted uncertainty for 645γ, 862γ and 1470γ to get an acceptable fit with reduced χ^2=2.9. Otherwise reduced χ^2=6.9.

‡ From Adopted Levels.

β^- radiations

Eβ^-	E(level)	Iβ^-†‡	Log *ft*	Comments
(930 *30*)	3093.9	0.4 *2*	5.9 *2*	av Eβ=318 *12*.
(1190 *30*)	2831.29	0.607 *20*	6.10 *5*	av Eβ=426 *13*.
(1240 *30*)	2785.4	1.02 *3*	5.94 *5*	av Eβ=446 *13*.
(1270 *30*)	2747.7	1.5 *7*	5.8 *2*	av Eβ=462 *13*.
(1630 *30*)	2392.91	1.02 *11*	6.40 *6*	av Eβ=616 *13*.
(1640 *30*)	2383.41	0.97 *9*	6.43 *6*	av Eβ=621 *13*.
(1760 *30*)	2259.57	1.30 *4*	6.43 *4*	av Eβ=676 *13*.
(1840 *30*)	2180.94	4.00 *9*	6.01 *3*	av Eβ=711 *13*.
(1870 *30*)	2154.87	0.63 *2*	6.84 *4*	av Eβ=722 *13*.
(1910 *30*)	2114.96	3.55 *7*	6.13 *3*	av Eβ=740 *13*.
(2110 *30*)	1913.79	1.62 *5*	6.64 *3*	av Eβ=831 *14*.
(2170 *30*)	1848.82	0.67 *5*	7.08 *4*	av Eβ=861 *14*.
(2180 *30*)	1841.95	2.64 *8*	6.49 *3*	av Eβ=864 *14*.

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^{129}Sn β$^-$ Decay (2.23 min) 1995St28,1987StZO (continued)

β$^-$ radiations (continued)

Eβ$^-$	E(level)	Iβ$^-$†‡	Log *ft*	Comments
(2260 *30*)	1762.00	1.72 *6*	6.74 *3*	av Eβ=901 *14*.
(2520 *30*)	1503.59	1.2 *1*	7.09 *5*	av Eβ=1020 *14*.
(2530 *30*)	1493.11	2.7 *2*	6.75 *4*	av Eβ=1024 *14*.
(2770 *30*)	1252.24	0.24 *12*	8.0 *2*	av Eβ=1136 *14*.
(3110 *30*)	913.61	3.2 *2*	7.05 *4*	av Eβ=1294 *14*.
(3380 *30*)	644.96	71 *2*	5.853 *22*	av Eβ=1420 *14*.

† Deduced by evaluators from γ–ray intensity balance.
‡ Absolute intensity per 100 decays.

γ(^{129}Sb)

Gamma rays reported in 1982Hu09 but not confirmed in 1987StZO

Eγ	Iγ	Level	Eγ	Iγ	Level
66.4 *3*	5.0 *10*		455.2 *5*	0.4 *2*	
80.5 *1*	6.6 *9*		541.0 *3*	0.8 *3*	
82.2 *2*	2.3 *5*		567.4 *4*	0.6 *2*	2749.0?
139.8 *1*	2.3 *2*		569.6 *2*	1.1 *3*	2018.1?
182.2 *1*	0.7 *1*		598.2 *2*	1.1 *3*	
190.2 *2*	0.5 *1*		600.6 *2*	1.5 *3*	2749.0?
192.6 *2*	0.5 *1*		618.6 *2*	1.5 *4*	
198.1 *1*	2.2 *2*		803.0 *2*	2.1 *6*	1448.2
202.9 *2*	0.9 *1*		867.7 *2*	1.2 *4*	
256.6 *2*	0.5 *1*	2018.1?	897.7 *4*	0.8 *3*	
258.3 *2*	0.9 *2*		1110.7 *2*	4.0 *10*	1755.8
262.6 *10*			1406.6 *3*	1.2 *4*	
273.7 *2*	0.4 *1*	2115.4	1410.7 *3*	1.1 *4*	
284.8 *3*	0.5 *1*	2749.0?	1725.6 *2*	2.8 *8*	
296.0 *1*	2.1 *3*		1755.9 *3*	1.5 *5*	1755.8
336.0 *1*	1.7 *2*		1779.1 *3*	2.5 *8*	
368.3 *2*	0.5 *1*		1831.8 *3*	1.8 *6*	
372.3 *3*	0.6 *2*		1865.0 *3*	1.3 *5*	
374.1 *4*	0.4 *2*		1915.2 *3*	1.5 *5*	
385.9 *3*	0.7 *2*		1942.6 *3*	2.1 *7*	
416.9 *2*	1.0 *3*	2258.6	1951.0 *4*	1.2 *5*	
445.5 *2*	1.0 *2*	2463.8?			

Iγ normalization: From summed I(γ+ce) to g.s.=100. No β$^-$ feeding to g.s. is expected.

Eγ†	E(level)	Iγ†§	Comments
251.7 *4*	1503.59	0.59 *2*	
266.1 *2*	2114.96	1.28 *2*	
332.2 *2*	2180.94	0.30 *2*	Eγ,Iγ: from figure III–30 in 1987StZO; uncertainties assumed by the evaluators.
339.1 *2*	2180.94	0.66 *5*	
342.2 *2*	1503.59	0.92 *2*	
349.0 *2*	1841.95	0.69 *2*	
353.1 *2*	2114.96	0.44 *2*	
410.2 *2*	1913.79	1.84 *5*	
579.30 *8*	1493.11	2.4 *1*	
645.19‡ *5*	644.96	100.0 *16*	
688.0 *3*	1848.82	0.62 *3*	
848.27 *6*	1493.11	2.44 *5*	
858.2 *2*	1503.59	1.70 *3*	
862.2‡ *1*	2114.96	0.64 *2*	
890.3 *2*	2383.41	1.1 *1*	
913.54 *5*	913.61	6.3 *2*	
928.8 *2*	2180.94	2.17 *4*	
1117.06 *8*	1762.00	2.39 *5*	
1140.6 *2*	2392.91	0.91 *9*	
1161.42 *5*	1161.41	0.90 *6*	

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^{129}Sn β^- Decay (2.23 min) 1995St28,1987StZO (continued)

γ(^{129}Sb) (continued)

Eγ[†]	E(level)	Iγ[†][§]
1196.98 *5*	1841.95	2.97 *5*
1203.8 *1*	1848.82	1.72 *3*
1252.21 *5*	1252.24	4.58 *9*
1281.8 *4*	2785.4	1.16 *3*
1327.69 *8*	2831.29	0.69 *2*
1470.4[‡] *1*	2114.96	1.67 *4*
1479.3 *1*	2392.91	0.25 *8*
1503.63 *8*	1503.59	1.90 *5*
1509.9 *1*	2154.87	0.72 *2*
1535.9 *1*	2180.94	1.45 *3*
1614.6 *1*	2259.57	1.48 *4*
2102.7 *3*	2747.7	1.7 *8*
2448.9 *5*	3093.9	0.5 *2*

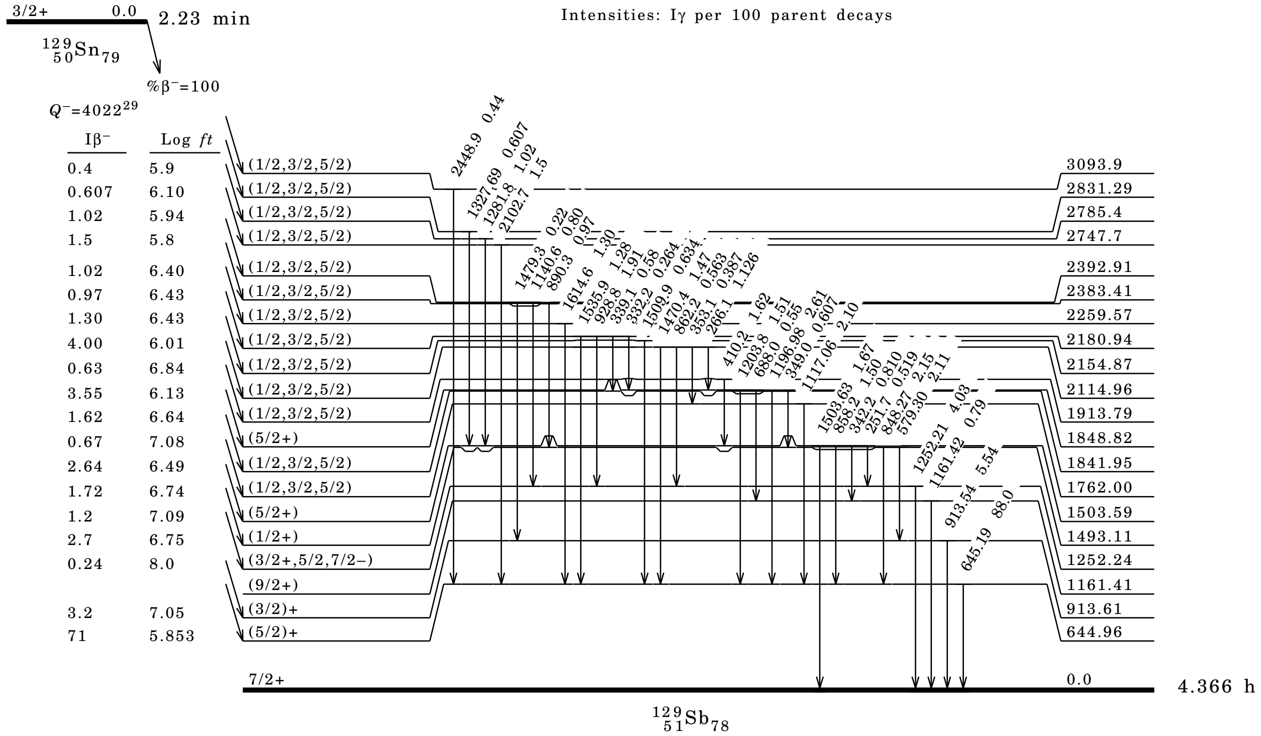
[†] From 1987StZO (thesis from first author of 1995St28). Detailed γ–ray data are also available from 1982Hu09, but a large number of γ rays in this work has not been confirmed by 1987StZO. Many of these γ rays probably belong to impurities.

[‡] Double uncertainty assumed by evaluators for least–squares fit.

[§] For absolute intensity per 100 decays, multiply by 0.880 *13*.

^{129}Sn β^- Decay (2.23 min) 1995St28,1987StZO (continued)

Decay Scheme



^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23

Parent ^{129}Sn: E=35.15 *5*; Jπ=11/2–; $T_{1/2}$=6.9 min *1*; Q(g.s.)=4022 *29*; %β$^-$ decay=100.

^{129}Sn–Q(β$^-$): From 2012Wa38.

^{129}Sn–E,t,J: From Adopted Levels of ^{129}Sn.

1987StZO, 1987St23, 1988StZQ: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, ce, γγ–coin, $T_{1/2}$.

1982Hu09: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, γγ–coin, $T_{1/2}$.

1977He24: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, γγ–coin.

1980De35: ^{235}U(n,F) E=th, on–line mass separator; Ge detector, scin γ, β, ce, γγ–, βγ–coin.

1974Fo06: ^{235}U(n,F) E=th, chem; pc, β, Ge detector.

See also ^{129}Sb IT decay (17.7 min) and ^{129}Sn β$^-$ decay (2.23 min).

The decay scheme first proposed by 1982Hu09 is substantially extended and revised in 1987StZO, only a small portion of which is presented in 1987St23. A 17–min isomer is observed by 1982Hu09 and 1987St23; however, only the latter specify the level. 1977He24 propose a 3–µs isomer at 1703.4 keV which is not confirmed by 1982Hu09 and 1987St23.

In the opinion of evaluators, the decay scheme of 6.9–min ^{129}Sn is not known well from either the work of 1987StZO (also 1987St23) or 1982Hu09. In the present dataset, evaluators have adopted data from 1987StZO (also 1987St23,1988StZQ) since this work seems more reliable in terms of γγ–coincidence data and inventory of γ–ray transitions. However, there remain several misprints (and possible mistakes) in data presented by 1987StZO, not all of which have been resolved. The multipolarities of γ transitions (some of which have large conversion coefficients) remain largely unknown. The spins and parities assigned by 1987StZO are tentative at best.

^{129}Sb Levels

Following levels proposed in 1982Hu09 are not confirmed in 1987StZO. The gamma rays assigned in 1982Hu09 either have been placed elsewhere or not seen in 1987StZO: 1978.4, 1999.5, 2263.0, 2555.9, 2714.3, 2792.5. These are omitted here.

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	7/2+	4.366 h *26*	
1128.63 *4*	(11/2+)		
1161.40 *4*	(9/2+)		

Continued on next page (footnotes at end of table)

^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

^{129}Sb Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	Comments
1851.31 *6*	(19/2−)	17.7 min *1*	%IT=15 (1987St23); %β^-=85. $T_{1/2}$: from Adopted Levels.
1861.07 *5*	(15/2−)	>2 μs	$T_{1/2}$: from coin resolving time (1987St23). 1982Hu09 propose a ground–state transition of 1861.2 keV from this level, but in view of implied M4 multipolarity, this transition is unlikely. This γ was not reported in 1987StZO.
1911.21 *5*	(13/2−)		
1922.33 *6*	(11/2−)		
1928.64 *5*	(17/2−)		
1940.38 *8*	(15/2−,17/2−)		
1972.75 *5*	(13/2−)		
1991.96 *5*	(13/2−)		
2031.07 *5*	(11/2−,13/2−)		Jπ: 11/2− in 1987StZO.
2148.13 *5*	(15/2−)		
2148.47 *7*	(9/2,11/2,13/2)		
2221.33 *12*	(9/2,11/2,13/2)		
2232.17 *11*	(9/2−,11/2,13/2)		Jπ: 11/2− in 1987StZO.
2247.35 *7*	(13/2−,15/2+)		Jπ: 15/2− in 1987StZO.
2271.57 *7*	(15/2−)		Jπ: 13/2−,(15/2−) in 1987StZO.
2294.69 *8*	(9/2− to 15/2+)		
2297.24 *10*	(13/2−,15/2+)		Jπ: 15/2− in 1987StZO.
2303.36 *7*	(9/2−,11/2,13/2+)		Jπ: 11/2− in 1987StZO.
2317.10 *7*	(9/2,11/2,13/2+)		Jπ: 9/2−,11/2− in 1987StZO.
2329.85 *21*	(13/2−)		Jπ: 11/2− in 1987StZO.
2369.21 *10*	(9/2,11/2,13/2+)		Jπ: 9/2− in 1987StZO.
2377.5 *6*	(9/2,11/2,13/2)		
2430.25 *6*	(11/2−,13/2+)		Jπ: 11/2− in 1987StZO.
2434.44 *8*	(13/2−,15/2+)		Jπ: 15/2− in 1987StZO.
2564.81 *10*	(11/2−,13/2)		Jπ: 13/2−,(11/2−) in 1987StZO.
2568.29 *8*	(11/2−,13/2+)		Jπ: 11/2−,(9/2−) in 1987StZO.
2611.26 *8*	(11/2−,13/2+)		Jπ: 11/2− in 1987StZO.
2665.04 *8*	(9/2,11/2,13/2+)		Jπ: 7/2 to 11/2 in 1987StZO.
2678.30 *9*	(9/2,11/2,13/2)		Jπ: 13/2− in 1987StZO.
2698.47 *21*	(11/2−,13/2)		
2722.8 *3*	(11/2−,13/2)		Jπ: 13/2− in 1987StZO.
2726.29 *10*	(9/2,11/2,13/2)		Jπ: 9/2−,11/2− in 1987StZO.
2766.91 *10*	(9/2,11/2,13/2)		
2796.81 *21*	(9/2,11/2,13/2+)		Jπ: 7/2 to 13/2 in 1987StZO.
2822.73 *19*	(9/2−,11/2,13/2)		
2864.40 *19*	(11/2−,13/2)		Jπ: 13/2− in 1987StZO.
2882.08 *15*	(9/2,11/2,13/2+)		Jπ: 9/2,11/2 in 1987StZO.
2884.44 *15*	(9/2,11/2,13/2)		
2948.25 *21*	(9/2,11/2,13/2)		
2960.5 *4*	(9/2,11/2,13/2)		
3013.8 *4*	(9/2,11/2,13/2)		
3031.96 *21*	(9/2−,11/2,13/2)		
3070.02 *8*	(9/2,11/2,13/2)		
3097.03 *20*	(9/2−,11/2,13/2)		Jπ: 9/2−,13/2− in 1987StZO.
3130.8 *8*	(9/2,11/2,13/2)		
3148.13 *8*	(9/2,11/2,13/2)		
3164.05 *11*	(9/2,11/2,13/2)		
3208.70 *12*	(9/2,11/2,13/2)		
3274.17 *12*	(9/2−,11/2,13/2)		Jπ: 11/2− in 1987StZO.
3280.72 *8*	(13/2−)		Jπ: 15/2− in 1987StZO.

† From least–squares fit to Eγ data. The uncertainties of following Eγ values were doubled in order to obtain an acceptable least–squares fit with reduced χ^2=2.1 instead of 4.1 without this adjustment: 159γ from 2430 level, 445γ from 2678 level, 1174γ from 2303 level, 296γ, 408γ, 423γ and 695γ from 2726 level. Critical χ^2=1.6.

‡ As proposed by 1987StZO and 1987St23 from systematics and shell–model calculations in 1981Sa15. All assignments are considered as tentative.

^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

β^- radiations

There are negative β feedings of −1.7% *7* at 1928 level, −0.55% *8* at 2148.1 level, and −0.18% *13* at 2271 level. These are not surprising since both levels involve low−energy transitions, multipolarities of which are only assumed M1 values, small admixtures can easily affect these feedings.

Eβ⁻	E(level)	Iβ⁻†§	Log *ft*‡	Comments
(780 *30*)	3280.72	1.7 *2*	5.5	av Eβ=257 *12*. Iβ⁻: 1987StZO list 1.8 *4*.
(780 *30*)	3274.17	3.06 *11*	5.2	av Eβ=260 *12*. Iβ⁻: 1987StZO list 3.37 *3*.
(850 *30*)	3208.70	0.60 *5*	6.1	av Eβ=286 *12*. Iβ⁻: 1987StZO list 0.69 *5*.
(890 *30*)	3164.05	0.39 *2*	6.3	av Eβ=303 *12*. Iβ⁻: 1987StZO list 0.45 *1*.
(910 *30*)	3148.13	2.11 *8*	5.6	av Eβ=310 *12*. Iβ⁻: 1987StZO list 2.41 *3*.
(930 *30*)	3130.8	0.51 *4*	6.3	av Eβ=317 *12*. Iβ⁻: 1987StZO list 0.58 *3*.
(960 *30*)	3097.03	1.23 *6*	5.9	av Eβ=331 *12*. Iβ⁻: 1987StZO list 1.4.
(990 *30*)	3070.02	0.86 *4*	6.1	av Eβ=342 *12*. Iβ⁻: 1987StZO list 0.98 *2*.
(1030 *30*)	3031.96	0.57 *3*	6.4	av Eβ=357 *12*. Iβ⁻: 1987StZO list 0.64 *2*.
(1040 *30*)	3013.8	0.221 *14*	6.8	av Eβ=365 *12*. Iβ⁻: 1987StZO list 0.27 *1*.
(1100 *30*)	2960.5	0.96 *4*	6.3	av Eβ=387 *13*. Iβ⁻: 1987StZO list 1.10 *1*.
(1110 *30*)	2948.25	0.322 *14*	6.8	av Eβ=392 *13*. Iβ⁻: 1987StZO list 0.37 *1*.
(1170 *30*)	2884.44	1.44 *7*	6.2	av Eβ=419 *13*. Iβ⁻: 1987StZO list 1.6.
(1180 *30*)	2882.08	2.5 *2*	6.0	av Eβ=420 *13*. Iβ⁻: 1987StZO list 1.46 *2*.
(1190 *30*)	2864.40	3.13 *11*	5.9	av Eβ=427 *13*. Iβ⁻: 1987StZO list 3.62 *4*.
(1230 *30*)	2822.73	5.5 *2*	5.7	av Eβ=445 *13*. Iβ⁻: 1987StZO list 0.26 *2*.
(1260 *30*)	2796.81	0.72 *3*	6.6	av Eβ=456 *13*. Iβ⁻: 1987StZO list 0.82 *2*.
(1290 *30*)	2766.91	0.56 *9*	6.8	av Eβ=469 *13*. Iβ⁻: 1987StZO list 0.64 *9*.
(1330 *30*)	2726.29	11.0 *5*	5.5	av Eβ=486 *13*. Iβ⁻: 1987StZO list 12.7 *3*.
(1330 *30*)	2722.8	1.17 *13*	6.5	av Eβ=488 *13*. Iβ⁻: 1987StZO list 1.3 *1*.
(1360 *30*)	2698.47	0.68 *3*	6.8	av Eβ=498 *13*. Iβ⁻: 1987StZO list 0.78 *1*.
(1380 *30*)	2678.30	0.72 *4*	6.8	av Eβ=507 *13*. Iβ⁻: 1987StZO list 0.82 *3*.
(1390 *30*)	2665.04	1.87 *7*	6.4	av Eβ=513 *13*. Iβ⁻: 1987StZO list 2.14 *3*.
(1450 *30*)	2611.26	3.39 *13*	6.2	av Eβ=536 *13*. Iβ⁻: 1987StZO list 3.9 *1*.
(1490 *30*)	2568.29	1.18 *5*	6.7	av Eβ=555 *13*. Iβ⁻: 1987StZO list 1.35 *4*.
(1490 *30*)	2564.81	2.95 *11*	6.3	av Eβ=556 *13*. Iβ⁻: 1987StZO list 3.37 *4*.
(1620 *30*)	2434.44	0.044 *17*	8.3	av Eβ=613 *13*. Iβ⁻: 1987StZO list 0.05 *2*.
(1630 *30*)	2430.25	0.24 *10*	7.5	av Eβ=615 *13*. Iβ⁻: 1987StZO list 0.3 *1*.
(1680 *30*)	2377.5	0.67 *3*	7.1	av Eβ=639 *13*. Iβ⁻: 1987StZO list 0.77 *2*.
(1690 *30*)	2369.21	3.46 *12*	6.4	av Eβ=642 *13*. Iβ⁻: 1987StZO list 4.0 *1*.

Continued on next page (footnotes at end of table)

^{129}Sn β$^-$ Decay (6.9 min) 1987StZO,1987St23 (continued)

β$^-$ radiations (continued)

Eβ$^-$	E(level)	Iβ^{-}†§	Log *ft*‡	Comments
(1730 *30*)	2329.85	0.45 *2*	7.3	av Eβ=660 *13*. Iβ$^-$: 1987StZO list 0.25 *1*.
(1740 *30*)	2317.10	0.7 *6*	7.2	av Eβ=666 *13*. Iβ$^-$: 1987StZO list 0.8 *4*.
(1750 *30*)	2303.36	1.1 *3*	7.0	av Eβ=672 *13*. Iβ$^-$: 1987StZO list 1.3 *3*.
(1760 *30*)	2297.24	0.18 *9*	7.8	av Eβ=674 *13*. Iβ$^-$: 1987StZO list 0.2 *1*.
(1760 *30*)	2294.69	0.33 *5*	7.5	av Eβ=676 *13*. Iβ$^-$: 1987StZO list 0.4 *1*.
(1810 *30*)	2247.35	0.26 *13*	7.7	av Eβ=697 *13*. Iβ$^-$: 1987StZO list 0.8 *1*.
(1820 *30*)	2232.17	2.2 *3*	6.8	av Eβ=704 *13*. Iβ$^-$: 1987StZO list 2.0 *3*.
(1840 *30*)	2221.33	2.80 *10*	6.7	av Eβ=708 *13*. Iβ$^-$: 1987StZO list 3.20 *3*.
(1910 *30*)	2148.47	1.70 *6*	6.9	av Eβ=741 *13*. Iβ$^-$: 1987StZO list 1.9.
(2030 *30*)	2031.07	3.6 *5*	6.7	av Eβ=794 *14*. Iβ$^-$: 1987StZO list 4.2 *1*.
(2070 *30*)	1991.96	1.2 *3*	7.2	av Eβ=812 *14*. Iβ$^-$: 1987StZO list 1.3 *4*.
(2080 *30*)	1972.75	9.5 *6*	6.4	av Eβ=821 *14*. Iβ$^-$: 1987StZO list 11.5 *1*.
(2130 *30*)	1922.33	5.7 *21*	6.6	av Eβ=844 *14*. Iβ$^-$: 1987StZO list 6.7 *23*.
(2150 *30*)	1911.21	6.5 *7*	6.6	av Eβ=849 *14*. Iβ$^-$: 1987StZO list 7.1 *4*.
(2900 *30*)	1161.40	2.9 *21*	7.5	av Eβ=1195 *14*. Iβ$^-$: 1987StZO list 3.2 *24*.
(2930 *30*)	1128.63	5.8 *9*	7.2	av Eβ=1210 *14*. Iβ$^-$: 1987StZO list 1.1 *1*.
(4060 *30*)	0.0	≈2	≈9.9^{1u}	av Eβ=1723 *14*. Iβ$^-$: Iβ(1U to g.s.)≈2% is estimated by the evaluators from systematics of log *ft* for 11/2− to 7/2+ transitions in this region. 1987StZO assume no β feeding for this level.

† From γ–ray intensity balance. All feedings should be considered as approximate since multipolarities of many low–energy transitions are not known, these are only assumed here.

‡ All values are considered as approximate.

§ Absolute intensity per 100 decays.

γ(^{129}Sb)

Gamma rays reported in 1982Hu09 but not confirmed in 1987StZO

Eγ	Iγ	Level	Eγ	Iγ	Level
97.5 *2*	1.2 *4*		579.4 *2*	6.0 *10*	
103.7 *3*	0.8 *3*		604.9 *1*	9.0 *20*	
109.6 *4*	1.5 *6*		692.4 *2*	5.0 *10*	2723.1
148.8 *1*	2.1 *3*	1999.5	780.5 *7*	1.0 *5*	
206.4 *2*	1.3 *3*		792.2 *5*	2.0 *10*	2714.3
225.6 *1*	2.8 *4*		801.0 *2*	4.0 *10*	2723.1
232.5 *2*	1.4 *3*	2263.0	815.6 *2*	2.7 *7*	
238.7 *1*	4.1 *4*	2555.9	862.7 *2*	2.3 *8*	2714.3
241.6 *1*	1.7 *3*	2220.5	928.4 *2*	5.1 *15*	
264.3 *6*	1.3 *9*	2263.0	931.2 *7*	0.9 *6*	2792.5
266.5 *2*	4.8 *7*	2822.4	970.1 *2*	3.0 *10*	
315.1 *2*	2.1 *5*		1002.9 *1*	9.0 *20*	
352.5 *2*	2.7 *7*	2331.2	1101.0 *4*	1.3 *5*	2263.0
364.5 *1*	4.4 *8*		1349.7 *2*	3.0 *10*	
421.4 *6*	0.7 *3*	2331.2	1861.2 *10*	1.0 *5*	1860.9

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^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

γ(^{129}Sb) (continued)

435.4 *2* 2.2 *6*

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Iγ normalization: From summed I(γ+ce)=98 to g.s. and 1851–keV isomer, assuming 2% β feeding to g.s.

Eγ†	E(level)	Iγ†§	Mult.‡	α	I(γ+ce)§	Comments
(9.76 *8*)	1861.07		[E2]	33900	26.2 *13*	α(L)=2.72E4 4; α(M)=5.59E3 8. α(N)=989 *14*; α(O)=63.6 *9*. Eγ: from level–energy difference. I(γ+ce): from intensity balance at 1861 level, 5% uncertainty assigned by evaluators. 1987St23 list 25.8 and 1987StZO list 18.6 *5*.
39.04 *5*	2031.07	0.092 *5*	[M1]	9.40		Mult.: M1 suggested by 1987StZO, but I(γ+ce)=1.14 *6* and Iγ=0.092 *5* (1987StZO) give δ(E2/M1)=0.22 *5*.
44.04 *5*	1972.75	0.64 *3*	[E2]	31.9	21.0 *10*	Iγ: from I(γ+ce) listed in 1987St23 (and 1987StZO) and α for E2. Iγ=1.93 *10* listed in 1987StZO gives δ(E2/M1)=0.37 *5*, α(exp)=9.7 *8*.
50.13 *5*	1911.21	3.28 *3*	[M1]	4.53		
61.55 *5*	1972.75	1.22 *4*	[M1]	2.49		
67.47 *5*	1928.64	2.9 *3*	[M1]	1.91		Iγ: from I(γ+ce)=8.4 in 1987St23 and α. 1987StZO list I(γ+ce)=0.64 *6* and Iγ=0.22 *2*, which seems erroneous.
69.67 *5*	1991.96	3.41 *10*	[M1]	1.742		
77.34 *5*	1928.64	9.3 *3*	[M1]	1.29		Iγ: from I(γ+ce)=21.4 *5* in 1987St23, 1987StZO and α. 1987StZO list Iγ=0.706 *5*, which seems in erroneous.
79.4 *1*	1940.38	0.27 *13*	[M1]	1.20		Iγ: from I(γ+ce)=0.6 *3* in 1987StZO and α. 1987StZO list Iγ=0.07 *1*, which seems erroneous in view of γ spectrum shown in author's figure iii–31 and intensity of 79.4γ therein.
80.68 *5*	1991.96	2.2 *3*	[M1]	1.142		
82.5 *2*	2329.85	0.54 *1*	[M1]	1.07		Mult.: M1 proposed by 1987StZO but E2 implied by their spin–parity assignments to levels concerned.
108.81 *5*	2031.07	1.66 *5*	[M1]	0.49		
111.78 *5*	1972.75	1.79 *2*	[M1]	0.452		
117.40 *5*	2148.47	3.77 *3*	[D,E2]	0.5 *4*		Mult.: E1 suggested by 1987StZO.
119.92 *5*	2031.07	5.62 *9*	[M1]	0.37		
123.44 *5*	2271.57	4.84 *3*	[M1]	0.34		
130.91 *5*	1991.96	0.40 *3*	[M1]	0.290		
135.7 *1*	2430.25	0.22 *3*	[M1]	0.26		
145.3 *6*	2377.5	1.37 *3*	[M1]	0.22		
156.18 *5*	2148.13	1.05 *3*	[M1]	0.18		
159.4 *2*	2430.25	0.94 *2*	[M1]	0.17		
175.36 *5*	2148.13	0.91 *2*	[M1]	0.13		
219.48 *5*	2148.13	7.30 *7*	[M1,E2]	0.088 *17*		
236.96 *5*	2148.13	3.18 *3*	[M1]	0.058		
258.2 *4*	2822.73	0.10 *1*				
279.6 *1*	2271.57	0.4 *2*				
285.98 *6*	2317.10	1.4 *2*				
295.0 *3*	2726.29	6.97 *5*				
296.2 *5*	2568.29	0.69 *7*				
299.0 *1*	2221.33	6.97 *7*				
307.00 *5*	2247.35	0.6 *3*				
311.47 *5*	2303.36	4.88 *6*				
320.9 *1*	2232.17	8.5 *7*				
322.03 *8*	2294.69	1.1 *1*				
336.12 *5*	2247.35	1.16 *6*				
339.6 *2*	2611.26	0.5 *1*				
368.6 *1*	2297.24	0.79 *8*				
386.0 *2*	2297.24	0.47 *4*				
408.0 *2*	2726.29	6.8 *7*				Eγ: poor fit. Level–energy difference=409.2.
417.0 *2*	2564.81	1.91 *5*				

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^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

γ(^{129}Sb) (continued)

Eγ†	E(level)	Iγ†§	Mult.‡	α	Comments
422.3 *2*	2726.29	3.37 *5*			
425.4 *5*	2722.8	0.8 *2*			
426.9 *2*	2698.47	1.69 *3*			
445.2 *2*	2678.30	1.32 *5*			
451.4 *5*	2722.8	1.4 *2*			
505.5 *2*	2822.73	13.3 *3*			
505.80 *5*	2434.44	0.11 *4*			
507.84 *7*	2430.25	2.5 *2*			
519.04 *6*	2430.25	1.98 *6*			
574.7 *5*	2722.8	0.72 *7*			
578.8 *2*	2882.08	3.1 *5*			
592.8 *2*	2864.40	1.96 *5*			
618.6 *4*	2611.26	4.21 *7*			
688.5 *2*	2611.26	2.55 *6*			
695.43 *5*	2726.29	6.06 *6*			
699.64 *6*	1861.07	2.32 *5*	[E3]	0.0076	
716.4 *4*	2864.40	5.83 *6*			
722.69 *5*	1851.31		(M4)	0.0547	Iγ: ≈6.8 deduced by evaluators from total I(γ+ce) feeding this level and 15% ^IT decay. 1987StZO (also 1987St23) list 18.9 *10*, probably from observation in a spectrum run for a certain counting schedule. The decay of 17.7–min isomer does not reach equilibrium. α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*. Mult.: from α(K)exp=0.049 *9* (1987St23).
732.48 *5*	1861.07	1.10 *1*	[M2]	0.0095	
761.0 *1*	1922.33	47 *5*			
782.59 *5*	1911.21	32.2 *10*			
827.4 *8*	3130.8	1.27 *6*			
844.58 *8*	2766.91	1.4 *2*			
851.3 *9*	2822.73	0.35 *2*			
891.6 *1*	3208.70	1.5 *1*			
902.39 *5*	2031.07	10.6 *10*			
961.8 *2*	2884.44	0.09 *1*			
1059.2 *2*	3031.96	1.41 *4*			
1066.2 *7*	3097.03	1.16 *6*			
1128.60 *5*	1128.63	100.0 *10*			
1141.5 *8*	2303.36	4.3 *4*			
1147.69 *6*	3070.02	2.13 *5*			
1155.72 *9*	2317.10	16.23 *7*			
1161.42 *5*	1161.40	98.7 *10*			
1174.42 *5*	2303.36	1.41 *9*			
1185.8 *2*	3097.03	1.91 *8*			
1188.6 *5*	2317.10	5.8 *10*			
1207.7 *2*	2369.21	6.89 *6*			
1225.80 *5*	3148.13	5.25 *6*			
1240.6 *1*	2369.21	1.72 *9*			
1268.6 *2*	2430.25	1.7 *1*			
1301.4 *1*	3274.17	0.27 *4*			
1352.07 *5*	3280.72	4.1 *4*			
1406.89 *7*	2568.29	2.25 *3*			
1436.1 *1*	2564.81	5.52 *7*			
1449.97 *8*	2611.26	1.18 *4*			
1503.63 *7*	2665.04	4.65 *7*			
1549.69 *8*	2678.30	0.47 *4*			
1597.4 *2*	2726.29	4.12 *6*			
1635.4 *2*	2796.81	1.79 *4*			
1720.6 *2*	2882.08	3.18 *4*			
1756.1 *2*	2884.44	3.5 *1*			
1819.6 *2*	2948.25	0.80 *2*			
1831.9 *4*	2960.5	2.39 *3*			
1885.2 *4*	3013.8	0.55 *3*			
2035.4 *1*	3164.05	0.98 *3*			

Continued on next page (footnotes at end of table)

^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

$\gamma(^{129}Sb)$ (continued)

Eγ[†]	E(level)	Iγ[†][§]
2146 *1*	3274.17	7.33 *7*

[†] From 1987StZO. Detailed γ–ray data are also available from 1982Hu09, but many γ rays in this work as listed in above table have not been confirmed in the work of 1987StZO. These probably belong unidentified impurities.

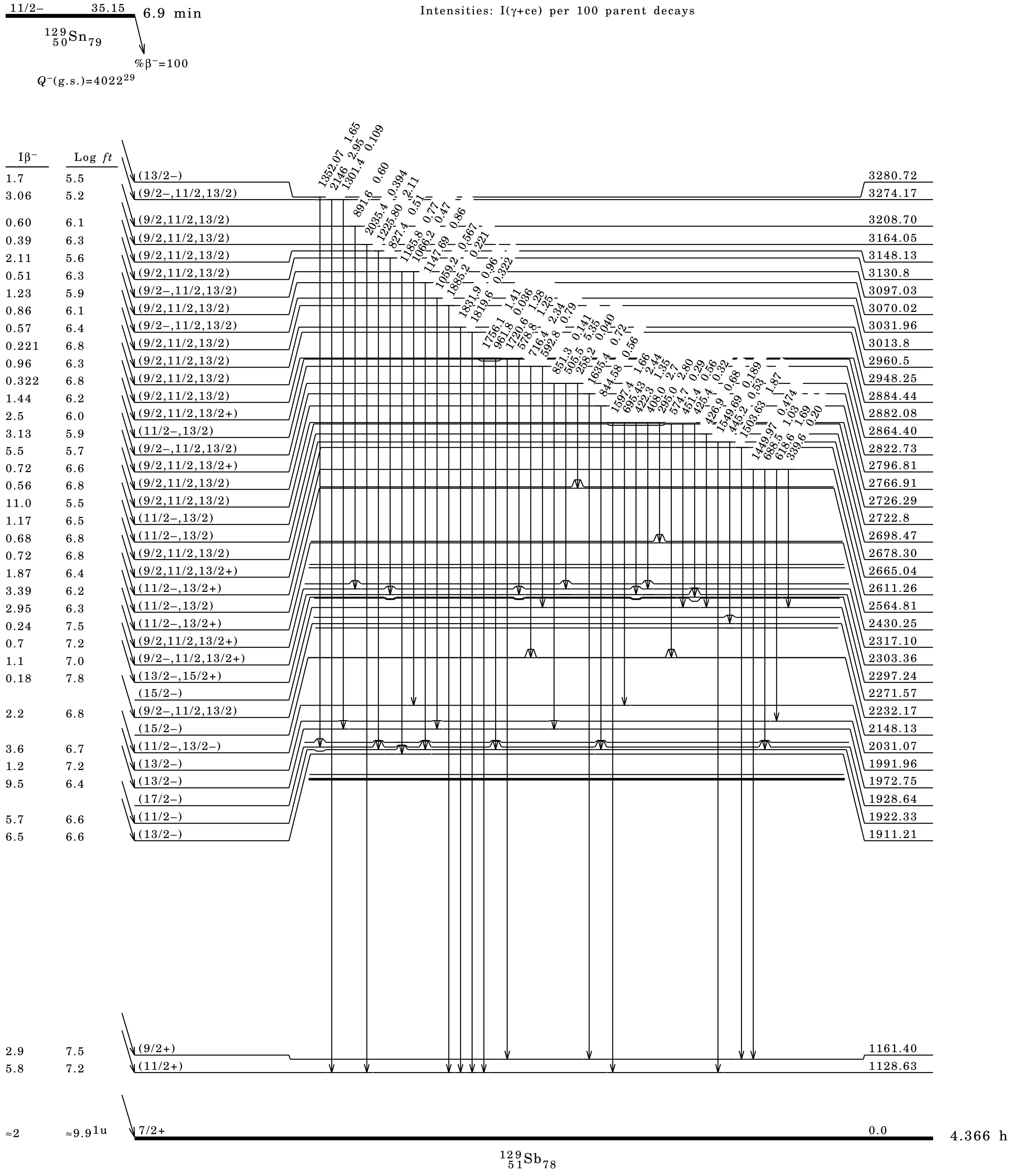
[‡] Assumed multipolarities up to Eγ=250 keV, based on assignments made in 1987StZO and as suggested by authors' listed Iγ+ce and Iγ values in table III–16. Only some of these multipolarity assignments are given in Adopted dataset.

[§] For absolute intensity per 100 decays, multiply by 0.402 *13*.

^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

Decay Scheme

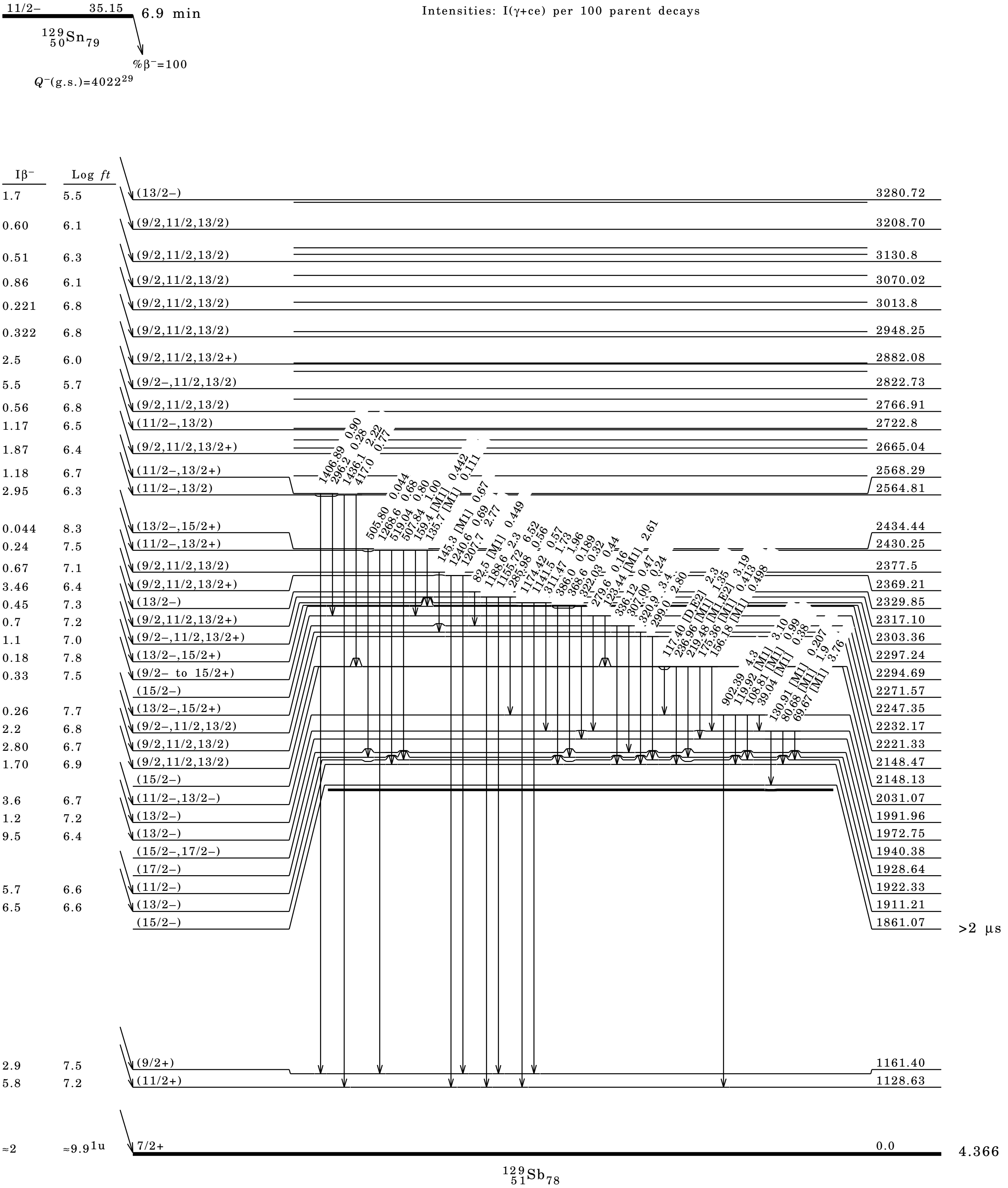
Intensities: I(γ+ce) per 100 parent decays



^{129}Sn β⁻ Decay (6.9 min) 1987StZO,1987St23 (continued)

Decay Scheme (continued)

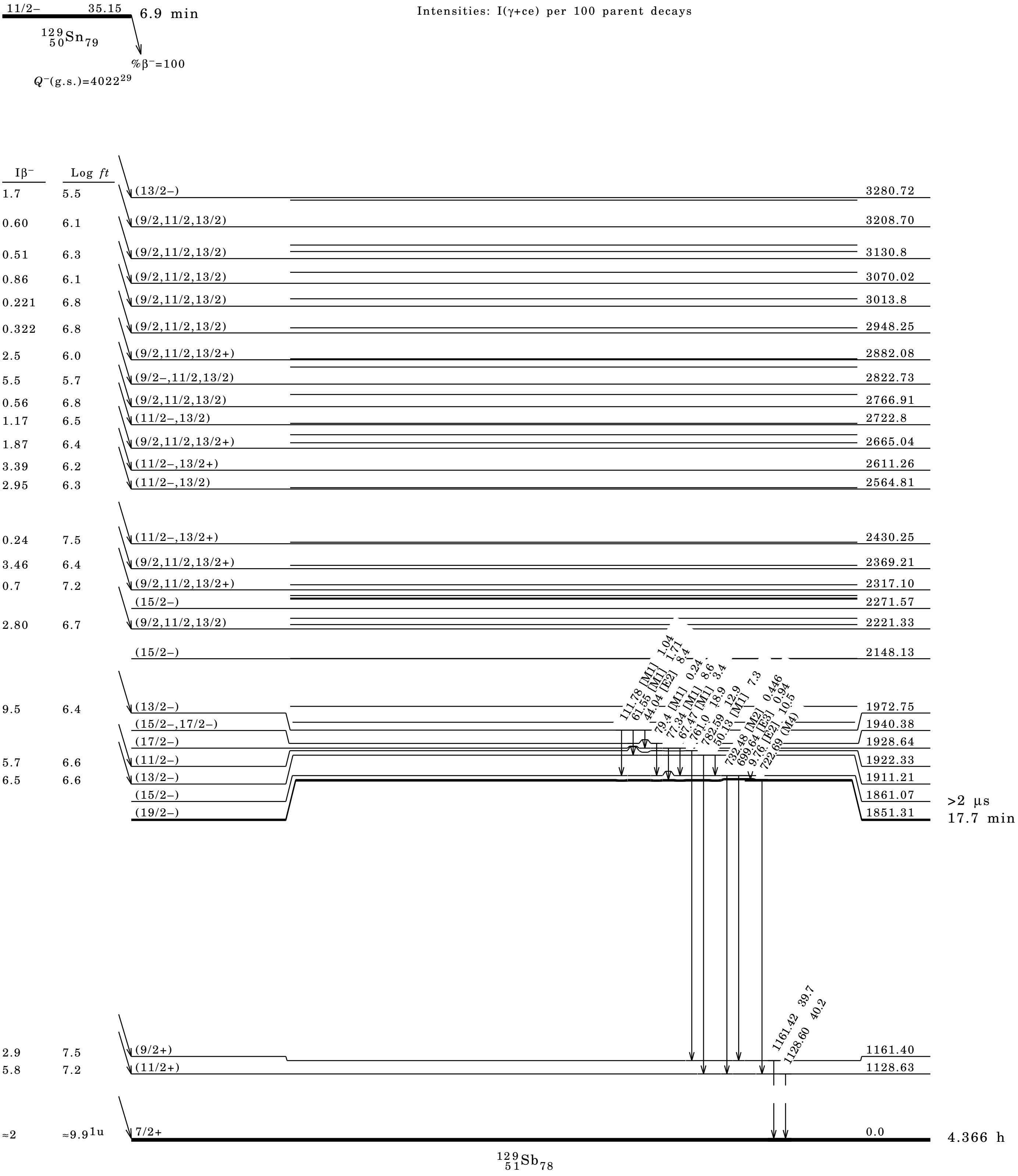
Intensities: I(γ+ce) per 100 parent decays



^{129}Sn β^- Decay (6.9 min) 1987StZO,1987St23 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays



^{129}Sb IT Decay (17.7 min) 1987St23,1987StZO,1982Hu09

Parent ^{129}Sb: E=1851.29 *10*; Jπ=(19/2–); $T_{1/2}$=17.7 min *1*; %IT decay=15.
1987St23, 1987StZO: ^{235}U(n,F) E=th, on–line ms; semi, γ, ce, γγ–coin, $T_{1/2}$.
1982Hu09: ^{235}U(n,F) E=th, on–line ms; Ge γ, γγ–coin, $T_{1/2}$.
See also ^{129}Sn β⁻ decay (6.9 min).

^{129}Sb Levels

1982Hu09 report a 17–min isomer with excitation energy unknown. 1987St23 assign the isomer to 1851 level.

E(level)	Jπ[†]	$T_{1/2}$[†]	Comments
0.0	7/2+	4.366 h *26*	
1128.60 *8*	(11/2+)		
1851.29 *10*	(19/2–)	17.7 min *1*	%IT=15 (1987St23); %β⁻=85. $T_{1/2}$: from γ–multiscaling (1982Hu09), 17.1 min (1987St23).

[†] From Adopted Levels.

γ(^{129}Sb)

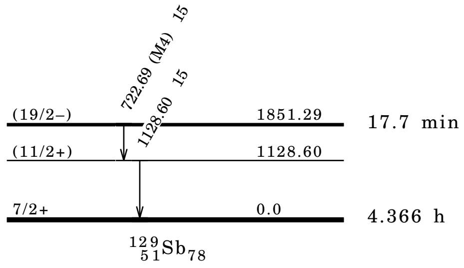
Eγ[†]	E(level)	Iγ[‡][§]	Mult.	α	I(γ+ce)[§]	Comments
722.69 *5*	1851.29	94.8	(M4)	0.0547	100	α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*. Mult.: from α(K)exp=0.049 *9* (1987St23).
1128.60 *8*	1128.60	100			100	

[†] From 1987StZO.
[‡] Deduced from I(γ+ce)=100 and α.
[§] For absolute intensity per 100 decays, multiply by 0.15.

^{129}Sb IT Decay (17.7 min) 1987St23,1987StZO,1982Hu09 (continued)

Decay Scheme

Intensities: I(γ+ce) per
100 parent decays
%IT=15



^{129}Sb IT Decay (2.2 μs) 2003Ge04

Parent ^{129}Sb: E=1860.8 *3*; Jπ=(15/2−); $T_{1/2}$=2.2 μs *2*; %IT decay=100.

2003Ge04 (also 1998GeZX): E(n)=thermal. Measured Eγ, Iγ, γγ, γ(t) using two large−volume Ge detectors and two cooled Si(Li) detectors after separation by the LOHENGRIN spectrometer.

^{129}Sb Levels

E(level)†	Jπ†	$T_{1/2}$†	Comments
0.0	7/2+	4.366 h *26*	
1128.63 *4*	(11/2+)		
1161.39 *4*	(9/2+)		
1851.31 *6*	(19/2−)	17.7 min *1*	%β⁻=85; %IT=15.
1861.06 *5*	(15/2−)	2.2 μs *2*	%IT=100. $T_{1/2}$: measured by 2003Ge04, 1998GeZX.

† From Adopted Levels, unless otherwise stated.

γ(^{129}Sb)

Iγ normalization,I(γ+ce) normalization: From summed Iγ+ce=100 of transitions from 1861 level.

Eγ†	E(level)	Iγ‡§	Mult.†	α	I(γ+ce)#	Comments
(9.76 *8*)	1861.06	0.033 *2*	[E2]	33900	1130 *60*	α(L)=2.72E4 4; α(M)=5.59E3 8; α(N)=989 *14*; α(O)=63.6 *9*.
699.64 *6*	1861.06	100.0 *22*	[E3]	0.0076		
722.69 *5*	1851.31		(M4)	0.0547		α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*.
732.48 *5*	1861.06	47.4 *4*	[M2]	0.0095		α(K)=0.00820 *12*; α(L)=0.001059 *15*; α(M)=0.000210 *3*. α(N)=4.06×10^{-5} *6*; α(O)=4.02×10^{-6} *6*.
1128.60 *5*	1128.63	47.9 *4*				
1161.42 *5*	1161.39	100.8 *22*				

† From Adopted Gammas.

‡ From Adopted Gammas for γ rays from the 1860.8 isomer; for γ rays deduced from the level scheme.

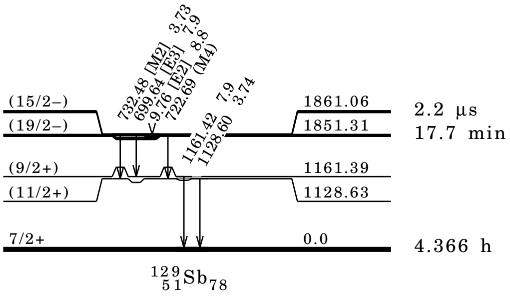
§ For absolute intensity per 100 decays, multiply by 0.078 *4*.

For absolute intensity per 100 decays, multiply by 0.0078 *4*.

^{129}Sb IT Decay (2.2 μs) 2003Ge04 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100
parent decays
%IT=100



^{129}Sb IT Decay (1.1 μs) 2003Ge04

Parent ^{129}Sb: E=2139.4 *3*; Jπ=(23/2+); $T_{1/2}$=1.1 μs *1*; %IT decay=100.

2003Ge04 (also 1998GeZX): E(n)=thermal. Measured Eγ, Iγ, γγ, γ(t) using two large–volume Ge detectors and two cooled Si(Li) detectors after separation by the LOHENGRIN spectrometer.

^{129}Sb Levels

E(level)†	Jπ†	$T_{1/2}$†	Comments
0.0	7/2+	4.366 h *26*	
1128.63 *4*	(11/2+)		
1851.31 *6*	(19/2−)	17.7 min *1*	%β⁻=85; %IT=15.
2040.81 *21*	(19/2+)		
2139.4 *3*	(23/2+)	1.1 μs *1*	%IT=100. $T_{1/2}$: γ(t) in (n,Fγ) (2003Ge04).

† From Adopted Levels, unless otherwise stated.

γ(^{129}Sb)

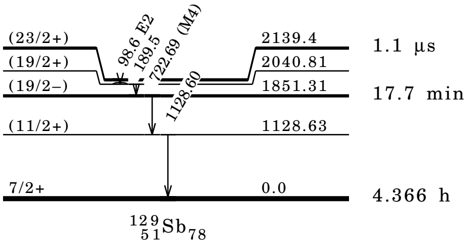
Eγ†	E(level)	Mult.†	α	Comments
98.6 *2*	2139.4	E2	1.73 *3*	α(K)=1.226 *19*; α(L)=0.406 *7*; α(M)=0.0838 *14*. α(N)=0.0153 *3*; α(O)=0.001138 *19*. Mult.: α(K)exp is compatible only with E2 character (2003Ge04).
189.5 *2*	2040.81			
722.69 *5*	1851.31	(M4)	0.0547	α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*.
1128.60 *5*	1128.63			

† From Adopted Gammas.

^{129}Sb IT Decay (1.1 μs) 2003Ge04 (continued)

Decay Scheme

%IT=100



^{130}Te(d,^{3}He) 1968Au04

1968Au04: E=34 MeV; semi, σ(θ) θ=11°–35°, deduced spectroscopic factors; enriched target; FWHM=125 keV.

^{129}Sb Levels

E(level)	L	S[†]	Comments
0.0	4	2.01 *20*	
640 *50*	2	0.26 *4*	
910 *50*	(2)	0.09 *3*	S: if $2d_{3/2}$.
1450 *50*	(0)	0.03 *2*	
2710 *50*	(4)	3.5	S: if $1g_{9/2}$.
3060 *50*	(1)	1.1	S: if $2p_{1/2}$.

[†] C^{2}S from DWBA.

^{130}Te(t,α) 1973Co33

1973Co33: E=12 MeV; measured α spectra and σ(θ) using a magnetic spectrograph, θ=12.5–175°; deduced spectroscopic factors; enriched target. FWHM=30 keV. DWBA analysis.

1980Sh03: E=16 MeV; measured α spectra and σ(θ) using Enge split–pole magnetic spectrograph. FWHM=30 keV. DWBA analysis.

^{129}Sb Levels

E(level)	L[§]	S[†]	Comments
0.0	4	1.75	S: if $1g_{7/2}$. Other: 1.85 (1980Sh03).
640 *10*	2	0.20	S: if $2d_{5/2}$. Other: 0.06 (1980Sh03).
913 *10*	2	0.05	E(level): other: 910 (1980Sh03). S: if $2d_{3/2}$.
1450[‡] *30*			
2710 *10*	4	2.72	S: if $1g_{9/2}$.
3071 *10*	1	0.82	S: if $2p_{1/2}$.
3110 *10*			
3291 *10*			
3410 *10*	1	0.40	S: if $2p_{1/2}$, 0.32 if $2p_{3/2}$.
3484 *10*	3	1.42	S: if $1f_{5/2}$.

[†] C^{2}S are relative values, normalized to ΣC^{2}S=2 for the low–lying levels with the assumption that ^{130}Te can be represented by two protons outside Z=50 core distributed among the $1g_{7/2}$, $2d_{5/2}$, $2d_{3/2}$, $3s_{1/2}$ and $1h_{11/2}$ orbitals.

[‡] From 1980Sh03.

[§] From DWBA in 1973Co33.

^{241}Pu(n,Fγ) E=thermal 2003Ge04

2003Ge04 (also 1998GeZX): E(n)=thermal. Measured Eγ, Iγ, γγ, γ(t) using two large–volume Ge detectors and two cooled Si(Li) detectors after separation by the LOHENGRIN spectrometer.

^{129}Sb Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	7/2+		Jπ: from Adopted Levels.
1128.41 *20*	(11/2+)		Jπ: taken from literature and odd Sb systematics by 2003Ge04.
1851.0 *3*	(19/2−)	17.7 min *1*	%IT=100. Jπ: comparison to ^{131}Sb and shell model calculations.
1860.8 *3*	(15/2−)	2.2 µs *2*	%IT=100. $T_{1/2}$: measured by 2003Ge04, 1998GeZX. Jπ: comparison to ^{131}Sb and shell model calculations.
2040.5 *4*	(19/2+)		Jπ: comparison to shell model calculations.
2139.1 *4*	(23/2+)	1.1 µs *1*	%IT=100. Jπ: E2 γ to (19/2+).

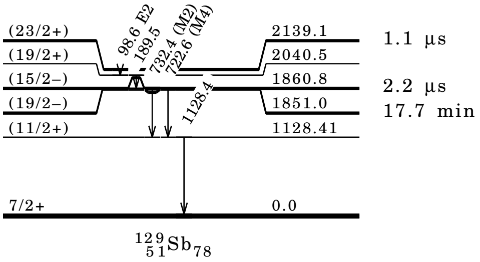
γ(^{129}Sb)

Eγ†	E(level)	Mult.	α	Comments
98.6 *2*	2139.1	E2	1.73 *3*	α(K)exp=1.1 *2* (2003Ge04). α(K)=1.226 *19*; α(L)=0.406 *7*; α(M)=0.0838 *14*. α(N)=0.0153 *3*; α(O)=0.001138 *19*. Mult.: from α(K)exp.
189.5 *2*	2040.5			
722.6 *2*	1851.0	(M4)	0.0547	α(K)=0.0457 *7*; α(L)=0.00721 *11*; α(M)=0.001462 *21*. α(N)=0.000281 *4*; α(O)=2.68×10^{-5} *4*. Mult.: from ΔJπ.
732.4 *2*	1860.8	(M2)		α=0.00951 *14*; α(K)=0.00820 *12*; α(L)=0.001059 *15*; α(M)=0.000210 *3*. α(N)=4.06×10^{-5} *6*; α(O)=4.02×10^{-6} *6*. Mult.: from ΔJπ.
1128.4 *2*	1128.41			

† Δ(Eγ) assigned as 0.2 keV based on a general statement by 2003Ge04.

^{241}Pu(n,Fγ) E=thermal 2003Ge04 (continued)

Level Scheme



Adopted Levels, Gammas

Q(β$^-$)=1502 *3*; S(n)=6082.41 *8*; S(p)=9664 *19*; Q(α)=–3533.3 *13* 2012Wa38.

S(2n)=14865.8 *17*, S(2p)=18112 *10* (2012Wa38).

^{129}Te produced and identified by 1939Se05 in deuteron bombardment of tellurium, measured half–lives of ground state and isomers, later reported in detail in 1940Se01. Earlier reports of T$_{1/2}$ without specific assignment to ^{129}Te: 1935Am01; W. Bother and W. Gentner, Naturwiss. 25, 191 (1937); G.F. Tape and J.M. Cook, Phys. Rev. 53, 676 (1938); P. Abelson, Phys. Rev. 55, 670 (1939).

Later studies of decay of ^{129}Te g.s. and isomer: 1953Pa25, 1963Ma20, 1963Br18, 1963Ha23, 1964De10, 1965An05, 1969Di08, 1970Bo02, 1971Ba28, 1972Em01, 1973Si14, 1974De15, 1976Ma35.

Nuclear structure calculations (levels, J, π, spectroscopic factors): 2000Bu15, 1994Di06, 1986Ma05.

^{129}Te Levels

Cross Reference (XREF) Flags

A	^{129}Sb β$^-$ Decay (4.366 h)	F	^{128}Te(d,p),(pol d,p)	K	^{130}Te(d,t),(pol d,t)
B	^{129}Sb β$^-$ Decay (17.7 min)	G	^{128}Te(t,d)	L	^{130}Te(^{3}He,α)
C	^{129}Te IT Decay (33.6 d)	H	^{128}Te(α,^{3}He)	M	^{130}Te(^{64}Ni,Xγ)
D	^{128}Te(n,γ) E=thermal	I	Coulomb Excitation	N	^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ)
E	^{128}Te(n,γ),(n,n): Resonances	J	^{130}Te(p,d)		

E(level)†	Jπ‡	XREF	T$_{1/2}$	Comments
0.0	3/2+	ABCD FGHIJKL N	69.6 min *3*	%β$^-$=100. μ=0.702 *4* (1979Ge04,2014StZZ). Q=0.055 *13* (1987Be36,2014StZZ). μ: NMR on oriented nuclei (1979Ge04). Q: Mossbauer detection of oriented nuclei (1987Be36). Jπ: L=2 in (t,d), (^{3}He,α), (p,d) and (d,p); log *ft*=5.8 to 5/2+ level in ^{129}I forbids 1/2+. Configuration=ν2d$_{3/2}$. T$_{1/2}$: weighted average of 68.7 min *4* (1963Br18), 69.5 min *5* (1963Ha23), 70.2 min *3* (1970Bo22). Others: 72 min *3* (1940Se01), 67.5 min *10* (1963Ma20), 1956Gr10, 1948Wa13, 1939Ab02.
105.51 *3*	11/2–	ABCD FGHIJKLMN	33.6 d *1*	%IT=64 *7*; %β$^-$=36 *7*. μ=–1.091 *7* (1980Ge02,2014StZZ). Q=+0.40 *3* (2006Si40,2011StZZ). Configuration=ν1h$_{11/2}$. %IT,%β$^-$: deduced by the evaluators from the measured ratio Iβ(to g.s.)/Iβ(to 27 level in ^{129}I)=0.58 *18* in equilibrium between the 33.6–d and 69.6–M ^{129}Te activities (1964De10,1969Di01), together with the ^{129}I level scheme from 1976Ma35. μ: NMR on oriented nuclei (1980Ge02). Other: –1.10 *3* (2006Si40, laser spectroscopy on resonant ionization of laser–desorbed atoms at COMPLIS facility in ISOLDE–CERN). 2014StZZ cite 1979Ge04 reference incorrectly. Q: laser spectroscopy on resonant ionization of laser–desorbed atoms at COMPLIS facility in ISOLDE–CERN (2006Si40). Charge radius measurement: 2006Si40. Jπ: L=5 in (t,d), (^{3}He,α), (p,d) and (d,p); M4 γ to 3/2+. T$_{1/2}$: weighted average of 33.3 d *1* (1953Pa25), 33.8 d *3* (1963Ha23), 34.1 d *2* (1965An05,1972Em01), 33.2 d *5* (1970Bo22), 33.52 d *12* (1971Ba28). Others: 32 d *2* (1940Se01), 1948Wa13, 1951Co34, 1956Gr10, 1963Ma20, 1965Br34.
180.356 *16*	1/2+	A D FG IJK		Configuration=ν3s$_{1/2}$. Jπ: L=0 in (t,d), (d,p) and (d,t).
250 *5*		J		
360 *5*	(5/2+,3/2+)	J L		XREF: L(372). Jπ: L=(2) in (^{3}He,α). E(level): from (p,d).
455 *5*	7/2+,9/2+	J L		Jπ: L=4 in (p,d),(^{3}He,α). E(level): from (p,d).

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
464.659 *25*	9/2(–)	A D I		Jπ: γ to 11/2–; 359γ(θ) does not allow 7/2.
544.585 *20*	5/2+	A D FGHIJK		Jπ: L=2 in (t,d); L=2, L+1/2 in (pol d,p) and (pol d,t).
633.801 *24*	5/2+	A D FG I		Jπ: L=2 in (t,d); log *ft*=8.6 from 7/2+.
759.84 *3*	7/2–	A D FG I K		Jπ: L(d,p)=3; L+1/2 from (pol d,p).
773.23 *3*	1/2+	D F J L		XREF: L(783). Jπ: L=0 in (d,p).
812.991 *19*	7/2+	A D FG IJK N		XREF: J(819). Jπ: L=4 and analyzing power in (pol d,p).
865.4 *5*	(7/2+)	F K		Jπ: L=(4) and analyzing power in (pol d,p) and (pol d,t).
865.51 *11*	15/2(–)	B I MN		Jπ: ΔJ=2, Q G to 11/2–; systematics of nuclei in this mass region.
874.945 *22*	3/2+	A D F IJKL		Jπ: L=2 in (^{3}He,α) and (d,p); γ(θ) in ^{129}Sb g.s. decay.
878 *5*	5/2–,7/2–	G		Jπ: L=3 in (t,d).
966.902 *22*	5/2+	A D FG JKL		Jπ: L=2 in (t,d); L=2 and analyzing power in (pol d,p).
1155 *5*	1/2+	G		Jπ: L=0 in (t,d).
1162.25 *5*	(7/2)–	D F		Jπ: L(d,p)=3; γ to 11/2–.
1211.8 *8*	7/2+	FG K		Jπ: L=4 and analyzing power in (pol d,p).
1217 *5*	3/2+,5/2+	J		Jπ: L=2 in (p,d).
1221.28 *3*	(5/2–,7/2+)	D		Jπ: gammas to 3/2+ and 9/2–.
1227.98 *3*	(7/2–,9/2+)	A		Jπ: gammas to 5/2+ and 11/2–; 5/2 ruled out from γ(θ) of 500γ from 1727 level. 9/2 from γ(θ) of 683γ. 525γ(θ) from 1754 level fits 7/2 somewhat better.
1233.81 *9*	3/2+,5/2+	D F		Jπ: L(d,p)=2.
1281.64 *3*	5/2+	A D FG JK		XREF: J(1290). Jπ: L=2 and analyzing power in (pol d,p); also γ(θ) in ^{129}Sb g.s. decay.
1303.41 *6*	1/2+	D F K		Jπ: L(d,p)=0.
1318.30 *3*	7/2+	A D FG KL		XREF: F(1319.0)G(1306)L(1280). Jπ: L=4 and analyzing power in (d,p).
1384.98 *5*	(3/2–,5/2,7/2+)	A		Jπ: γ to 3/2+; log *ft*=8.6 from 7/2+.
1405.66 *5*	(5/2,7/2,9/2+)	A		Jπ: gammas to 5/2+ and 7/2+; log *ft*=8.6 from 7/2+.
1421.35 *9*	5/2+	D FG JK		XREF: F(1419.4)G(1435)J(1430). Jπ: L=2 and analyzing power in (pol d,p).
1460.90 *5*	(5/2,7/2,9/2+)	A		Jπ: gammas to 5/2+ and 7/2+; log *ft*=8.3 from 7/2+.
1481.21 *5*	(3/2–,5/2,7/2+)	A		Jπ: γ to 3/2+; log *ft*=8.0 from 7/2+.
1483.37 *4*	7/2+	A FG JK		XREF: J(1490). Jπ: L=4 and analyzing power in (pol d,p).
1515.7 *10*	(11/2+)	N		
1523.29 *13*	19/2(–)	B MN		Jπ: ΔJ=2 γ, Q to 15/2(–); systematics in this mass region.
1545.09 *9*	7/2+,9/2+	A L		XREF: L(1535). Jπ: L(^{3}He,α)=4; γ to 5/2+.
1559.86 *4*	(3/2)–	D FG		Jπ: L(d,p)=L(t,d)=1; γ to 7/2–.
1581.97 *4*	7/2+	A F K		Jπ: L=4 and analyzing power in (pol d,p).
1600.08 *3*	5/2+	A D F JK		Jπ: L=2 and analyzing power in (pol d,p); γ(θ) in ^{129}Sb g.s. decay; also L(p,d)=2.
1632.57 *3*	7/2–,9/2+	A		Jπ: γ(θ); 9/2– ruled out by 405γ(θ); γ to 9/2–; log *ft*=6.7 from 7/2+.
1654 *5*	1/2+	G		Jπ: L(t,d)=0.
1654.31 *13*	(17/2–,19/2–)	B MN		Jπ: gammas to (15/2–) and (19/2–); possible configuration=$\pi g_{7/2}{}^{2}\otimes\nu h_{11/2}$.
1656.17 *4*	5/2+	A D F K		XREF: F(1655.7). Jπ: L=2 and analyzing power in (pol d,p).
1672 *10*	3/2+,5/2+	J		Jπ: L(p,d)=2.
1723.5 *5*	5/2+	K		Jπ: L=2 and analyzing power in (d,t).
1727.1 *10*	(15/2+)	N		
1727.972 *23*	(9/2)+	A		Jπ: log *ft*=5.6 from 7/2+; γ(θ); γ to 11/2–.
1739.7 *5*	3/2+,5/2+	K		Jπ: L(d,t)=2.
1751.11 *13*	(5/2,7/2,9/2)	A		Jπ: log *ft*=6.8 from 7/2+.
1752.32 *7*	(5/2)–	D F		XREF: F(1752.7). Jπ: L(d,p)=3; γ to 3/2+.

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$	Comments
1753.35 *5*	5/2+	A G		Jπ: L(t,d)=2; log *ft*=6.6 from 7/2+.
1754.2 *5*	7/2+	K		Jπ: L=4 and analyzing power in (pol d,t).
1762.45 *4*	(5/2+)	A		Jπ: log *ft*=8.1 from 7/2+; γ to 1/2+.
1777.8 *6*	(5/2,7/2,9/2+)	A g		Jπ: log *ft*=8.2 from 7/2+; γ to 5/2+.
1779.79 *5*	5/2+	A Fg JK		XREF: J(1797). Jπ: L=2 and analyzing power in (pol d,p). L(t,d)=(2).
1812.8 *6*	7/2+	F K		E(level),Jπ: L=4 and analyzing power in (pol d,p).
1839.2 *6*	(1/2+)	D FG		Jπ: L(t,d)=(0). E(level): from (d,p).
1843.6 *5*	–	K		E(level),Jπ: doublet; L(d,t)=1+5 suggests 1/2–,3/2– for one component and 9/2–,11/2– for the other.
1843.67 *3*	(9/2)+	A L		Jπ: L(^{3}He,α)=4; γ to 11/2–; γ(θ).
1851.55 *6*	5/2–,7/2–	D F		XREF: F(1852.9). Jπ: L(d,p)=3.
1867.65 *6*	(5/2,7/2+)	A		Jπ: log *ft*=7.6 from 7/2+; γ to 3/2+.
1868.87 *12*	5/2+	D K		XREF: K(1869.9). Jπ: L=2 and analyzing power in (pol d,t).
1869.6 *5*	5/2–,7/2–	FG		Jπ: L(d,p)=3.
1870.57 *3*	5/2+	A		Jπ: log *ft*=6.7 from 7/2+; γ(θ); γ to 1/2+.
1886.64 *14*	(21/2–)	MN		Jπ: ΔJ=1, d γ to 19/2(–); γ to (17/2–).
1887.5 *6*	(3/2+,5/2+)	JK		Jπ: L(d,t)=(1,2); L(p,d)=(4+2).
1921.26 *6*	(5/2)+	A KL		Jπ: L(^{3}He,α)=2; log *ft*=7.5 from 7/2+. L=(2) analyzing power in (pol d,t) suggests (3/2+).
1939.52 *4*	(5/2,7/2,9/2)	A		Jπ: log *ft*=7.2 from 7/2+.
1957.06 *15*	(21/2–)	B MN		Jπ: ΔJ=1, dipole γ to 19/2(–); log *ft*=6.1 from (19/2–); possible configuration=$\pi g_{7/2}d_{5/2}\otimes nh_{11/2}$ (1998Zh09).
1992.4 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2040.20 *4*	3/2–	D FG K		Jπ: L=1 and analyzing power in (pol d,p).
2059.3 *10*	1/2+	K		Jπ: L(d,t)=0.
2071.400 *22*	5/2+	A		Jπ: γ(θ); log *ft*=5.5 from 7/2+; γ to 3/2+, weak γ to 1/2+.
2071.5 *10*	3/2+	K		Jπ: L=2 and analyzing power in (POL d,t).
2072.4 *5*	7/2–	FG		Jπ: L=3 and analyzing power in (pol d,p).
2086.10 *3*	(7/2+)	A JK		XREF: J(2085)K(2089.9). Jπ: log *ft*=6.0 from 7/2+; γ to 3/2+; L(d,t)=(4).
2106.6 *5*	7/2–	FGH K		Jπ: L=3 and analyzing power in (pol d,p) and (pol d,t).
2113.9 *10*	1/2+	K		Jπ: L(d,t)=0.
2114.58 *3*	5/2+	A		Jπ: log *ft*=5.4 from 7/2+; 7/2+ ruled out by 2115γ(θ); γ to 3/2+.
2131 *5*	(1/2+)	G J		Jπ: L(t,d)=(0).
2131.20 *5*	7/2–	A F		XREF: F(2132.7). Jπ: L=3 and analyzing power in (pol d,p).
2133.0 *10*	9/2–,11/2–	K		Jπ: L(d,t)=5.
2134.86 *5*	(5/2–,7/2+)	A		Jπ: log *ft*=6.5 from 7/2+; gammas to 3/2+ and 9/2–.
2137.83 *17*	(23/2+)	MN	33 ns *3*	$T_{1/2}$: γ(t) in (^{64}Ni,Xγ). Jπ: ΔJ=1, dipole γ to (21/2–); level systematics of ^{128}Te and ^{130}Te (1998Zh09).
2141.8 *10*	7/2+	JK		Jπ: L=4 and analyzing power in (pol d,t).
2182.6 *10*	3/2+	KL		E(level),Jπ: L=2 and analyzing power in (pol d,t).
2197.7 *11*	(5/2–,7/2–)	K		Jπ: L(d,t)=(3).
2220.9 *4*	(3/2,5/2+)	D		Jπ: gammas to 1/2+, 5/2+ and 5/2–; weak primary γ from 1/2+.
2221.3 *5*	7/2–	FGH JK		Jπ: L=3 and analyzing power in (pol d,p); L(p,d)=(0+2) is inconsistent.
2232.2 *5*	5/2–,7/2–	F		Jπ: L(d,p)=3.
2255.1 *15*	1/2+	K		Jπ: L(d,t)=0.
2265.29 *4*	(5/2+,7/2+)	A		Jπ: log *ft*=4.8 from 7/2+; γ to 3/2+.
2267.20 *4*	3/2–	D FG K		XREF: F(2267.6)G(2261)K(2266.6). Jπ: L=1 and analyzing power in (pol d,p). L(d,t)=(2) is inconsistent.
2278.5 *15*	(7/2)+	JK		Jπ: L=4 and analyzing power in (pol d,t); L(p,d)=(0+2) is inconsistent.

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$	Comments
2303.7 *16*	9/2–,11/2–	K		Jπ: L(d,t)=5.
2309.7 *15*	1/2+	G K		Jπ: L(d,t)=0.
2312.2 *5*	7/2–	F		Jπ: L=3 and analyzing power in (pol d,p).
2316.6 *15*	(11/2)–	K		Jπ: L=5 and analyzing power in (pol d,t).
2353.8 *15*	1/2+	K		Jπ: L(d,t)=0.
2360.472 *21*	3/2–	D FG		Jπ: L=1 and analyzing power in (pol d,p).
2362.6 *16*	(1/2–)	K		Jπ: L=1 and analyzing power in (POL d,t).
2370.5 *16*	(3/2)+	JKL		Jπ: L=2 and analyzing power in (pol d,t).
2377.4 *16*	(1/2–)	K		Jπ: L=1 and analyzing power in (POL d,t).
2379.555 *23*	3/2–	D FG		Jπ: L=1 and analyzing power in (pol d,p).
2416 *2*	5/2+	JK		XREF: J(2395). Jπ: L=2 and analyzing power in (pol d,t). E(level): 2395 in (p,d) may correspond to 2377.4, 2379.5 and/or 2379.5 levels, but more likely to 2416 from level populations in similar (d,t) and (p,d) reactions, and energy matching.
2427.2 *5*	7/2–	F		Jπ: L=3 and analyzing power in (pol d,p).
2432 *2*	1/2+	K		Jπ: L(d,t)=0.
2454 *2*	7/2+,9/2+	JK		Jπ: L(d,t)=4.
2462.5 *5*	7/2–	F		Jπ: L=3 and analyzing power in (pol d,p).
2465 *2*	(3/2+,5/2+)	K		Jπ: L(d,t)=(2).
2477 *2*	(3/2+,5/2+)	K		Jπ: L(d,t)=(2).
2482 *2*	7/2+,9/2+	K		Jπ: L(d,t)=4.
2491 *5*	1/2+	G		Jπ: L(t,d)=0.
2493.06 *11*	3/2–	D F		XREF: F(2491.6). Jπ: L=1 and analyzing power in (pol d,p).
2507 *3*	(3/2)+	K		Jπ: L=2 and analyzing power in (pol d,t).
2507.1 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2510.79 *16*	23/2(–)	MN		Jπ: ΔJ=2, Q γ to 19/2(–); possible configuration= $\pi g_{7/2}{}^{2}\otimes\nu h_{11/2}$.
2511.0 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2515 *25*	9/2–,11/2–	L		Jπ: L(^{3}He,α)=5.
2519 *3*	3/2+	K		Jπ: L=2 and analyzing power in (pol d,t).
2524.76 *3*	1/2–	D F J		XREF: F(2524.4). Jπ: L=1 and analyzing power in (pol d,p). L(p,d)=(2) is inconsistent.
2556 *3*	5/2+	K		Jπ: L=2 and analyzing power in (pol d,t).
2581.67 *8*	3/2–	D F		XREF: F(2581.1). Jπ: L=1 and analyzing power in (pol d,p).
2584 *3*	(3/2)+	K		Jπ: L=2 and analyzing power in (pol d,t).
2612.4 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2616 *4*	(3/2+,5/2+)	JK		Jπ: L(d,t)=(2).
2632 *4*	5/2+	K		Jπ: L=2 and analyzing power in (pol d,t).
2641.3 *6*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2671 *4*	(3/2+,5/2+)	K		Jπ: L(d,t)=(2).
2681 *4*	9/2+	K		Jπ: L=4 and analyzing power in (pol d,t).
2705.130 *21*	1/2–	D F K		XREF: F(2705.8)K(2702). Jπ: L=1 and analyzing power in (pol d,p) and (pol d,t).
2711 *4*	5/2+	K		Jπ: L=2 and analyzing power in (pol d,t).
2728.2 *5*	1/2–,3/2–	F		Jπ: L(d,p)=1.
2736.6 *5*	(3/2–)	F		Jπ: L=(1) and analyzing power in (pol d,p).
2747 *4*	3/2+,5/2+	JKL		Jπ: L(d,t)=2; L(p,d) is inconsistent.
2757 *4*	(3/2)+	K		Jπ: L=2 and analyzing power in (pol d,t).
2765.3 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2767 *4*	(5/2+)	K		Jπ: L=(2) and analyzing power in (pol d,t).
2811.7 *5*	(9/2–,11/2–)	F		Jπ: L(d,p)=(5).
2819.5 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2824 *5*	7/2+,9/2+	K		Jπ: L(d,t)=4.
2831 *5*	(3/2+)	K		Jπ: L=(2) and analyzing power in (pol d,t).
2835.2 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).
2840.3 *6*	27/2(–)	N		Jπ: ΔJ=2, (E2) γ to 2/2(–).
2844 *5*	3/2+,5/2+	K		Jπ: L(d,t)=2.
2853.7 *5*	(5/2–,7/2–)	F		Jπ: L(d,p)=(3).

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$	Comments
2856 5	5/2+	K		Jπ: L=2 and analyzing power in (pol d,t).
2859.5 5	(5/2−,7/2−)	F		Jπ: L(d,p)=(3).
2871.2 5	(5/2−)	F		Jπ: L=(3) and analyzing power in (pol d,p).
2885.8 8		N		
2889.8 5	(5/2−,7/2−)	F		Jπ: L(d,p)=(3).
2891 15	(3/2 to 9/2)(+)	J		Jπ: L(p,d)=(4+2).
2899.9 5	9/2−,11/2−	F		Jπ: L(d,p)=5.
2919.6 5	(5/2)−	F		Jπ: L=3 and analyzing power in (pol d,p).
2971.3 5	7/2−	F		Jπ: L=3 and analyzing power in (pol d,p).
2979.4 5	5/2−	F		Jπ: L=3 and analyzing power in (pol d,p).
2980 25	7/2+,9/2+	L		Jπ: L(^{3}He,α)=4.
2999.6 6		F		
3009.4 5		F		
3023.8 6		F		
3029.1 5		F		
3046.3 5		F		
3051.6 4	(27/2+)	MN		Jπ: ΔJ=2, Q γ to (23/2+).
3056.4 5		F		
3070.4 5		F		
3077 15	(3/2+,5/2+)	h J		Jπ: L(p,d)=(2).
3089.3 5		F h		
3102.8 5		F		
3128.5 6		F		
3133.5 5		F		
3150.7 5		F		
3163.3 6		F		
3182.0 5		F		
3202.3 6		F		
3211.8 6		F		
3230.5 5		F		
3240 15	(3/2 to 9/2)(+)	J		Jπ: L(p,d)=(4+2).
3246.1 5		F		
3253.1 5		F		
3260.9 5		F		
3277.1 7		F		
3281.6 5		F		
3295.7 7		F j		
3306.4 5		F j		
3321.4 5		F j		
3326.6 5		F		
3350.3 5		F		
3355.46 10	3/2−	D F		XREF: F(3355.6). Jπ: L=1 and analyzing power in (pol d,p).
3361.5 5		F		
3364.6 5		F		
3371.6 5		F		
3379.3 5		F		
3384.8 5		F j		
3389.8 6		F j		
3405.8 5		F j		
3414.3 5		F		
3419.9 5		F		
3429.8 3	(3/2)−	D F		XREF: F(3428.9). Jπ: L(d,p)=1; γ to 7/2−.
3441.0 5		F j		
3452.8 5		F j		
3461.1 5		F j		
3474.8 5		F		
3479.1 5		F		
3489.6 5	1/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
3500 25	7/2+,9/2+	L		Jπ: L(^{3}He,α)=4.

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
3502.58 *8*	(3/2−)	D F		XREF: F(3503.4). Jπ: L=(1) and analyzing power in (pol d,p); gammas to 1/2+ and 7/2−.
3512.0 *5*		F j		
3512.9 *7*	(29/2−)	N		Jπ: ΔJ=1, dipole γ to 27/2(−).
3524.2 *5*		F j		
3528.28 *10*	(1/2−)	D F j		XREF: F(3527.7). Jπ: L=(1) and analyzing power in (pol d,p).
3546.91 *9*	(3/2−)	D F		XREF: F(3545.8). Jπ: L=(1) and analyzing power in (pol d,p).
3559.3 *5*		F		
3564.51 *9*	1/2−	D F		XREF: F(3565.0). Jπ: L=1 and analyzing power in (pol d,p).
3569.2 *5*		F		
3579.7 *5*		F		
3587.4 *5*		F		
3593.7 *5*		F		
3600.5 *5*	(3/2)−	F		Jπ: L=1 and analyzing power in (pol d,p).
3615.2 *5*		F		
3617.0 *9*	(31/2−)	N		Jπ: γ to 27/2(−).
3622.9 *6*		F		
3628.7 *6*		F		
3634.2 *5*		F		
3636.7 *7*	(29/2+)	N		Jπ: γ to (27/2+).
3638.38 *7*	1/2−	D F		XREF: F(3638.4). Jπ: L=1 and analyzing power in (pol d,p).
3643.3 *5*		F		
3648.77 *11*	1/2−	D F		XREF: F(3649.0). Jπ: L=1 and analyzing power in (pol d,p).
3655.1 *5*		F H		
3666.4 *5*		F		
3671.5 *5*	3/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
3677.9 *5*		F		
3695.7 *5*		F		
3707.7 *5*	1/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
3713.8 *5*		F		
3729.3 *5*		F		
3737.1 *5*		F		
3744.9 *5*	3/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
3752.3 *5*		F		
3765.0 *5*	(3/2)−	F		Jπ: L=1 and analyzing power in (pol d,p).
3769.9 *5*		F		
3777.5 *5*		F		
3784.6 *5*		F		
3792.40 *4*	3/2−	D F H		XREF: F(3792.6). Jπ: L=1 and analyzing power in (pol d,p).
3800.9 *5*		F		
3811.7 *6*		F		
3818.9 *5*		F		
3826.7 *5*		F		
3837.7 *5*		F		
3852.71 *12*	3/2−	D F		XREF: F(3851.9). Jπ: L=1 and analyzing power in (pol d,p).
3859.6 *5*		F		
3865.36 *7*	3/2−	D F		XREF: F(3865.7). Jπ: L=1 and analyzing power in (pol d,p).
3873.4 *5*		F		
3884.5 *5*		F		
3890.2 *5*		F		
3899.3 *5*	3/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
3906.9 *5*		F		
3917.0 *6*		F		
3921.6 *5*		F		

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
3929.4 *5*		F		
3938.5 *5*		F		
3944.2 *5*		F		
3948.1 *6*	(3/2−)	F		Jπ: L=(1) and analyzing power in (pol d,p).
3952.8 *5*		F		
3962.3 *5*		F		
3969.4 *6*	(3/2−)	F		Jπ: L=(1) and analyzing power in (pol d,p).
3974.3 *5*	3/2−	F		Jπ: L=1 and analyzing power1 in (pol d,p).
3986.8 *6*		F		
3993.7 *5*		F		
3997.6 *5*		F		
4002.4 *6*		F		
4005.8 *6*		F		
4017.1 *5*		F		
4024.9 *5*		F		
4032.59 *16*	3/2−	D F		XREF: F(4032.5). Jπ: L=1 and analyzing power in (pol d,p).
4033.1 *9*	(31/2+)	N		Jπ: γ to (29/2+).
4043.3 *5*		F		
4045.8 *5*		F		
4053.7 *5*		F		
4059.1 *5*	(1/2)−	F		Jπ: L=1 and analyzing power in (pol d,p).
4067.8 *5*	3/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
4072.2 *5*		F		
4082.2 *5*	3/2−	F		Jπ: L=1 and analyzing power in (pol d,p).
4087.54 *11*	3/2−	D F		XREF: F(4086.8). Jπ: L=1 and analyzing power in (pol d,p).
4092.5 *6*		F		
4101.8 *6*		F		
4106.1 *6*		F		
4110.4 *6*		F		
4121.18 *8*	1/2−	D F H		XREF: F(4122.1). Jπ: L=1 and analyzing power in (pol d,p).
4129.0 *5*		F		
4133.50 *9*	3/2−	D F		XREF: F(4132.8). Jπ: L=1 and analyzing power in (pol d,p).
4150.2 *6*		F		
4155.6 *9*	(31/2+)	N		Jπ: γ to (27/2+).
4161.1 *7*		F		
4166.2 *5*		F		
4175.3 *3*	(1/2)−	D F		XREF: F(4175.1). Jπ: L=1 and analyzing power in (pol d,p).
4180.68 *18*	(3/2)−	D F		XREF: F(4181.2). Jπ: L=1 and analyzing power in (pol d,p).
4200.8 *5*		F		
4204.3 *3*	1/2−	D F		XREF: F(4205.9). Jπ: L=1 and analyzing power in (d,p).
4212.4 *5*		F		
4220.46 *16*	3/2−	D F		XREF: F(4220.1). Jπ: L=1 and analyzing power in (pol d,p).
4229.1 *5*		F		
4240.5 *3*	3/2−	D F		XREF: F(4239.8). Jπ: L=1 and analyzing power in (pol d,p).
4251.2 *6*		F		E(level): from (d,p).
4259.3 *6*		F		
4267.4 *5*	(1/2)−	D F		XREF: F(4267.4). E(level),Jπ: L=1 and analyzing power in (pol d,p).
4277.02 *11*	3/2−	D F		XREF: F(4277.4). Jπ: L=1 and analyzing power in (pol d,p).
4291.2 *6*		F		
4297.80 *22*	1/2−	D F		XREF: F(4298.5). Jπ: L=1 and analyzing power in (pol d,p).
4306.7 *5*		F		

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
4311.7 *5*	(1/2)–	F		Jπ: L=1 and analyzing power in (pol d,p).
4317.1 *5*		F		
4326.5 *5*		F		
4336.2 *5*	(1/2)–	F		Jπ: L=1 and analyzing power in (pol d,p).
4349.5 *5*		F		
4356.13 *8*	1/2–	D F		XREF: F(4356.3). Jπ: L=1 and analyzing power in (pol d,p).
4364.57 *6*	1/2–	D F		XREF: F(4365.3). Jπ: L=1 and analyzing power in (pol d,p).
4374.0 *3*	(1/2,3/2,5/2+)	D F		XREF: F(4372.6). Jπ: γ to 3/2+; primary γ from 1/2+.
4380.6 *5*		F		
4388.93 *10*	1/2–	D F		XREF: F(4389.1). Jπ: L=1 and analyzing power in (pol d,p).
4402.1 *6*		F		
4410.5 *5*		F		
4425.1 *5*	(3/2–)	F		E(level),Jπ: L=(1) and analyzing power in (pol d,p).
4432.93 *9*	3/2–	D F		XREF: F(4433.1). Jπ: L=1 and analyzing power in (pol d,p).
4435.3 *10*	(33/2–)	N		Jπ: γ to (29/2–).
4444.0 *5*		F		
4456.4 *5*		F		
4467.4 *5*	(1/2–)	F		E(level),Jπ: L=(1) and analyzing power in (pol d,p).
4474.7 *6*		F		
4483.9 *5*		F		
4496.8 *5*		F		
4504.2 *5*		F		
4511.8 *6*		F		
4522.5 *7*		F		
4543.3 *6*		F		
4558.2 *6*		F		
4572.7 *5*		F		
4580.3 *6*		F		
4588.48 *12*	(1/2,3/2,5/2+)	D F		XREF: F(4589.2). Jπ: γ to 3/2+; primary γ from 1/2+.
4595.2 *7*		F		
4608.4 *6*		F		
4622.0 *5*		F		
4634.7 *7*		F		
4643.2 *6*	(1/2–,3/2–)	F		Jπ: L(d,p)=(1).
4652.9 *6*	(1/2–,3/2–)	F		Jπ: L(d,p)=(1).
4665.8 *5*	1/2–,3/2–	F		Jπ: L(d,p)=1.
4682.0 *6*	1/2–,3/2–	F		Jπ: L(d,p)=1.
4695.4 *7*		F		
4696.8 *10*	(33/2+)	N		Jπ: γ to (31/2+).
4711.80 *25*	1/2–,3/2–	F		Jπ: L(d,p)=1.
4724.3 *5*		F		
4743.5 *6*		F		
4766.2 *7*		F		
4777.9 *6*	(1/2–,3/2–)	F		Jπ: L(d,p)=(1).
4794.3 *6*		F		
4807.9 *6*		F		
4825.2 *11*	(35/2–)	N		Jπ: γ to (33/2–).
4840.4 *6*		F		
4849.6 *8*		F		
4868.2 *7*		F		
4879.7 *6*		F		
4907.4 *7*		F		
4917.0 *7*	(1/2–,3/2–)	F		Jπ: L(d,p)=(1).
4929.4 *7*		F		
4946.8 *6*		F		
4958.3 *6*		F		
4975.3 *6*		F		

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Adopted Levels, Gammas (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
5002.3 *6*		F		
5013.3 *9*		F		
(6082.40 *8*)	1/2+	D		Jπ: s–wave capture in 0+. E(level): S(n)=6082.41 8 (2012Wa38).
6082.76 *8*		E		
6082.83 *8*	1/2	E	0.15 eV *10*	Jπ: from (n,n):resonances. Γ from (n,n):resonances.
6082.84 *8*	1/2–	E	0.0697 eV *10*	Jπ: from (n,n):resonances. Γ from (n,n):resonances.
6083.34 *8*	1/2–	E	0.170 eV *20*	Jπ: from (n,n):resonances. Γ from (n,n):resonances.
6083.72 *8*		E		
6083.86 *8*		E		
6083.98 *8*		E		
6084.23 *8*		E		
6085.36 *8*		E		
6085.65 *8*		E		
6085.93 *8*		E		
6086.46 *8*		E		
6087.70 *8*		E		
6088.47 *8*		E		
6089.43 *8*		E		
6090.28 *8*		E		
6092.34 *8*		E		
6092.68 *8*		E		
6092.98 *8*		E		
6093.16 *8*		E		
6093.82 *8*		E		
6094.41 *8*		E		
6095.14 *8*		E		
6095.20 *8*		E		
6095.27 *8*		E		
6095.39 *8*		E		
6096.90 *8*		E		
6097.62 *8*		E		
6098.62 *8*		E		
6099.29 *8*		E		
6099.79 *8*		E		
6100.26 *8*		E		
6101.16 *8*		E		
6101.68 *8*		E		
6101.96 *8*		E		
6102.47 *8*		E		
6103.27 *8*		E		
6104.06 *8*		E		

† From least–squares fit to Eγ data for levels populated in γ–ray studies. In order to get an acceptable fit with reasonable reduced χ^2, uncertainties of about 9 γ rays were doubled and another 4 γ rays not included in the fit. With these adjustments reduced χ^2=1.9 somewhat larger than critical χ^2 of 1.3. For levels populated in particle–transfer data only, values are mainly from (d,p) and (d,t). For energies taken from (d,p), 0.5 keV systematic uncertainty is added in quadrature, and for energies from (d,t), uncertainty of 0.5 to 5 keV has been added in quadrature based on statement in 2003Wi02.

‡ For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

γ(^{129}Te)

E(level)	Eγ†	Iγ†	Mult.&	α	Comments
105.51	105.50 *5*	100	M4	429 *7*	α(K)=217 *3*; α(L)=165.3 *24*; α(M)=38.5 *6*; α(N)=7.43 *11*; α(O)=0.656 *10*. Mult.: from ^{129}Te IT decay. α(K)exp and L–subshell ratios (1977So06,1972Ka61).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Te) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[&]	α	Comments
					Eγ: from IT decay (33.6 d). B(M4)(W.u.)=4.0 *11*.
180.356	180.37 *5*	100	[M1]	0.1311 *21*	α(K)=0.1130 *18*; α(L)=0.01448 *23*; α(M)=0.00289 *5*. α(N)=0.000572 *10*; α(O)=6.21×10^{-5} *10*.
464.659	359.19 *5*	100	(M1+E2)	0.0216 *4*	Eγ: from (n,γ). δ(E2/M1)=−0.025 *22* or −27 *14*.
544.585	364.24 *5*	2.4 *4*	[E2]	0.0208	Iγ: unweighted average from (n,γ) and ^{129}Te g.s. decay. α(K)=0.01753 *25*; α(L)=0.00266 *4*; α(M)=0.000537 *8*. α(N)=0.0001044 *15*; α(O)=1.053×10^{-5} *15*.
	544.59 *5*	100.0 *9*	(M1+E2)		
633.801	453.38 *5*	23.6 *23*			Iγ: unweighted average from (n,γ) and ^{129}Te g.s. decay.
	633.76 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=+0.58 *5* or +4.3 *7*.
759.84	295.27 *5*	29.9 *20*	(M1+E2)	0.038 *3*	Iγ: unweighted average from (n,γ) and ^{129}Te g.s. decay. δ(E2/M1)=−0.07 *4* or −6.3 *15*.
	654.29 *5*	100.0 *10*	(E2)		
773.23	592.81 *5*	31.9 *7*			
	773.22 *5*	100 *7*			
812.991	268.48[‡] *5*	0.444 *7*	(M1,E2)	0.051 *5*	α(K)=0.043 *4*; α(L)=0.0064 *14*; α(M)=0.0013 *3*. α(N)=0.00025 *6*; α(O)=2.5×10^{-5} *4*. δ(E2/M1)=+0.47 *19* or +9 *6*.
	812.95 *5*	100.0 *10*	(E2)		α=0.00232 *4*; α(K)=0.00200 *3*; α(L)=0.000257 *4*; α(M)=5.13×10^{-5} *8*. α(N)=1.010×10^{-5} *15*; α(O)=1.079×10^{-6} *16*.
865.51	759.82 *15*	100	Q		Mult.: from γγ(θ) in ^{238}U(^{12}C,Fγ).
874.945	330.32 *5*	13.6 *6*			Iγ: from ^{129}Te g.s. decay. Iγ=34.6 *6* in (n,γ) is in disagreement.
	694.63 *14*	72 *4*			
	874.83 *5*	100.0 *9*	(M1+E2)		δ(E2/M1)=0.00 *2* or +3.9 *4*.
966.902	333.21[‡] *5*	1.91 *4*			
	421.72[@] *10*	0.56 *4*			
	786.41 *5*	11.95 *12*			Iγ: from ^{129}Te g.s. decay. Iγ=33.6 *24* in (n,γ) is in disagreement.
	966.83 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=+0.18 *1* or −9.1 *10*.
1162.25	697.59 *5*	100.0 *11*			
	1056.53 *16*	7.9 *6*			
1221.28	461.47 *5*	21.0 *10*			
	756.59 *3*	100 *10*			
	1221.23 *13*	4.2 *6*			
1227.98	415.17[@] *5*	1.67 *7*			
	682.77[§][#] *5*	100.0 *10*			Eγ: poor fit, level-energy difference=683.40.
	1122.48[@] *5*	1.60 *5*			
1233.81	689.22[a] *9*	111[a] *17*			
	1053.36 *19*	100 *6*			
1281.64	314.40[‡][@] *5*	22.0 *4*			
	737.00 *6*	88 *9*			
	1281.65 *6*	100.0 *10*			
1303.41	669.64 *8*	43.9 *23*			
	1123.01 *7*	100 *4*			
	1303.6 *4*	40 *4*			
1318.30	351.46[‡] *11*	2.7 *3*			
	505.33 *5*	18.33 *19*			
	684.39 *21*	22.01 *22*			Iγ: from ^{129}Sb decay. Iγ=172 *12* in (n,γ) is discrepant, probably due to incorrect splitting of doublet at 773.2 keV. Iγ(684)/Iγ(1318)=1.35 *2* in ^{129}Sb decay as compared to 1.06 *17* in (n,γ).
	773.29[#] *7*	100.0 *10*			
	1318.42 *12*	16.35 *17*			Iγ: from ^{129}Sb decay. Iγ=159 *20* in (n,γ) is discrepant.
1384.98	840.17 *22*	27 *9*			
	1384.98 *5*	100.0 *24*			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Te) (continued)

E(level)	Eγ†	Iγ†	Mult.&	α	Comments
1405.66	592.77 *6*	61 *4*			
	861.00 *5*	100.0 *21*			
1421.35	648.11 *10*	39.6 *23*			
	1421.36 *15*	100 *4*			
1460.90	647.94 *5*	100.0 *23*			
	826.75 *16*	54 *16*			
1481.21	514.43 *8*	100 *8*			
	606.22 *5*	99 *3*			
1483.37	670.31 *5*	100			
1515.7	703.3 *6*	100			
1523.29	657.74 *10*	100	Q		
1545.09	1000.50 *8*	100			
1559.86	338.65 *8*	71 *5*			
	786.45 *7*	43 *5*			Iγ: doubly placed, intensity split based on ^{129}Sb decay data.
	800.04 *3*	100 *11*			
	1379.33 *19*	29 *5*			
	1559.66 *21*	62 *3*			
1581.97	354.13 *8*	13.08 *14*			
	707.08 *5*	43.1 *14*			
	768.98 *5*	100.0 *15*			
1600.08	318.36‡ *5*	13.08 *14*			
	787.16 *5*	100.0 *11*	(M1+E2)		δ(E2/M1)=+0.06 *24* or −1 *8*. Eγ: from ^{129}Sb decay. Other: 786.45 *7* doublet in (n,γ).
	1419.40‡ *12*	22.7 *3*	(E2)		
	1600.13‡ *5*	33.4 *3*	(M1+E2)		δ(E2/M1)=+0.77 *11* or +2.7 *6*.
1632.57	404.64 *5*	84.4 *8*			δ(Q/D)=+0.47 *5* or +3.65 *65* for 9/2 to 7/2; +0.10 *4* or +0.71 *16* for 9/2 to 9/2; +0.12 *19* or +0.93 *34* for 7/2 to 7/2; −0.45 to −1.73 for 7/2 to 9/2.
	819.51 *5*	100.0 *21*			
	1087.98 *5*	29.6 *6*			
	1167.95 *5*	18.2 *2*			
1654.31	131.0 *1*	84 *8*			
	788.8 *1*	100 *10*			
1656.17	1022.12‡ *7*	2.24 *22*			
	1475.91‡ *5*	5.33 *11*			
	1656.20 *10*	100.0 *11*	(M1+E2)		δ(E2/M1)=+0.02 *3* or −3.7 *4*.
1727.1	211.4 *5*	100			
1727.972	95.42 *5*	0.19 *1*	[D,E2]	1.1 *9*	
	146.11 *5*	0.39 *1*	[M1+E2]	0.34 *11*	
	244.53 *5*	1.73 *2*			
	409.71 *5*	0.99 *2*			
	499.99 *5*	1.84 *2*			δ(Q/D)=−0.14 to −3.2 for J(1228)=7/2; no fit for 9/2.
	761.12 *5*	18.51 *19*	(E2)		
	914.96 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=+0.105 *15* or −15.5 *30*.
	1263.30 *5*	3.90 *4*	(E1)		
	1622.46 *5*	0.89 *1*	(E1(+M2))		δ(M2/E1)=−0.07 *10*.
1751.11	523.13§ *12*	100			
1752.32	590.00 *9*	47 *3*			
	992.52 *8*	100 *5*			
	1287.62 *18*	47 *5*			
	1752.6 *4*	40 *12*			
1753.35	435.04§ *9*	22.6 *15*			
	471.54 *9*	4.8 *4*			
	525.23 *10*	17 *1*			δ(Q/D)=−0.34 *7* or +4 *8* if J(1228)=7/2; no fit for J(1228)=9/2.
	940.51§ *12*	82 *4*			
	1209.03@ *5*	100.0 *15*	(M1+E2)		
	1646.79# *5*	2.87 *10*	[E3]		Eγ: poor fit, level-energy difference=1647.84.
1762.45	1582.11 *5*	100 *4*			
	1762.42 *5*	94 *3*			
1777.8	1233.2 *6*	100			

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Adopted Levels, Gammas (continued)

$\gamma(^{129}$Te) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[&]	α	Comments
1779.79	1779.78 *5*	100			
1843.67	115.84 *5*	0.58 *2*	[M1+E2]	0.7 *3*	
	876.65 *5*	18.2 *4*			
	1030.65 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=+0.077 *13* or −10.8 *15*.
	1738.16 *5*	49.2 *5*			
	1843.49[b] *5*	0.14 *4*	[M3]		Eγ: this transition is less certain.
1851.55	689.22[a] *9*	100[a] *9*			
	885.0 *3*	10.9 *14*			
	1091.42 *23*	13.9 *20*			
	1851.28 *18*	37 *3*			
1867.65	992.70 *5*	100			
1868.87	1095.47 *18*	100 *8*			
	1234.5 *3*	100 *8*			
	1324.6 *3*	81 *8*			
1870.57	589.98 *25*	3.2 *9*			
	996.54 *5*	25.3 *6*			Eγ: poor fit, level–energy difference=995.63.
	1237.81[§] *12*	34.7 *9*	(M1+E2)		Eγ: poor fit, level–energy difference=1236.77. δ(E2/M1)=−0.65 *17* or −7 to +10.
	1326.98 *5*	100.0 *10*	(M1+E2)		Eγ: poor fit, level–energy difference=1325.99. δ(E2/M1)=+0.30 *15* or +9.2 *24*.
	1691.24 *5*	6.10 *21*			Eγ: poor fit, level–energy difference=1690.21.
	1871.58 *5*	51.3 *5*	(M1+E2)		δ(E2/M1)=−0.07 *6* or −2.8 *6*.
1886.64	232.2 *2*	21 *4*			
	363.35 *15*	100 *10*	D		
1921.26	1287.45 *5*	100			
1939.52	657.6[b]				
	1126.57 *5*	100.0 *24*			
	1179.63 *5*	45.2 *16*			
1957.06	433.74 *9*	100	D		
2040.20	480.22 *21*	18.5 *3*			
	818.86 *6*	28.5 *9*			
	1859.64 *8*	100 *3*			
	2040.38 *7*	47 *3*			
2071.400	1104.52 *5*	46.7 *5*	(M1+E2)		δ(E2/M1)=−0.13 *12* or +2.5 *8*.
	1196.42 *5*	11.70 *20*			
	1258.44 *5*	55.1 *5*	(M1+E2)		δ(E2/M1)=−0.37 *15* or −2.1 *7*.
	1437.52 *5*	43.3 *7*	(M1+E2)		δ(E2/M1)=−1.0 *4* or −2.2 to +45.
	1526.84 *5*	75.1 *7*	(M1+E2)		δ(E2/M1)=−0.10 *9* or +2.1 *5*.
	1606.72 *5*	2.7 *3*	[M2]		
	1891.10 *7*	2.18 *13*			
	2071.36 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=−0.29 *8* or +1.55 *25*.
2086.10	1211.89[@] *17*	100 *16*			
	1273.10 *5*	43.2 *9*			
	1541.47 *5*	17.6 *5*			
	2086.11 *5*	14.18 *25*			
2114.58	796.21 *6*	4.6 *3*			
	832.99 *16*	7.2 *17*			
	1147.59 *5*	10.2 *3*			
	1301.45 *5*	23.2 *9*			
	1480.94[§] *12*	42.8 *6*			
	1570.09 *5*	100.0 *10*	(M1+E2)		δ(E2/M1)=−0.10 *5* or +2.1 *3*.
	2114.67 *5*	48.0 *5*	(M1+E2)		δ(E2/M1)=+0.17 *5* or −9 *3*.
2131.20	849.57 *5*	54.0 *21*			
	903.19 *8*	100 *5*			
2134.86	1501.04 *5*	100 *3*			
	1669.16[#] *7*	36.3 *24*			Eγ: poor fit, level–energy difference=1670.20.
	2134.86[@] *5*	62.1 *16*			
2137.83	180.4 *2*	35 *4*	(E1)	0.0374	B(E1)(W.u.)=3.5×10^{-7} *6*.
	251.1 *2*	100 *11*	(E1)	0.0152	B(E1)(W.u.)=3.6×10^{-7} *7*.
2220.9	1000.26 *10*	34.7 *14*			
	1677.29 *15*	49 *5*			
	2041.6 *7*	34.7 *14*			
	2221.5 *7*	100 *14*			

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Adopted Levels, Gammas (continued)

γ(^{129}Te) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[&]	Comments
2265.29	1037.29 *5*	100 *3*		
	1298.7 *4*	38 *13*		
	2265.27 *5*	11.0 *3*		
2267.20	707.21 *15*	31 *5*		
	1045.83 *10*	27.3 *15*		
	1105.46[@] *11*	15.2 *15*		
	1493.91 *12*	22 *3*		
	1633.6 *3*	20 *4*		
	2086.84 *6*	100.0 *23*		
	2267.1 *9*	9.1 *23*		
2360.472	704.40 *18*	0.81 *8*		
	800.40 *20*	2.8 *4*		
	1139.21 *13*	2.27 *17*		
	1485.48 *16*	1.92 *12*		
	1586.7 *5*	0.81 *23*		
	1815.6 *5*	0.47 *12*		
	2180.12 *3*	100 *3*		
	2360.42 *3*	18.72 *17*		
2379.555	527.90 *8*	3.86 *19*		
	723.22 *14*	1.9 *4*		
	1097.9 *3*	8.6 *7*		
	1158.37 *12*	14.6 *7*		
	1412.4 *5*	1.4 *4*		
	1504.3 *3*	10.0 *16*		
	1606.60 *13*	10.5 *9*		
	1619.5 *6*	6.0 *7*		
	1745.7 *3*	4.2 *9*		
	1834.9 *3*	4.6 *4*		
	2199.21 *3*	100.0 *11*		
	2379.51 *4*	36.1 *7*		
2493.06	623.87 *20*	64 *9*		
	641.84 *17*	79 *9*		
	1526.4 *6*	79 *21*		
	2312.7 *8*	86 *21*		
	2493.1 *6*	100 *21*		
2510.79	987.5 *1*	100	Q	
2524.76	1649.47[a] *9*	28[a] *8*		
	2343.7 *3*	17.3 *18*		
	2524.78[a] *3*	100[a] *27*		
2581.67	729.97 *10*	70 *5*		
	1360.4 *4*	63 *11*		
	2401.74 *22*	100 *7*		
	2581.5 *9*	33 *7*		
2705.130	344.55 *10*	4.6 *3*		
	437.4 *4*	1.5 *3*		
	1401.4 *3*	2.7 *4*		
	1470.9 *4*	5.6 *8*		Eγ: placement not unique; also in γγ coin with 359γ.
	1830.22 *4*	44.2 *4*		
	1931.91 *23*	6.5 *10*		
	2071.03 *23*	9.0 *6*		
	2524.78[a] *3*	100[a] *6*		
	2705.07 *4*	67.3 *6*		
2840.3	330.4 *3*	100	(E2)	Mult.: ΔJ=2, Q from γγ(θ), and RUL.
2885.8	748.0 *6*	100		
3051.6	913.9 *3*	100	Q	
3355.46	3355.14 *14*			
3429.8	2554.0 *5*	100 *31*		
	2670.4 *6*	42 *7*		
	3250.0 *10*	38 *8*		
3502.58	2627.7 *5*	43 *7*		
	2741.4 *11*	25 *7*		
	3322.0 *4*	100 *11*		
3512.9	672.6 *4*	100	D	

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Adopted Levels, Gammas (continued)

γ(^{129}Te) (continued)

E(level)	Eγ[†]	Iγ[†]
3528.28	2652.3[a] *4*	30[a] *9*
	2754.8 *7*	22 *5*
	3348.6 *5*	100 *5*
	3528.4 *4*	11.3 *17*
3546.91	1987.6 *6*	23 *5*
	3366.3 *6*	100 *14*
	3546.6 *11*	23 *5*
3564.51	3564.71 *14*	100
3617.0	776.7 *6*	100
3636.7	586.8 *4*	100
3638.38	3457.6 *3*	48 *4*
	3638.36 *13*	100 *4*
3648.77	3468.7 *3*	100
3792.40	2371.1 *7*	5.1 *9*
	3018.7 *10*	5.1 *14*
	3612.02 *6*	100.0 *19*
	3792.4 *3*	18.2 *9*
3852.71	2630.0 *11*	31 *12*
	3672.2 *3*	100 *12*
3865.36	3684.74 *14*	100
4032.59	3853.6 *7*	100
4033.1	396.4 *5*	100
4087.54	1708.4[c] *3*	200[c] *28*
	3907.2 *5*	100 *8*
4121.18	3940.4 *4*	100 *8*
	4120.5 *4*	25 *5*
4133.50	3952.8 *4*	57 *4*
	4133.23 *19*	100 *4*
4155.6	1105.7 *6*	100
4175.3	4174.6[c] *6*	100[c]
4180.68	4001.5 *8*	100
4204.3	4204.0 *9*	100
4220.46	427.7 *3*	21 *4*
	1999.5 *3*	100 *21*
4240.5	4060.5 *5*	100
4277.02	4096.5 *3*	100
4297.80	4297.7 *6*	100
4356.13	4174.6[c] *6*	100[c]
4364.57	4184.0 *3*	53 *4*
	4364.38 *15*	100.0 *24*
4374.0	4374.6 *12*	100
4388.93	4208.4 *4*	100
4432.93	4252.0 *6*	35 *3*
	4433.6 *5*	100 *5*
4435.3	922.4 *6*	100
4588.48	4588.5 *5*	100
4696.8	541.2 *5*	100
4825.2	389.9 *5*	100
(6082.40)	1493.91[a] *12*	2.3[a] *3*
	1649.47[a] *9*	2.5[a] *5*
	1693.45 *10*	4.8 *4*
	1708.4[c] *3*	2.6[c] *3*
	1717.80 *5*	9.0 *3*
	1726.24 *7*	1.4 *3*
	1784.58 *23*	1.13 *20*
	1805.35 *11*	2.04 *10*
	1842.1 *3*	2.51 *10*
	1861.80 *18*	3.0 *3*
	1878.1 *3*	1.4 *3*
	1901.77 *18*	1.74 *20*
	1906.9 *3*	1.02 *20*
	1948.81 *10*	3.1 *7*
	1961.16 *8*	3.2 *10*
	1994.92 *12*	3.5 *3*
	2049.87 *16*	2.61 *15*
	2216.96 *7*	4.35 *15*
	2229.63 *13*	2.71 *10*
	2289.99 *4*	19.60 *20*
	2433.65 *11*	2.87 *15*
	2443.99 *7*	4.97 *15*
	2518.02 *11*	5.83 *10*
	2535.47 *9*	4.04 *15*
	2554.06 *10*	2.2 *4*
	2579.78 *7*	5.42 *15*
	2652.3[a] *4*	3.3[a] *3*
	2726.70 *12*	3.48 *15*
	3377.26 *4*	53.4 *5*
	3500.59 *12*	4.40 *20*
	3557.60 *9*	5.94 *15*
	3589.41 *17*	2.66 *15*
	3702.82 *6*	52.9 *5*
	3721.87 *5*	100.0 *10*
	3815.14 *6*	12.2 *3*
	3860.59 *10*	5.12 *15*
	4042.11 *7*	10.70 *20*
	4426.8 *7*	1.18 *15*
	4523.0 *5*	1.18 *10*
	5449.4 *6*	1.13 *10*
	5901.55 *24*	3.02 *15*
	6082.0 *3*	2.00 *10*

[†] The γ–ray data are primarily from (n,γ) and ^{129}Sb β^- g.s. decay. When levels are populated in both (n,γ) and β^- decay of 4.366–h decay of ^{129}Sb, values are unweighted averages with a minimum uncertainty of 0.05 keV for gamma–ray energy. For high–spin (J>11/2) data, values are unweighted averages from (^{64}Ni,Xγ) and 17.7–min decay of ^{129}Sb, when a level is populated in both studies.

[‡] γ reported in ^{129}Sb β^- (4.366 h), not in (n,γ).

[§] Doublet in ^{129}Sb β^- (4.366 h).

[#] This Eγ not included in the fitting procedure due to poor agreement.

[@] Uncertainty doubled in the fitting procedure.

[&] From γ(θ) data at low temperature in ^{129}Sb β^- g.s. decay. Mixing ratios are mostly double values and are given under comments.

[a] Multiply placed; intensity suitably divided.

[b] Placement of transition in the level scheme is uncertain.

[c] Multiply placed; undivided intensity given.

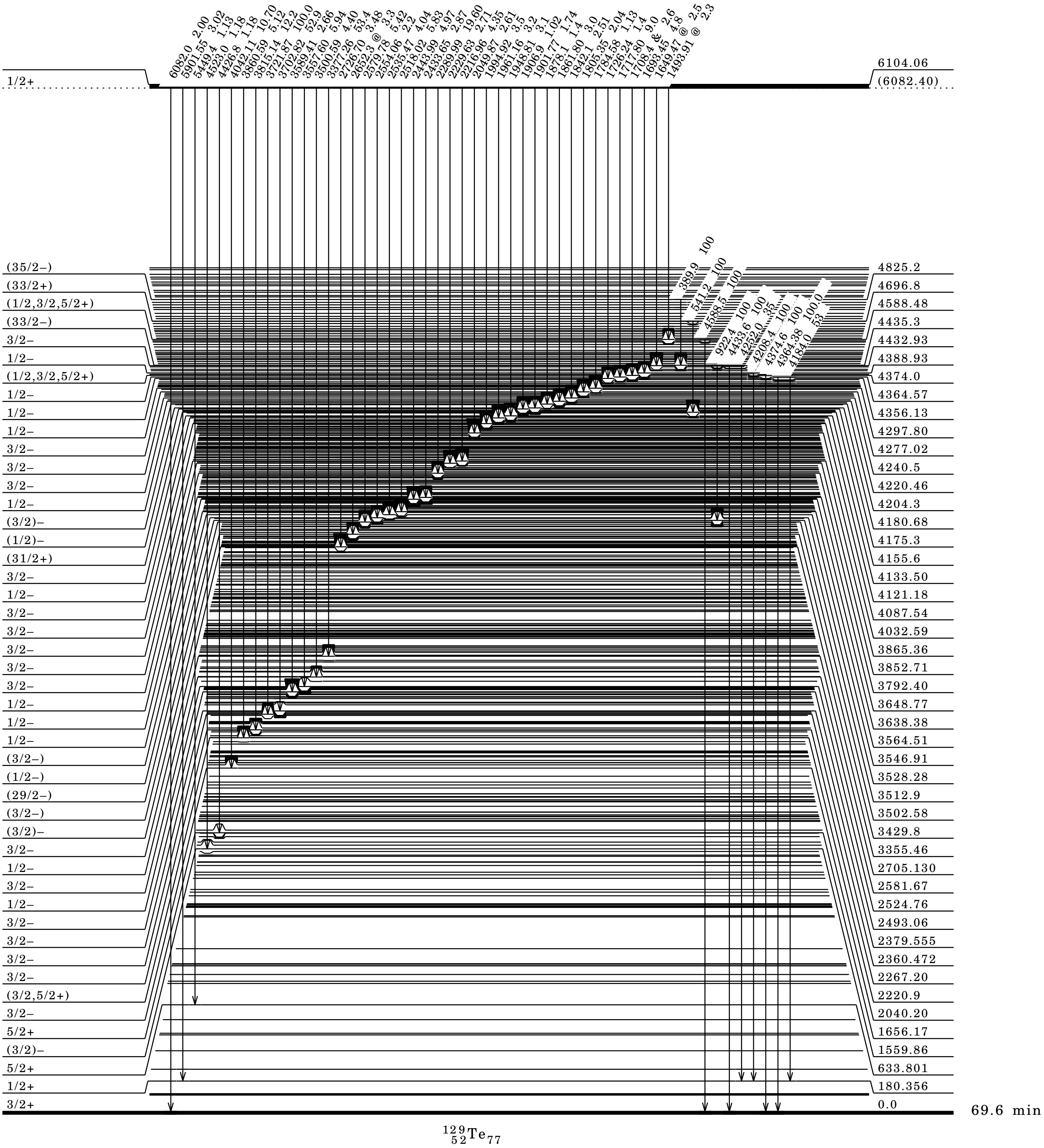
Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

@ Multiply placed; intensity suitably divided

& Multiply placed; undivided intensity given

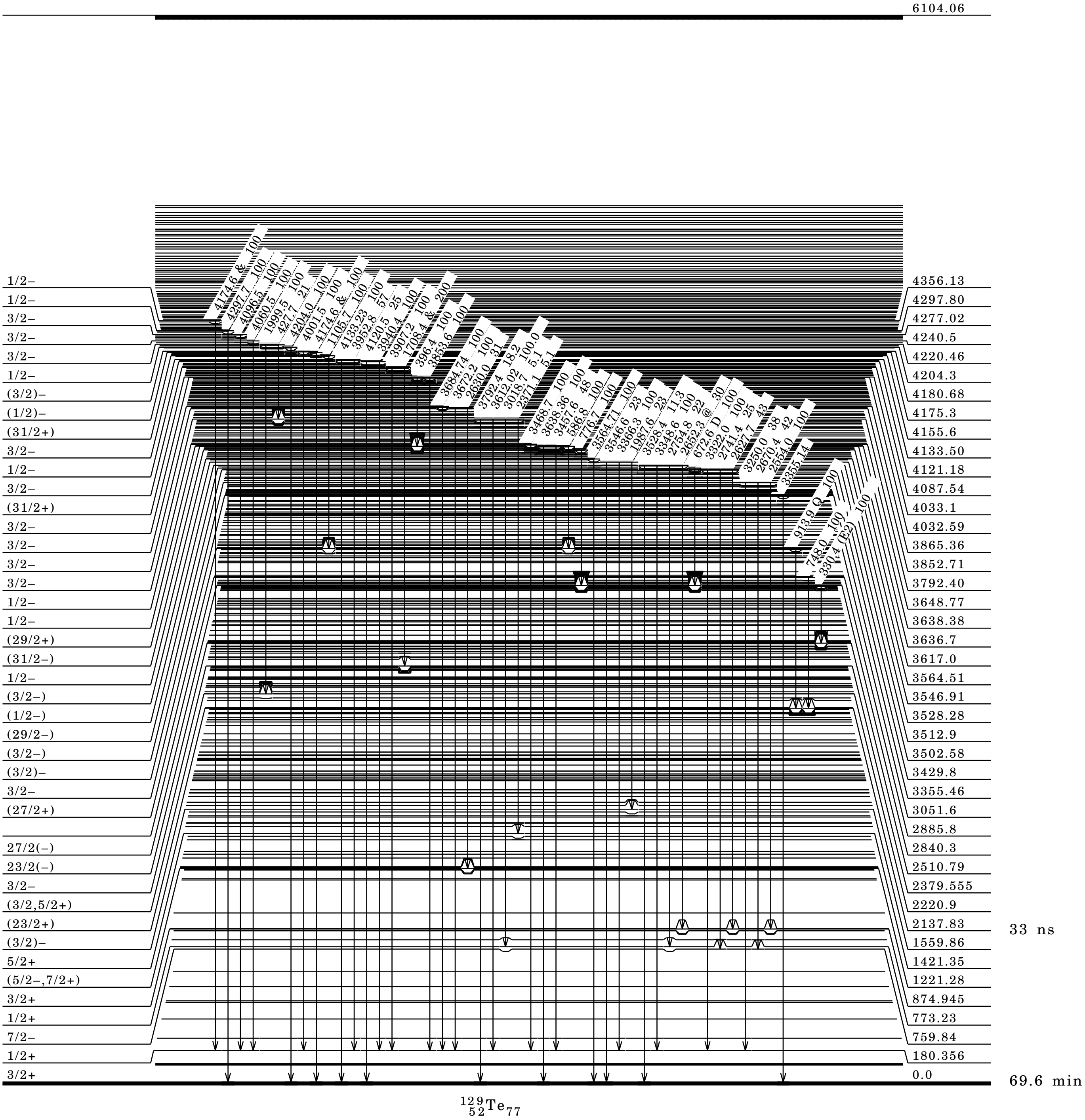


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

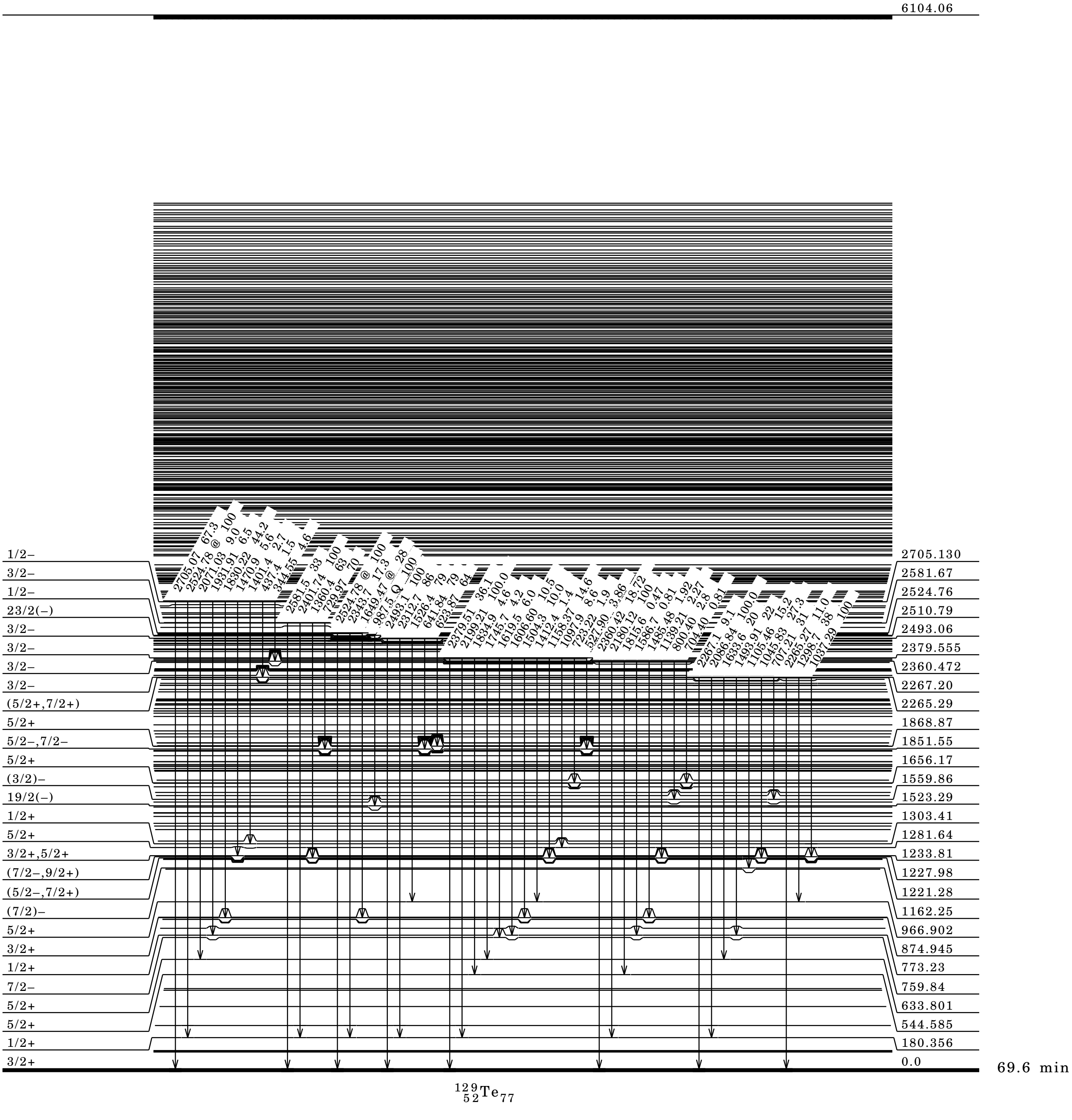


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

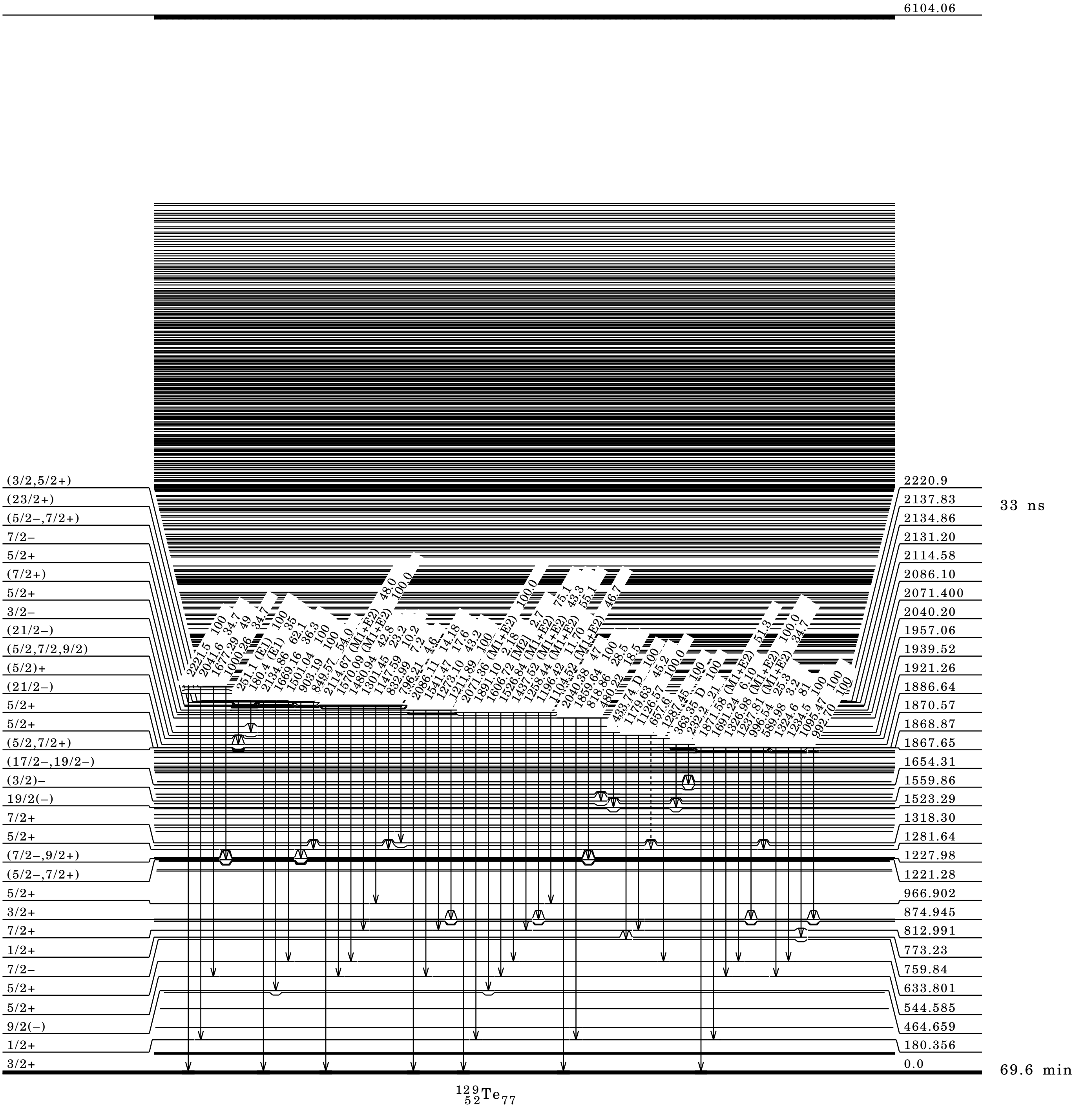
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

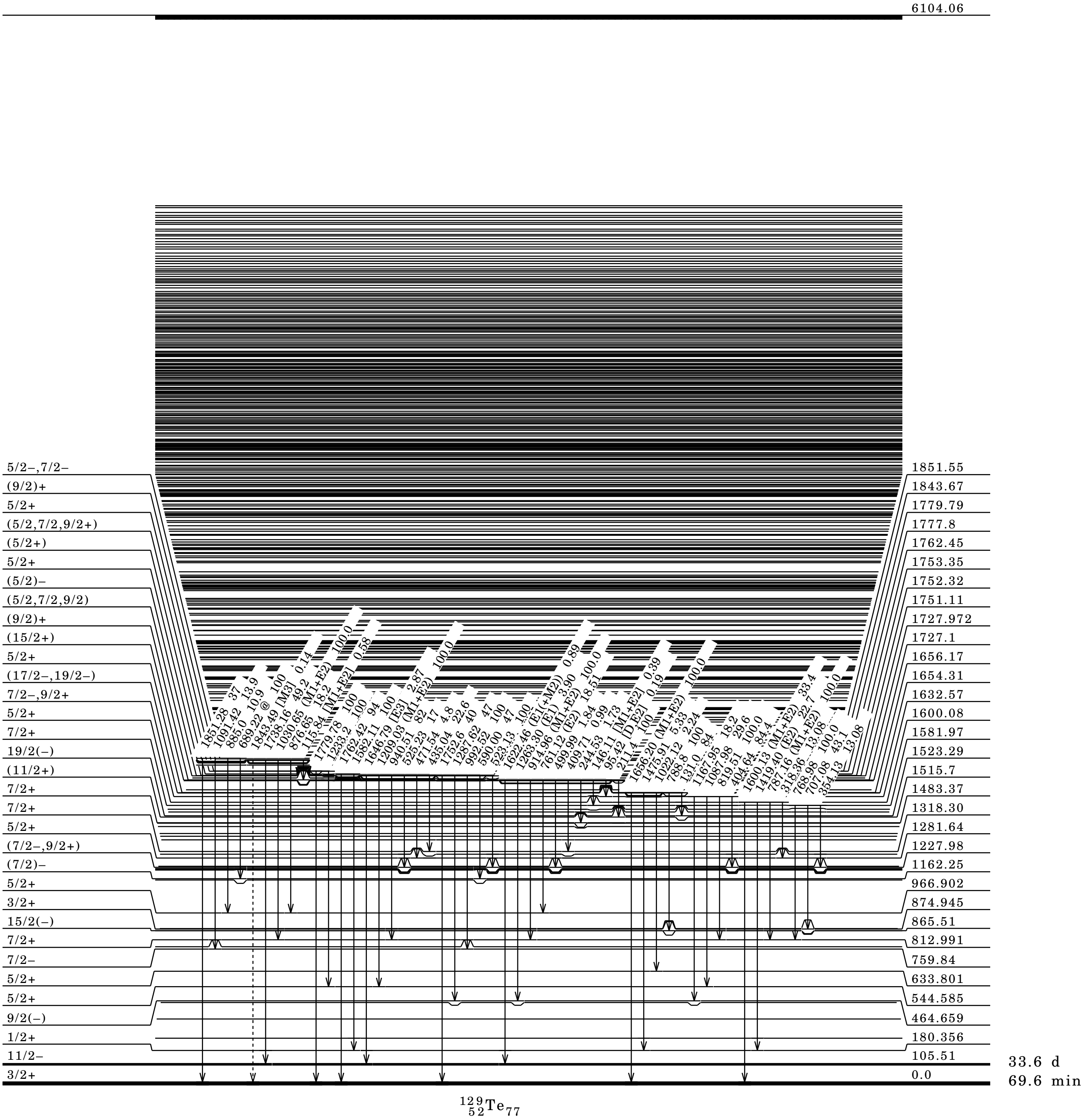


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



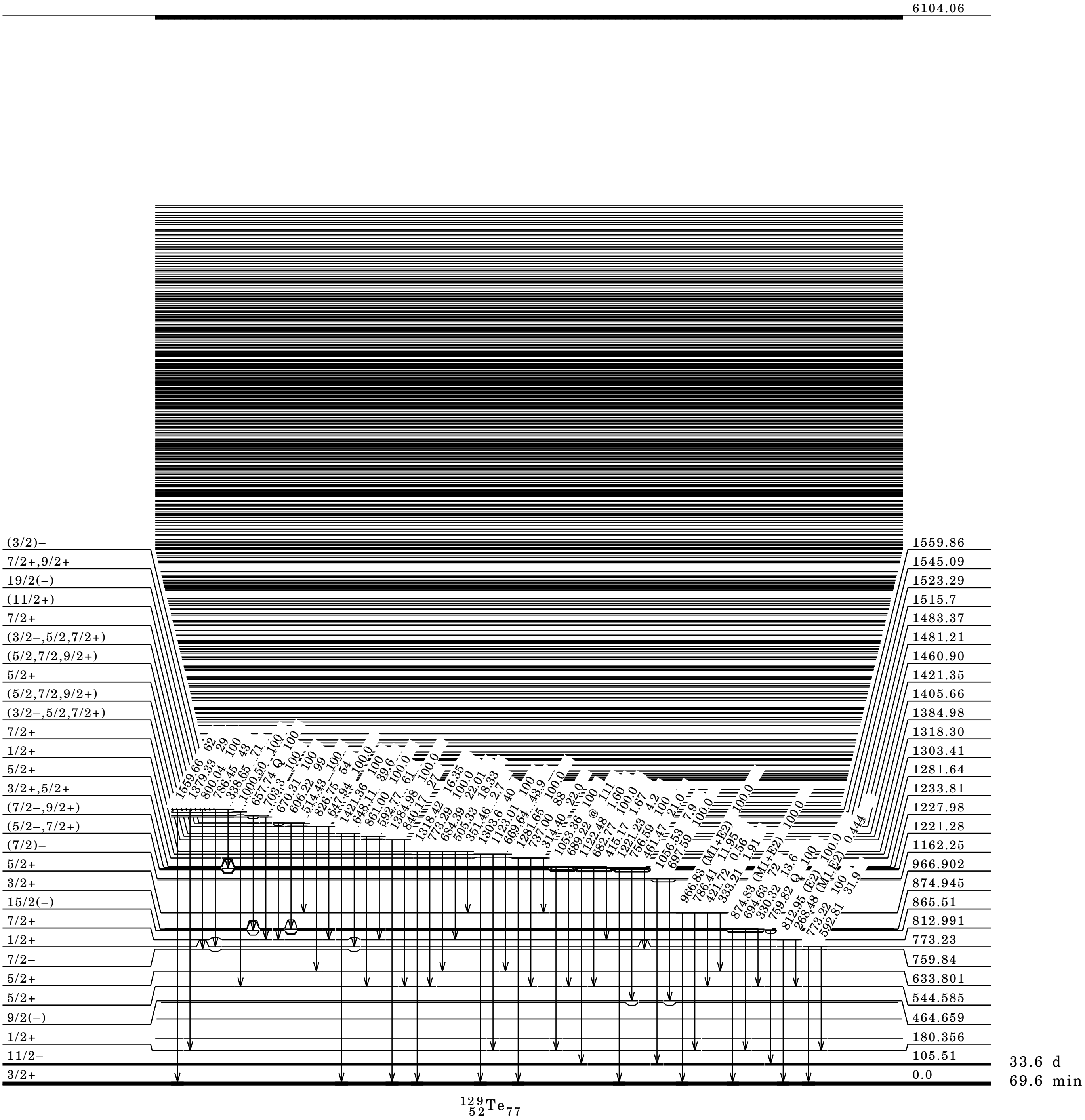
$^{129}_{52}$Te$_{77}$

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

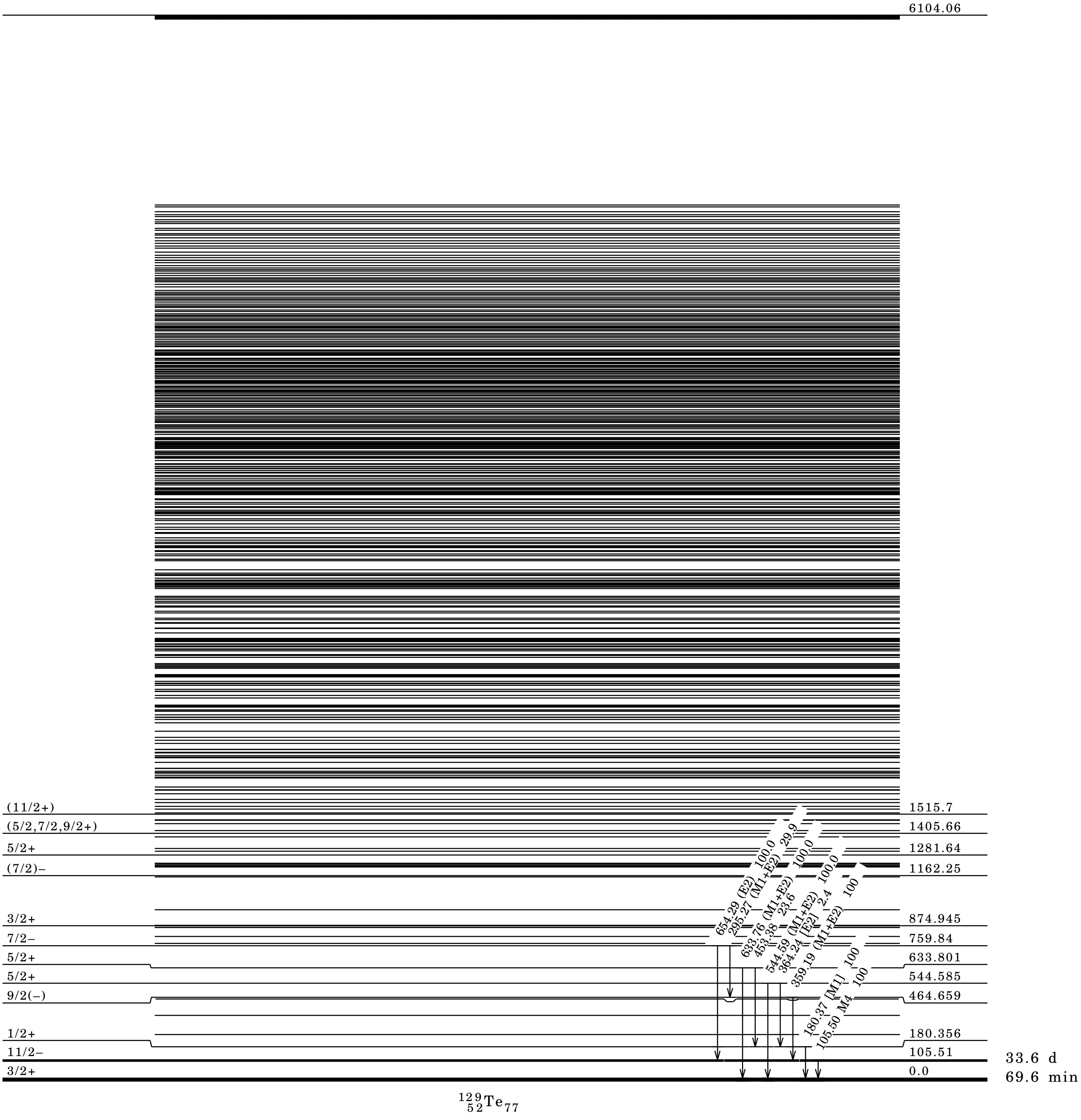
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{129}Sb β$^-$ Decay (4.366 h) 1989WaZJ,1995StZZ

Parent ^{129}Sb: E=0.0; Jπ=7/2+; T$_{1/2}$=4.366 h *26*; Q(g.s.)=2376 *21*; %β$^-$ decay=100.

^{129}Sb–Q(β$^-$): From 2012Wa38.

^{129}Sb–J,T$_{1/2}$: From ^{129}Sb Adopted Levels.

1989WaZJ: ^{129}Sb from fission, mass separated source, measured Eγ, Iγ, γγ coin.

1995StZZ: measured γ(θ) by low–temperature nuclear orientation method, deduced mixing ratios. This report is based on a thesis by M. Lindroos, Chalmers University of Technology, Goteborg, Sweden.

1970Oh05: source from ^{130}Te(γ,p). Measured Eγ, Iγ, β; γγ– and βγ–coin. A total of 55 γ rays were reported with 48 placed amongst 22 levels; only one level at 1736 is not confirmed in 1989WaZJ.

1970Ca23: ^{235}U(n,F) and ^{130}Te(γ,p). Measured Eγ, Iγ, γγ. A total of 85 gamma rays were reported with 60 placed amongst 33 levels, nine of these levels have not been confirmed by 1989WaZJ.

The present decay scheme is from 1989WaZJ, which represents an extension and major revision of previous decay schemes proposed in 1970Ca23 and 1970Oh05.

^{129}Te Levels

The following levels proposed in 1970Ca23 have been omitted since not confirmed by 1989WaZJ: 244.5, 350.1, 948.6, 1302.0, 1415.2, 2042.0, 2199.0, 2221,6 and 2262.5.

E(level)†	Jπ‡	T$_{1/2}$‡	Comments
0.0	3/2+	69.6 min *3*	
105.49 *4*	11/2−	33.6 d *1*	%IT=63 *17*; %β$^-$=37 *17*.
180.37 *4*	1/2+		Jπ: isotropic γ(θ) consistent with 1/2.
464.64 *6*	9/2(−)		Jπ: 7/2− not allowed by γ(θ).
544.64 *4*	5/2+		
633.85 *4*	5/2+		
759.83 *7*	7/2−		Jπ: γ(θ) can fit 7/2, 9/2 and 11/2, but 7/2− from Adopted Levels.
812.96 *4*	7/2+		
875.00 *5*	3/2+		
966.86 *4*	5/2+		
1227.98 *5*	(7/2−,9/2+)		Jπ: from γ(θ). 5/2 ruled out by γ(θ) of 500γ from 1727 level; 9/2 less favorable from γ(θ) of 525γ from 1754 level but not ruled out.
1281.72 *5*	5/2+		Jπ: from γ(θ) and decay modes; 7/2+ is not allowed by 1282γ(θ).
1318.23 *5*	7/2+		
1384.96 *10*	(3/2−,5/2,7/2+)		
1405.69 *8*	(5/2,7/2,9/2+)		
1460.82 *9*	(5/2,7/2,9/2+)		
1481.26 *8*	(3/2−,5/2,7/2+)		
1483.35 *8*	7/2+		
1545.14 *11*	7/2+,9/2+		
1581.99 *6*	7/2+		
1600.05 *6*	5/2+		Jπ: from γ(θ). Jπ=5/2− and 7/2+ are not allowed by γ(θ).
1632.57 *6*	7/2−,9/2+		Jπ: from γ(θ). 9/2− ruled out by 405γ(θ).
1656.12 *7*	5/2+		Jπ: from γ(θ). 7/2 ruled out by 1656γ(θ).
1727.95 *5*	(9/2)+		
1751.11 *13*	(5/2,7/2,9/2)		
1753.32 *6*	5/2+		Jπ: from γ(θ) and particle–transfer data. 3/2+ not allowed by 525γ(θ) and 941γ(θ).
1762.46 *8*	(5/2+)		
1777.8 *10*	(5/2,7/2,9/2+)		
1779.79 *10*	5/2+		
1843.62 *5*	(9/2)+		Jπ: from γ(θ) and log *ft*=5.3 from 7/2+.
1867.71 *11*	(5/2,7/2+)		
1871.61 *5*	5/2+		Jπ: from γ(θ) and decay modes. J=5/2−,7/2− not allowed by 1327γ(θ).
1921.30 *11*	(5/2)+		
1939.45 *7*	(5/2,7/2,9/2)		
2071.42 *5*	5/2+		Jπ: from γ(θ). 7/2+ ruled out by 2071γ(θ).
2086.10 *6*	(7/2+)		
2114.62 *4*	5/2+		Jπ: from γ(θ). 7/2+ ruled out by 2115γ(θ).
2131.24 *8*	7/2−		
2134.89 *8*	(5/2−,7/2+)		
2265.29 *8*	(5/2+,7/2+)		

† From least–squares fit to Eγ data by assuming minimum uncertainty of 0.1 keV for Eγ. In addition following Eγ values were left out of the fitting procedure due to their poor fit in the level scheme: 314.4 from 1481 level, 1646.79 from 1753 level, 1211.89 from 2086 level, 1669.16 from 2134 level. Without making these adjustments and using the uncertainties as quoted in 1989WaZJ, reduced χ^2=64 and 53 Eγ values fall outside 3σ. Using 0.05 minimum uncertainty for Eγ improved the fit but still with reduced χ^2=5.0 and about 15 γ rays deviating from the fitted values by more than 3σ.

‡ From Adopted Levels.

^{129}Sb β$^-$ Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

β$^-$ radiations

Eβ$^-$	E(level)	Iβ$^-$†‡	Log *ft*	Comments
(111 *21*)	2265.29	0.46 *4*	4.8 *3*	av Eβ=28.9 *59*.
(241 *21*)	2134.89	0.119 *3*	6.5 *1*	av Eβ=67.1 *65*.
(245 *21*)	2131.24	0.216 *9*	6.3 *1*	av Eβ=68.2 *66*.
(261 *21*)	2114.62	2.06 *4*	5.4 *1*	av Eβ=73.3 *66*.
(290 *21*)	2086.10	0.67 *7*	6.0 *1*	av Eβ=82.3 *68*.
(305 *21*)	2071.42	2.46 *4*	5.5 *1*	av Eβ=87.0 *68*.
(437 *21*)	1939.45	0.174 *4*	7.18 *8*	av Eβ=131.0 *73*.
(455 *21*)	1921.30	0.100 *3*	7.48 *7*	av Eβ=137.3 *74*.
(504 *21*)	1871.61	1.533 *23*	6.45 *7*	av Eβ=154.8 *75*.
(508 *21*)	1867.71	0.105 *4*	7.62 *7*	av Eβ=156.2 *76*.
(532 *21*)	1843.62	25.5 *4*	5.31 *6*	av Eβ=164.8 *76*.
(596 *21*)	1779.79	0.0781 *22*	7.99 *6*	av Eβ=188.1 *78*.
(598 *21*)	1777.8	0.053 *25*	8.2 *2*	av Eβ=188.8 *78*.
(614 *21*)	1762.46	0.0656 *20*	8.11 *6*	av Eβ=194.5 *79*.
(623 *21*)	1753.32	2.16 *5*	6.61 *6*	av Eβ=197.9 *79*.
(625 *21*)	1751.11	1.55 *4*	6.76 *6*	av Eβ=198.7 *79*.
(648 *21*)	1727.95	29.9 *5*	5.53 *5*	av Eβ=207.3 *79*.
(720 *21*)	1656.12	1.410 *23*	7.02 *5*	av Eβ=234.6 *81*.
(743 *21*)	1632.57	3.15 *7*	6.72 *5*	av Eβ=243.7 *82*.
(776 *21*)	1600.05	2.94 *5*	6.82 *5*	av Eβ=256.3 *82*.
(794 *21*)	1581.99	0.441 *22*	7.68 *5*	av Eβ=263.3 *83*.
(831 *21*)	1545.14	0.050 *4*	8.69 *6*	av Eβ=277.8 *84*.
(893 *21*)	1483.35	0.54 *4*	7.77 *5*	av Eβ=302.4 *85*.
(895 *21*)	1481.26	0.292 *14*	8.04 *5*	av Eβ=303.2 *85*.
(915 *21*)	1460.82	0.192 *20*	8.26 *6*	av Eβ=311.4 *85*.
(970 *21*)	1405.69	0.109 *4*	8.60 *4*	av Eβ=333.8 *86*.
(991 *21*)	1384.96	0.128 *10*	8.56 *5*	av Eβ=342.2 *86*.
(1058 *21*)	1318.23	4.02 *7*	7.17 *4*	av Eβ=369.6 *87*.
(1094 *21*)	1281.72	0.693 *21*	7.99 *4*	av Eβ=384.7 *88*.
(1148 *21*)	1227.98	2.07 *8*	7.59 *4*	av Eβ=407.2 *89*.
(1409 *21*)	966.86	2.29 *13*	7.89 *4*	av Eβ=518.6 *91*.
(1563 *21*)	812.96	3.1 *6*	7.93 *9*	av Eβ=585.7 *93*.
(1616 *21*)	759.83	3.77 *6*	7.90 *3*	av Eβ=609.1 *93*.
(1742 *21*)	633.85	1.08 *4*	8.57 *3*	av Eβ=664.9 *94*.
(1831 *21*)	544.64	2.74 *17*	8.26 *4*	av Eβ=704.7 *94*.
(1911 *21*)	464.64	0.38 *3*	9.19 *4*	av Eβ=740.6 *95*.
(2271 *21*)	105.49	3 *1*	9.76^{1u} *15*	av Eβ=899.8 *94*. Iβ$^-$: measured in singles β spectrum (1966Ta05). This value is consistent with a total feeding of ^{129}Te g.s.=84.3% *11* in the fission yield study by 1969Er01.

† From γ–ray intensity balance unless otherwise stated. From the level scheme, β feeding to 180.37, 1/2+ level is 0.34% *17*, whereas none is expected. In the opinion of the evaluators, this apparent feeding is due to poor knowledge of the intensity of 180.42γ; note that Iγ=2.389 in 1989WaZJ is much lower which gives a non–physical negative β feeding of about 1.5%.

‡ Absolute intensity per 100 decays.

γ(^{129}Te)

U_2A_2 values are from 1995StZZ.

Following weak γ rays with Eγ (Iγ) reported in 1970Ca23 have not been confirmed by 1989WaZJ and are omitted: 125.1 (w), 136.8 (w), 165.0 (0.08 *2*), 197.4 (0.15 *5*), 217.2 (0.03 *2*), 226.3 (0.05 *2*), 232.1 (0.70 *2*), 950.6 (0.05 *3*), 984.3 (0.15 *5*), 1066.8 (0.12 *7*), 1139.2 (0.4 *1*), 1155.0 (w), 1161.8 (0.25 *5*), 1223.3 (0.4 *1*), 1752.3 (0.10 *15*), 1919.2 (0.06 *2*), 1975.0 (0.17 *3*), 2011.1 (0.010 *5*), 2030.5 (0.02 *1*), 2042.0 (0.010 *5*), 2091.5 (0.04 *1*), 2198.9 (0.13 *3*), 2262.5. Energy uncertainty is ≈1 keV.

Iγ normalization: Summed I(γ+ce)=97 *1* to g.s. and 105.5 level. Beta feeding to 105.49, 11/2– level is taken as 3% *1* (1966Ta05). No β feeding is expected to g.s. About 1.5% absolute γ-ray intensity remains unplaced in level scheme.

Eγ†	E(level)	Iγ‡@	Mult.#	α	Comments
95.42 *3*	1727.95	0.093 *3*	[D,E2]	1.1 *9*	

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^{129}Sb β$^-$ Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

γ(^{129}Te) (continued)

Eγ[†]	E(level)	Iγ[‡@]	Mult.[#]	α	Comments
105.50 *5*	105.49		M4	429 *7*	Eγ,Mult.: from Adopted Gammas. I(γ+ce): total transition intensity feeding the 105.5 level is 27.4 *2*, out of which 17.3 units proceed by isomeric transition. α(K)=217 *3*; α(L)=165.3 *24*; α(M)=38.5 *6*; α(N)=7.43 *11*; α(O)=0.656 *10*.
115.84 *4*	1843.62	0.181 *6*	[M1+E2]	0.7 *3*	
146.11 *1*	1727.95	0.188 *3*	[M1+E2]	0.34 *11*	
180.42 *1*	180.37	5.9 *3*	[M1]	0.1318	Iγ: from 1970Oh05. Value of 2.389 *19* in 1989WaZJ seems too low which gives non-physical negative β feeding of ≈1.5%. U_2A_2=+0.03 *2*.
244.53 *1*	1727.95	0.837 *8*	[M1+E2]	0.067 *9*	U_2A_2=+0.35 *11*.
268.48 *2*	812.96	0.444 *7*	(M1+E2)	0.051 *5*	δ(E2/M1)=+0.47 *19* or +8.5 *59* from U_2a_2=−0.33 *17*.
^{x}290.48 *4*		0.124 *5*			
295.26 *1*	759.83	1.718 *17*	(M1+E2)	0.038 *3*	δ(E2/M1)=−0.07 *4* or −6.3 *15* for J(760)=7/2; δ(E2/M1)=−0.65 *9* or +3.5 *8* for J(634)=9/2; δ(E2/M1)=+0.13 *3* or −20 to +80 for J(634)=11/2 from U_2a_2=+0.05 *5*.
314.40 *2*	1281.72	0.255 *5*			
318.36 *1*	1600.05	0.471 *5*			
330.33 *4*	875.00	0.151 *7*			
333.21 *2*	966.86	0.354 *8*			
351.46 *11*	1318.23	0.156 *17*			
354.13 *8*	1581.99	0.201 *20*			
359.20 *1*	464.64	4.96 *5*	(M1+E2)	0.0216 *4*	δ(E2/M1)=−0.025 *22* or −27 *14* from U_2a_2=+0.20 *3*.
364.21 *3*	544.64	0.632 *16*	[E2]	0.0209	
^{x}398.97 *5*		0.143 *6*			
404.64 *1*	1632.57	2.432 *24*	(M1+E2)	0.013 *2*	δ(E2/M1)=+0.47 *5* or +3.65 *65* for 9/2 to 7/2; δ(E2/M1)=+0.10 *4* or +0.71 *16* for 9/2 to 9/2; δ(E2/M1)=+0.12 *19* or +0.93 *34* for 7/2 to 7/2; δ(E2/M1)=−0.45 to −1.73 for 7/2 to 9/2 from U_2a_2=−0.44 *6*.
409.71 *2*	1727.95	0.480 *10*			
415.17 *4*	1227.98	0.200 *8*			
421.72 *10*	966.86	0.104 *8*			Eγ: poor fit, level-energy difference=422.22.
^{x}434.74		0.231			
435.04[§] *9*	1753.32	0.44 *3*			
453.44 *1*	633.85	1.116 *13*			
471.54 *9*	1753.32	0.094 *8*			
499.99 *1*	1727.95	0.892 *9*			δ(E2/M1)=−0.14 to −3.2 for J(1228)=7/2 from U_2a_2=+0.8 *3*; no fit if J(1228)=5/2 or 9/2.
505.33 *1*	1318.23	1.074 *11*			
514.43 *8*	1481.26	0.304 *25*			
523.13[§] *12*	1751.11	3.21 *6*			U_2A_2=−0.24 *6*.
525.23	1753.32	0.341			δ(E2/M1)=−0.34 *7* or +4.0 *75* for J(1228)=7/2 from U_2a_2=−0.24 *6*; no fit if J(1228)=9/2.
^{x}539.52 *6*		0.159 *12*			
544.56 *1*	544.64	32.0 *3*	(M1+E2)	0.0070 *6*	δ(E2/M1)=+0.49 *3* or +6.0 *7* from U_2a_2=−0.43 *2*.
^{x}566.96 *2*		0.283 *5*			
589.98 *25*	1871.61	0.046 *13*			
592.77 *6*	1405.69	0.086 *6*			
606.22 *4*	1481.26	0.302 *9*			
^{x}630.29					
633.74 *1*	633.85	5.24 *5*	(M1+E2)		δ(E2/M1)=+0.58 *5* or +4.3 *7* for J(634)=5/2 from U_2a_2=−0.41 *3*. Possible doublet.
647.94 *2*	1460.82	0.258 *6*			
654.28 *1*	759.83	6.16 *6*			E2 for J(760)=7/2; δ(E2/M1)=−0.26 *3* or −2.95 *25* for J(634)=9/2; δ(E2/M1)=−0.34 *5* or +1.35 *11* for J(634)=11/2 from U_2a_2=−0.19 *3*.
657.61	1939.45				
670.31 *4*	1483.35	1.99 *7*			

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^{129}Sb β^{-} Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

γ(^{129}Te) (continued)

Eγ[†]	E(level)	Iγ[‡@]	Mult.[#]	Comments
682.77[§] *1*	1227.98	11.94 *12*		Eγ: poor fit, level–energy difference=683.34. E2 for J(1228)=9/2; δ(E2/M1)=+0.46 *8* or +4.8 *14* for J(1228)=7/2 from U_2a_2=–0.36 *2*.
684.18 *1*	1318.23	1.290 *13*		
^{x}688.59 *8*		0.34 *3*		
694.77 *3*	875.00	0.837 *20*		
^{x}697.78		0.528		
^{x}703.36 *5*		0.198 *8*		
707.08 *3*	1581.99	0.286 *9*		
^{x}715.49 *14*		0.105 *17*		
737.07 *1*	1281.72	0.921 *9*	(M1+E2)	δ(E2/M1)=–0.11 *18* or +2.4 *10* from U_2a_2=–0.28 *16*.
761.12 *1*	1727.95	8.96 *9*	(E2)	Mult.: U_2A_2=–0.43 *3* consistent with E2.
768.98 *2*	1581.99	0.665 *10*		
773.37 *1*	1318.23	5.86 *6*		δ(E2/M1)=+0.03 *4* or +1.53 *14* from U_2a_2=–0.41 *3*.
786.36 *1*	966.86	2.221 *22*	[E2]	
787.16 *1*	1600.05	3.60 *4*	(M1+E2)	Iγ: from 1995StZZ. 1989WaZJ list 1.819 *4*. δ(E2/M1)=+0.06 *24* or –1.4 *79* from U_2a_2=+0.11 *9*.
796.21 *6*	2114.62	0.084 *6*		
812.97 *1*	812.96	100.0 *10*	(E2)	Mult.: U_2A_2=–0.41 *3* consistent with E2.
819.51 *2*	1632.57	2.88 *6*		
826.75 *16*	1460.82	0.14 *4*		
832.99 *16*	2114.62	0.13 *3*		
840.17 *22*	1384.96	0.057 *19*		
849.57 *5*	2131.24	0.157 *6*		
861.00 *3*	1405.69	0.141 *3*		
874.89 *3*	875.00	1.108 *10*	(M1+E2)	δ(E2/M1)=0.00 *2* or +3.9 *4* from U_2a_2=–0.40 *3*.
876.65 *3*	1843.62	5.70 *13*		
903.19 *8*	2131.24	0.291 *15*		
914.96 *1*	1727.95	48.4 *5*	(M1+E2)	δ(E2/M1)=+0.105 15 or –15.5 30 from U_2A_2=+0.10 *2*.
^{x}939.52		0.398		
940.51[§] *12*	1753.32	1.59 *7*		δ(E2/M1)=–0.68 to –1.11 from U_2a_2=–0.45 *5*.
966.78 *1*	966.86	18.58 *19*	(M1+E2)	δ(E2/M1)=+0.18 *1* or –9.1 *10* from U_2a_2=+0.02 *2*.
992.70 *4*	1867.71	0.217 *8*		
996.54 *3*	1871.61	0.365 *8*		
1000.50 *8*	1545.14	0.104 *8*		
1022.12 *7*	1656.12	0.061 *6*		
1030.65 *1*	1843.62	31.4 *3*	(M1+E2)	δ(E2/M1)=+0.077 *13* or –10.8 *15* from U_2a_2=+0.146 *21*.
1037.29 *4*	2265.29	0.636 *20*		
^{x}1042.30 *6*		0.088 *6*		
^{x}1053.02 *5*		0.109 *6*		
1087.98 *3*	1632.57	0.852 *18*		
1104.52 *1*	2071.42	0.707 *7*	(M1+E2)	δ(E2/M1)=–0.13 *12* or +2.45 *75* from U_2a_2=–0.25 *11*.
1122.48 *3*	1227.98	0.191 *6*		
1126.57 *3*	1939.45	0.248 *6*		
1147.59 *3*	2114.62	0.185 *5*		
1167.95 *2*	1632.57	0.525 *7*		
1179.63 *4*	1939.45	0.112 *4*		
1196.42 *2*	2071.42	0.177 *3*		
1209.03 *3*	1753.32	1.95 *3*	(M1+E2)	Eγ: poor fit, level–energy difference=1208.68. δ(E2/M1)=–0.30 *5* or +4.0 *75* from U_2a_2=–0.08 *5*.
1211.89 *17*	2086.10	0.79 *13*		Eγ: poor fit, level–energy difference=1211.10.
1233.2 *6*	1777.8	0.11 *5*		
1237.81[§] *12*	1871.61	0.501 *10*	(M1+E2)	δ(E2/M1)=+0.09 *6* or –5.3 *17* for J(634)=3/2; δ(E2/M1)=–0.65 *17* or –7 to +10 for J(634)=5/2 from U_2a_2=+0.18 *10*.
^{x}1238.62				
1258.44 *1*	2071.42	0.834 *8*	(M1+E2)	δ(E2/M1)=–0.37 *15* or –2.05 *65* from U_2a_2=–0.24 *10*.
1263.30 *1*	1727.95	1.887 *19*	(E1)	U_2a_2=–0.43 *6* consistent with E1.
1273.10 *2*	2086.10	0.341 *7*		
^{x}1276.13 *7*		0.213 *19*		
1281.72 *1*	1281.72	1.160 *12*	(M1+E2)	δ(E2/M1)=–0.10 *7* or –2.45 *45* from U_2a_2=+0.49 *12*.
1287.45 *3*	1921.30	0.208 *5*		
1298.7 *4*	2265.29	0.24 *8*		
1301.45 *5*	2114.62	0.419 *16*		

Continued on next page (footnotes at end of table)

^{129}Sb β^- Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

$\gamma(^{129}$Te) (continued)

Eγ†	E(level)	Iγ‡@	Mult.#	Comments
1318.30 *1*	1318.23	0.958 *10*		δ(E2/M1)=+0.55 *8* or +4.8 *13* from U_2a_2=−0.49 *7*.
1326.98 *1*	1871.61	1.442 *14*	(M1+E2)	δ(E2/M1)=+0.30 *15* or +0.92 *24* from U_2a_2=−0.56 *6*.
1384.98 *3*	1384.96	0.208 *5*		
1419.40 *12*	1600.05	0.818 *10*	(E2)	E2 from U_2A_2=−0.36 *8*.
^{x}1421.23		0.078		
1437.52 *2*	2071.42	0.655 *10*	(M1+E2)	δ(E2/M1)=+0.03 *8* or −4.1 *13* for J(634)=3/2; δ(E2/M1)=−1.0 *4* or −2.2 to +45 for J(634)=5/2 from U_2a_2=+0.28 *13*.
1475.91 *3*	1656.12	0.145 *3*		
1480.94§ *12*	2114.62	0.774 *11*		
^{x}1483.04		0.085		
1501.04 *4*	2134.89	0.124 *4*		
1526.84 *1*	2071.42	1.136 *11*	(M1+E2)	δ(E2/M1)=−0.10 *9* or +2.1 *5* from U_2a_2=−0.28 *8*.
1541.47 *3*	2086.10	0.139 *4*		
1570.09 *1*	2114.62	1.810 *18*	(M1+E2)	δ(E2/M1)=−0.10 5 or +2.1 3 from U_2A_2=−0.28 *5*.
1582.11 *5*	1762.46	0.070 *3*		
1600.13 *1*	1600.05	1.201 *12*	(M1+E2)	δ(E2/M1)=+0.77 *11* or +2.7 *6* from U_2a_2=−0.65 *7*.
1606.72 *1*	2071.42	0.041 *4*		
1622.46 *1*	1727.95	0.431 *4*	(E1(+M2))	δ(E2/M1)=−0.07 *10* or −17 *13* from U_2a_2=+0.06 *14*; but Δ(Jπ) required E1.
1646.79 *5*	1753.32	0.056 *2*	[E3]	Eγ: poor fit, level−energy difference=1647.83.
1656.10 *1*	1656.12	2.72 *3*	(M1+E2)	δ(E2/M1)=+0.02 *3* or −3.65 *40* from U_2a_2=+0.29 *5*.
1669.16 *7*	2134.89	0.045 *3*		Eγ: poor fit, level−energy difference=1670.25.
1691.24 *4*	1871.61	0.088 *3*		
^{x}1724.31 *2*		0.276 *4*		
^{x}1727.77 *2*		0.060 *13*		
1738.16 *1*	1843.62	15.46 *15*		U_2A_2=+0.114 *19*.
1762.42 *5*	1762.46	0.066 *2*		
1779.78 *4*	1779.79	0.162 *4*		
1843.49& *1*	1843.62	0.043 *12*	[M3]	
1871.58 *1*	1871.61	0.739 *7*	(M1+E2)	δ(E2/M1)=−0.07 *6* or −2.75 *55* from U_2a_2=+0.43 *10*.
1891.10 *7*	2071.42	0.033 *2*		
^{x}1917.36 *3*		0.112 *3*		
^{x}1934.24 *3*		0.112 *3*		
^{x}2002.36 *6*		0.065 *3*		
2071.36 *1*	2071.42	1.513 *15*	(M1+E2)	δ(E2/M1)=−0.29 *8* or +1.55 *25* from U_2a_2=+0.74 *8*.
2086.11 *2*	2086.10	0.112 *2*		
2114.67 *1*	2114.62	0.868 *9*	(M1+E2)	δ(E2/M1)=+0.17 *5* or −9.2 *33* from U_2a_2=+0.04 *8*.
2134.86 *3*	2134.89	0.077 *2*		
^{x}2223.42 *5*		0.058 *2*		
2265.27 *4*	2265.29	0.070 *2*		

† From 1989WaZJ. The evaluators assign minimum uncertainty of 0.1 keV for the purpose of least−squares fit. In Adopted dataset increased uncertainties are used when taken from this dataset. Values from 1970Ca23 and 1970Oh05 are listed in the dataset under 'documentation' records.

‡ From 1989WaZJ unless otherwise stated. The evaluators assign minimum uncertainty of 1% for gamma−ray intensity in cases where 1989WaZJ quote an uncertainty lower than 1%. Values from 1970Ca23 and 1970Oh05 are listed in the dataset under 'documentation' records.

§ Doublet.

\# From γ(θ) and other considerations as explained in 1995StZZ. Almost all mixing ratios are double values (a low δ and a high δ); these are given under comments.

@ For absolute intensity per 100 decays, multiply by 0.482 *6*.

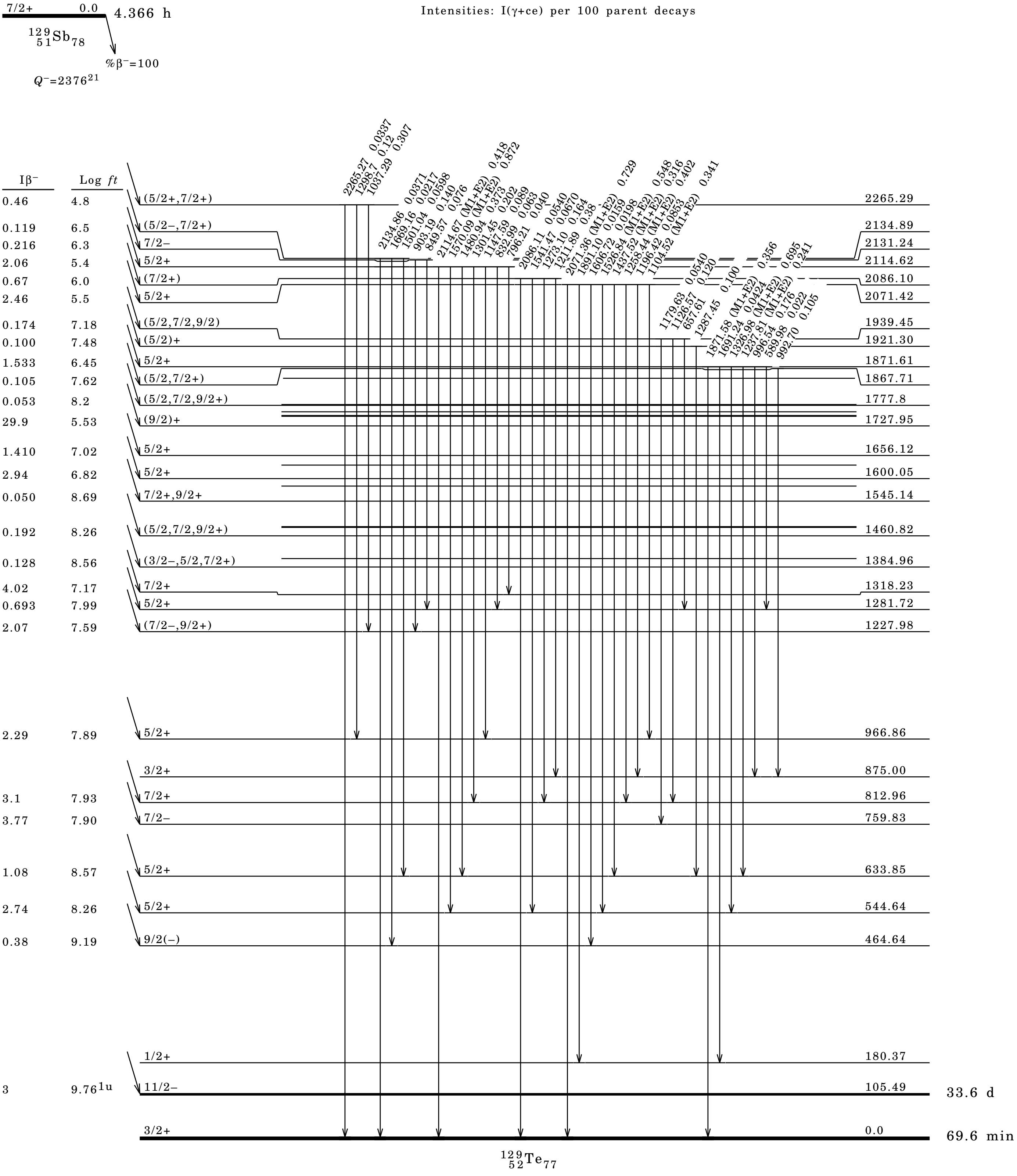
& Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

^{129}Sb β^- Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays

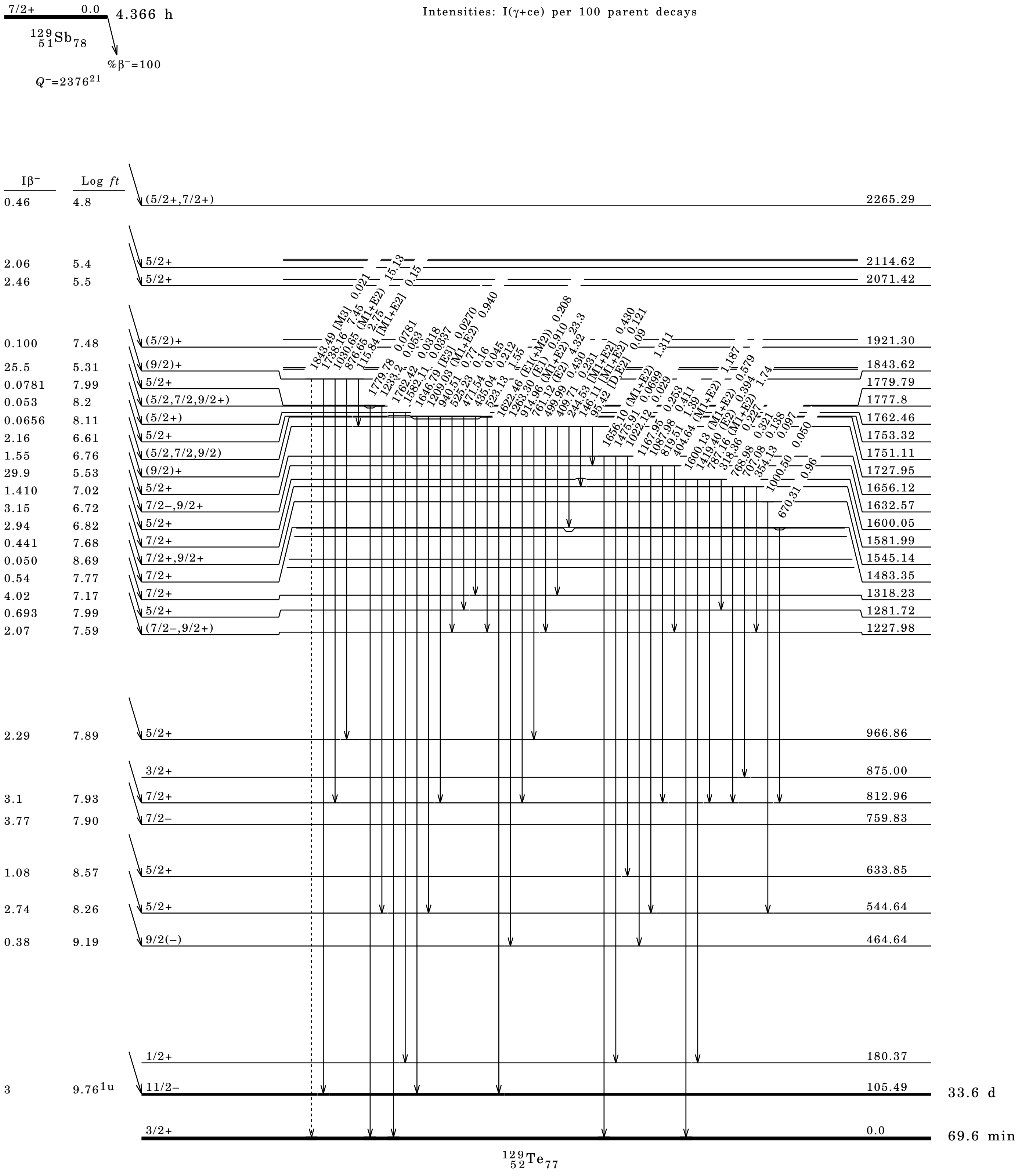


From NNDC(BNL)
program ENSDAT

^{129}Sb β^- Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays

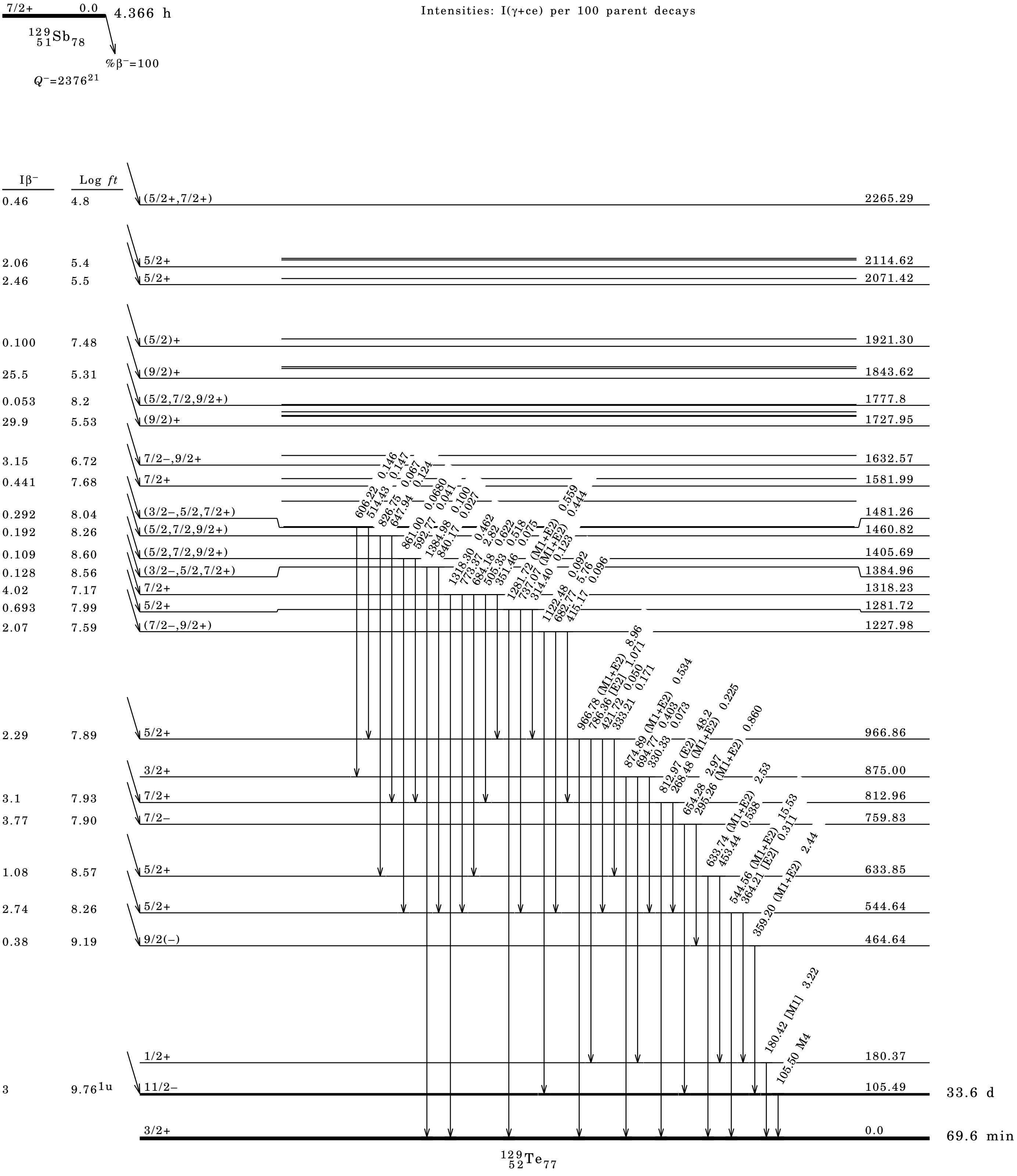


From NNDC(BNL)
program ENSDAT

^{129}Sb β⁻ Decay (4.366 h) 1989WaZJ,1995StZZ (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays



^{129}Sb β^- Decay (17.7 min) 1995Zh37,1987St23,1982Hu09

Parent ^{129}Sb: E=1850.31 *6*; Jπ=(19/2−); $T_{1/2}$=17.7 min *1*; Q(g.s.)=2376 *21*; %β^- decay≈85.0.

^{129}Sb-Q(β^-): From 2012Wa38.

^{129}Sb-E,J,$T_{1/2}$: From ^{129}Sb Adopted Levels.

1988StZQ, 1987St23: ^{235}U(n,f) E=th, on-line mass separator; Ge detector, Eγ, Iγ, ce, γγ-coin, half-life.

1982Hu09: ^{235}U(n,F) E=th, on-line mass separator; Ge detector, γγ-coin, half-life. A total of 29 γ rays reported up to 1843 keV, but only a few are common with those from 1987St23.

1988Go19 assigned a 16.7-min isomer to ^{131}Sb based on observation 433.8 and 642.3 gamma rays, but in an erratum (Phys. Rev. C 39, 1646 (1989) the authors revised its assignment to ^{129}Sb based on the work of 1982Hu09 and 1987St23; and also stated that 433.8 and 642.3 γ rays were in coin with a 759γ. While 433.8 and 759γ are confirmed in this decay, the origin of 642γ is not known.

1995Zh37: 17.7-min isomer produced in ^{130}Te(^{64}Ni,X) at 275 MeV. The authors estimate that ≈68% decay feeds the 1958, (21/2−) level in ^{129}Te which decays by 434–658–760 γ cascade to 11/2− isomer at 105 keV.

^{129}Te Levels

Since the gamma-ray data from 1982Hu09 and 1988StZQ are in severe disagreement, only those transitions are placed in a level scheme which are consistent with in-beam high-spin γ-ray data from 1998Zh09, 1995Zh37.

E(level)	Jπ†	$T_{1/2}$†	Comments
0.0	3/2+	69.6 min *3*	
105.50 *5*	11/2−	33.6 d *1*	%IT=63 *17*; %β^-=37 *17*.
865.3 *1*	15/2(−)		
1523.08 *14*	19/2(−)		
1654.0 *1*	(17/2−,19/2−)		
1956.84 *16*	(21/2−)		

† From Adopted Levels.

β^- radiations

Eβ^-	E(level)	Iβ^-†‡	Log *ft*	Comments
(2269 *21*)	1956.84	≈63	≈6.1	av Eβ=903.8 *96*. Iβ^-: 1995Zh37 estimate ≈68%.
(2572 *21*)	1654.0	≈10	≈7.1	av Eβ=1042.9 *97*.

† From intensity balance. These feedings should be considered as approximate since the decay scheme is not well established.

‡ For β^- intensity per 100 decays, multiply by ≈1.0.

γ(^{129}Te)

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-------------------------------------------------------------
               Gamma-ray data from 1982Hu09
   Eγ        Iγ      Level      Eγ        Iγ       Level

   39.0 2    6.0 20  1548.5      583.3 4    1.5 5
   61.1 8    3.0 10              657.78 8#  92 8      1417.6@
   63.6 9   10.0 30              684.6 2#   3.5 10    2102.1
  130.9 1    6.0 20              759.8 1#  100.0 9     759.8@
  146.0 2    1.8 5               788.7 2    4.0 15    1548.5@
  186.0 4    1.7 5               793.5 3    5.0 15
  250.5 2    2.0 5   2102.1      825.4 3    8.5 30
  281.1 4    1.0 3              1063.2 4    2.0 10
  346.9 3    2.0 5              1068.8 2#   4.0 15    1828.4
  410.8 1#   8.5 20  1828.4     1091.4 2    3.0 10    1851.4
  433.76 8#  73 8    1851.4@    1225.5 2    4.0 10
  435.6 3    1.8 5              1327.1 3    2.8 10
  438.0 2    1.8 5              1417.6 3    3.4 12    1417.6
  443.0 4    1.4 5              1843.1 5    1.8 5
  453.5 2    4.0 12

  @Energy of 105 keV should be added since the cascades are built
   on 105-keV, 11/2- isomer.
  # γ near this energy reported in 1988StZQ
------------------------------------------------------------------
           Gamma-ray data from 1988StZQ, 1987St23
```

Continued on next page (footnotes at end of table)

^{129}Sb β^- Decay (17.7 min) 1995Zh37,1987St23,1982Hu09 (continued)

γ(^{129}Te) (continued)

Eγ	Level	Eγ	Level
232	2190	544@	544
239	2020	658#	1524
257	1781	684#@	1228
307	2109	752	2275
320	2109	754	1621
314&	1934	761#	857
341	2275	814@	814
405	1623	877	1744
410#	1934	929	1796
434	1958	1031	1845
523	2157	1067#	1934

& 314γ shown incorrectly from 1958 level in Fig 6 of 1988StZQ

γ near this energy reported in 1982Hu09

@ γ may be from decay of 4.366-h ^{129}Sb populated by IT decay of 17.7-min ^{129}Sb

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Iγ normalization: Iγ(759.8)=100.

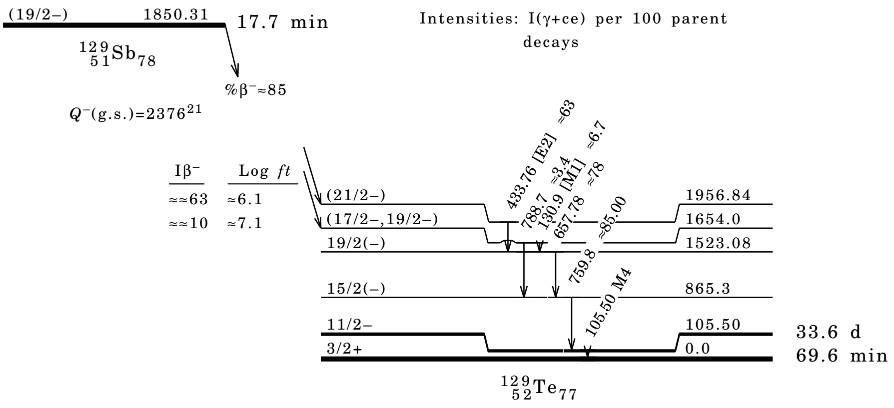
Eγ[†]	E(level)	Iγ[†][‡]	Mult.	α	Comments
105.50 *5*	105.50		M4		Eγ,Mult.: from Adopted Gammas.
130.9 *1*	1654.0	6.0 *20*	[M1]	0.32	
433.76 *8*	1956.84	73 *8*	[E2]	0.0123	
657.78 *8*	1523.08	92 *8*			
759.8 *1*	865.3	100.0 *9*			
788.7 *2*	1654.0	4.0 *15*			

[†] From 1982Hu09 unless otherwise stated.

[‡] For absolute intensity per 100 decays, multiply by ≈0.85.

^{129}Sb β$^-$ Decay (17.7 min) 1995Zh37,1987St23,1982Hu09 (continued)

Decay Scheme



^{129}Te IT Decay (33.6 d) 1969Di01

Parent ^{129}Te: E=105.50 *5*; Jπ=11/2–; $T_{1/2}$=33.6 d *1*; %IT decay=63 *17*.
1969Di01: produced by ^{130}Te(n,2n), ^{128}Te(n,γ); Ge detector, γγ-coin.
See also ^{129}Sb β$^-$ decay.

^{129}Te Levels

E(level)	Jπ†	$T_{1/2}$†	Comments
0.0	3/2+	69.6 min *3*	
105.50 *5*	11/2–	33.6 d *1*	%IT=63 *17*; %β$^-$=37 *17*. %IT,%β$^-$: Deduced by the evaluators from the measured ratio Iβ(to g.s.)/Iβ(to 27 level in ^{129}I)=0.58 *18* in equilibrium od 33.6-d and 69.6-min ^{129}Te activities (1964De10,1969Di01) along with the ^{129}I level scheme from 1976Ma35.

† From Adopted Levels.

γ(^{129}Te)

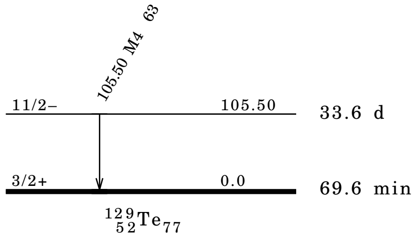
Eγ	E(level)	Iγ†	Mult.	α	I(γ+ce)†	Comments
105.50 *5*	105.50	0.23 *1*	M4	429 *7*	100	ce(K)/(γ+ce)=0.505 *8*; ce(L)/(γ+ce)=0.384 *6*; ce(M)/(γ+ce)=0.0895 *18*; ce(N+)/(γ+ce)=0.0188 *4*. ce(N)/(γ+ce)=0.0173 *4*; ce(O)/(γ+ce)=0.00152 *3*. α(K)=217 *3*; α(L)=165.3 *24*; α(M)=38.5 *6*; α(N)=7.43 *11*; α(O)=0.656 *10*. Mult.: α(K)exp=213 *10* (1977So06), ce(K)/(γ+ce)=0.503 *7*, ce(L)/(γ+ce)=0.383 *7*, ce(M+)/(γ+ce)=0.112 *3*, K:L:M:N+=1.29 *4*:1:<0.26:0.053 *4* (1972Ka61), L1:L2:L3=0.767 *39*:0.166 *18*:1 (1972Ka61), M1/M23=1/1.84 *53* (1972Ka61), (N+O)/L=0.053 *4* (1972Ka31).

† For absolute intensity per 100 decays, multiply by 0.63 *17*.

^{129}Te IT Decay (33.6 d) 1969Di01 (continued)

Decay Scheme

Intensity: I(γ+ce) per
100 parent decays
%IT=63 *17*



^{128}Te(n,γ) E=thermal 2003Wi02

2003Wi02 (also 1999Bo31): measured Eγ, Iγ, γγ coin using two HPGe detectors.

1994SwZZ: measured γγ, γγ(θ). Two levels at 875,(3/2+) and 937,(1/2+) reported. No details are given in this paper. The level at 875 keV is confirmed in 2003Wi02 but the level at 937 keV has not been reported in any of the other studies, thus omitted here.

1991StZX: measured Eγ, Iγ at NIST facility. A total of 18 excited states reported up to 2704 keV above the 105-keV isomer.

1981Bu02: enriched target, measured Eγ, Iγ for about 50 γ rays; but report only eight excited states.

2007ChZX: PGAA database: 23 γ rays listed in this database, mainly from 1981Bu02 and 1999Bo31. In Budapest measurements with natural Te target, eight secondary γ rays were reported.

All data are taken from 2003Wi02 since this work is the most complete comprehensive. Partial data reported in 1991StZX and 1981Ho12 are generally in agreement with results from 2003Wi02. 1991StZX report ten primary γ rays and 31 secondary γ rays are listed in 1991StZX, but placements of eight γ rays are different from those given in 2003Wi02. 1981Ho12 mention observation of ≈50 γ rays with Iγ>0.3 per 100 n-captures; however, they report only on those γ rays to levels for which L=1 in (d,p). These data are in agreement with those from 2003Wi02.

^{129}Te Levels

Following levels proposed in 1991StZX have not been adopted here: tentative 936.8, 1717.6, 2229.7, 2443.7, 3995.5, and 3745.5. The γ transitions connected with these levels have been placed elsewhere by 2003Wi02.

E(level)[†]	Jπ[§]	$T_{1/2}$[§]	Comments
0.0	3/2+		
105.49 *5*	11/2–	33.6 d *1*	
180.363[‡] *15*	1/2+		
464.62[‡] *4*	9/2(–)		
544.606[‡] *25*	5/2+		
633.741[‡] *22*	5/2+		
759.81[‡] *4*	7/2–		
773.215 *22*	1/2+		
812.93[‡] *7*	7/2+		
874.880[‡] *21*	3/2+		Jπ: 3/2 from γγ(θ) (1994SwZZ).
966.86[‡] *7*	5/2+		
1162.20 *5*	(7/2)–		
1221.25[‡] *4*	(5/2–,7/2+)		
1233.83 *9*	3/2+,5/2+		
1281.56 *6*	5/2+		
1303.39 *6*	1/2+		
1317.85 *4*	7/2+		
1421.34 *9*	5/2+		
1559.84 *4*	(3/2)–		
1599.39 *10*	5/2+		
1656.25 *9*	5/2+		
1752.28 *7*	(5/2)–		
1851.53 *6*	5/2–,7/2–		
1868.86 *12*	5/2+		

Continued on next page (footnotes at end of table)

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)†	Jπ§	Comments
2040.19‡ *4*	3/2−	
2221.66 *7*	(3/2,5/2+)	
2267.23 *4*	3/2−	
2360.473‡ *21*	3/2−	
2379.557‡ *23*	3/2−	
2493.05 *11*	3/2−	
2524.76‡ *3*	1/2−	
2581.67 *8*	3/2−	
2705.119‡ *21*	1/2−	
3355.46‡ *10*	3/2−	
3429.8 *3*	(3/2)−	
3502.58 *8*	(3/2−)	
3528.28 *10*	(1/2−)	
3546.91 *9*	(3/2−)	
3564.51 *9*	1/2−	
3638.38 *7*	1/2−	
3648.77 *11*	1/2−	
3792.41 *4*	3/2−	
3852.71 *12*	3/2−	
3865.37 *7*	3/2−	
4032.59 *16*	3/2−	
4087.54 *11*	3/2−	
4121.19 *8*	1/2−	
4133.50 *9*	3/2−	
4175.3 *3*	(1/2)−	
4180.67 *18*	(3/2)−	
4204.3 *3*	1/2−	
4220.61 *14*	3/2−	
4240.5 *3*	3/2−	
4277.02 *11*	3/2−	
4297.80 *22*	1/2−	
4356.13 *8*	1/2−	
4364.57 *6*	1/2−	
4374.0 *3*	(1/2,3/2,5/2+)	
4388.93 *10*	1/2−	
4432.93 *9*	3/2−	
4588.48 *12*	(1/2,3/2,5/2+)	
(6082.40 *8*)	1/2+	Jπ: s–wave capture in 0+. E(level): statistical uncertainty=0.023 keV. According to statement in 2003Wi02 about systematic uncertainty in calibration of singles spectra, 0.08 keV has been added in quadrature by evaluators. S(n)=6082.41 *8* (2012Wa38).

† From least–squares fit to Eγ data. According to 2003Wi02, a systematic uncertainty of about 80 eV arising from calibration of singles γ spectra should be added in quadrature.

‡ Level also reported in 1991StZX above the 105–keV isomer.

§ From Adopted Levels.

γ(^{129}Te)

All placed gamma rays are from γγ coin data in 2003Wi02, unless stated otherwise.

Eγ	E(level)	Iγ†§	Comments
^{x}149.65 *5*		0.310 *12*	
180.33 *3*	180.363	44.0 *4*	
^{x}188.42 *23*		0.050 *9*	
^{x}230.1 *3*		0.040 *10*	
295.27 *4*	759.81	1.23 *3*	
^{x}300.81 *14*		0.100 *12*	
330.32 *5*	874.880	1.10 *2*	
338.65 *8*	1559.84	0.45 *3*	
344.55 *10*	2705.119	0.220 *13*	
359.19 *5*	464.62	7.60 *8*	

Continued on next page (footnotes at end of table)

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

γ(^{129}Te) (continued)

Eγ	E(level)	Iγ[†][§]	Comments
364.26 *10*	544.606	0.150 *14*	
^{x}367.90 *7*		0.23 *4*	
^{x}380.2 *3*		0.070 *11*	
^{x}384.75 *17*		0.110 *11*	
^{x}391.6 *4*		0.050 *11*	
^{x}416.67 *9*		0.27 *4*	
427.7 *3*	4220.61	0.050 *9*	
437.4 *4*	2705.119	0.070 *13*	
^{x}439.9 *4*		0.070 *12*	
^{x}443.5 *4*		0.060 *13*	
453.33 *3*	633.741	1.01 *2*	
461.47 *5*	1221.25	0.65 *3*	
480.22[‡] *21*	2040.19	0.28[‡] *4*	
527.90 *8*	2379.557	0.220 *11*	
^{x}531.46 *20*		0.080 *11*	
544.61 *3*	544.606	5.37 *5*	
^{x}546.98 *16*		0.110 *11*	
590.00 *9*	1752.28	0.200 *12*	
592.81 *3*	773.215	0.89 *2*	
^{x}599.34 *23*		0.100 *14*	
623.87 *20*	2493.05	0.090 *12*	
633.78 *3*	633.741	3.92 *4*	
^{x}637.61 *21*		0.080 *11*	
641.84 *17*	2493.05	0.110 *12*	
648.11 *10*	1421.34	0.190 *11*	
654.30 *3*	759.81	2.85 *3*	
^{x}666.98 *14*		0.180 *14*	
669.64 *8*	1303.39	0.250 *13*	
684.6 *3*	1317.85	0.170 *12*	
689.22[#] *9*	1233.83	0.40[#] *6*	
	1851.53	1.01[#] *9*	Iγ: 1.41 in Table 5 of 2003Wi02 is a misprint.
694.49 *3*	874.880	2.17 *2*	
697.59 *3*	1162.20	2.67 *3*	
704.40 *18*	2360.473	0.140 *13*	
707.21 *15*	2267.23	0.41 *6*	
723.22[‡] *14*	2379.557	0.11[‡] *2*	
729.97 *10*	2581.67	0.190 *13*	
736.94 *6*	1281.56	0.38 *2*	
756.59 *3*	1221.25	3.1 *3*	
773.22[#] *3*	773.215	2.79[#] *20*	
	1317.85	0.10[#] *2*	
786.45[#] *7*	966.86	0.15[#] *2*	placement not confirmed in (n,γ) coincidence data, but confirmed ^{129}Sb β$^-$ decay. Iγ: total intensity for doublet=0.42 *3*; split based on branching ratios from ^{129}Sb decay (same in Adopted dataset).
	1559.84	0.27[#] *3*	
	1599.39	0.27[#] *3*	
800.04 *3*	1559.84	0.63 *7*	
800.40[‡] *20*	2360.473	0.48[‡] *7*	
812.93 *7*	812.93	0.54 *2*	
818.86 *6*	2040.19	0.430 *13*	
^{x}857.1 *6*		0.040 *12*	
^{x}874.78 *4*		3.18 *3*	
874.78 *4*	874.880	3.18 *3*	
885.0 *3*	1851.53	0.110 *14*	
^{x}889.0 *3*		0.090 *14*	
^{x}916.13 *12*		0.220 *14*	
^{x}937.4 *3*		0.100 *14*	
^{x}945.7 *4*		0.070 *13*	
966.87 *7*	966.86	1.25 *3*	
^{x}981.6 *5*		0.080 *14*	
^{x}984.1 *4*		0.10 *2*	
992.52 *8*	1752.28	0.43 *2*	
^{x}996.3 *4*		0.09 *2*	

Continued on next page (footnotes at end of table)

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

γ(^{129}Te) (continued)

Eγ	E(level)	Iγ[†][§]	Comments
1000.26 *10*	2221.66	0.340 *14*	
^{x}1034.97 *9*		0.360 *15*	
1045.83 *10*	2267.23	0.36 *2*	
1053.36 *19*	1233.83	0.36 *2*	
1056.53 *16*	1162.20	0.210 *15*	
^{x}1072.34 *23*		0.140 *10*	
1091.42 *23*	1851.53	0.14 *2*	
1095.47 *18*	1868.86	0.26 *2*	
1097.9[‡] *3*	2379.557	0.49[‡] *4*	
1105.46 *11*	2267.23	0.20 *2*	Eγ: poor fit; level–energy difference=1105.03.
1123.01 *7*	1303.39	0.57 *2*	
^{x}1126.10 *24*		0.10 *2*	
1139.21 *13*	2360.473	0.39 *3*	
^{x}1150.17 *23*		0.13 *2*	
^{x}1155.57 *15*		0.23 *2*	
1158.37 *12*	2379.557	0.83 *4*	
^{x}1208.3 *3*		0.12 *2*	
^{x}1211.9 *3*		0.13 *2*	
1221.23 *13*	1221.25	0.13 *2*	
^{x}1232.4 *3*		0.21 *2*	
1234.5 *3*	1868.86	0.26 *2*	
^{x}1253.87 *21*		0.18 *2*	
^{x}1273.5 *3*		0.11 *1*	
1281.59 *10*	1281.56	0.39 *3*	
1287.62 *18*	1752.28	0.20 *2*	
^{x}1301.5 *4*		0.18 *2*	
1303.6 *4*	1303.39	0.23 *2*	
1318.54 *22*	1317.85	0.16 *2*	Eγ: poor fit; level–energy difference=1317.84.
1324.6 *3*	1868.86	0.21 *2*	
^{x}1338.8 *3*		0.15 *2*	
^{x}1342.2 *5*		0.10 *2*	
^{x}1358.1 *7*		0.10 *2*	
1360.4 *4*	2581.67	0.17 *3*	
1379.33 *19*	1559.84	0.18 *3*	
1401.4 *3*	2705.119	0.13 *2*	
1412.4 *5*	2379.557	0.08 *2*	
^{x}1418.07 *21*		0.33 *2*	
1421.36 *15*	1421.34	0.48 *2*	
^{x}1439.7 *4*		0.15 *2*	
1470.9 *4*	2705.119	0.27 *4*	Eγ: placement not unique; also in γγ coin with 359γ.
1485.48 *16*	2360.473	0.33 *2*	
1493.91[#] *12*	2267.23	0.29[#] *4*	
	(6082.40)	0.45[#] *5*	
1504.3 *3*	2379.557	0.57 *9*	
^{x}1514.2 *4*		0.16 *2*	
1526.4 *6*	2493.05	0.11 *3*	
^{x}1529.55 *22*		0.15 *3*	
^{x}1541.1 *3*		0.16 *2*	
^{x}1549.0 *5*		0.10 *2*	
^{x}1556.53 *5*		0.11 *2*	
1559.66 *21*	1559.84	0.39 *2*	
^{x}1569.84 *23*		0.28 *4*	
1586.7 *5*	2360.473	0.14 *4*	
1606.60 *13*	2379.557	0.60 *5*	
^{x}1617.95 *16*		0.52 *5*	
1619.5[‡] *6*	2379.557	0.34[‡] *4*	
1633.6 *3*	2267.23	0.26 *5*	
1649.47[#] *9*	2524.76	0.31[#] *9*	Eγ: poor fit; level–energy difference 1649.86.
	(6082.40)	0.48[#] *10*	
1656.29 *13*	1656.25	0.52 *5*	
1677.29 *15*	2221.66	0.48 *5*	
^{x}1682.50 *23*		0.31 *5*	
1693.45 *10*	(6082.40)	0.93 *7*	

Continued on next page (footnotes at end of table)

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

γ(^{129}Te) (continued)

Eγ	E(level)	Iγ[†][§]
1708.4[@] *3*	4087.54	0.50[@] *7*
	(6082.40)	0.50[@] *7*
1717.80 *5*	(6082.40)	1.76 *5*
1726.24 *7*	(6082.40)	0.28 *5*
^{x}1731.9 *3*		0.27 *5*
1745.7 *3*	2379.557	0.24 *5*
1752.6 *4*	1752.28	0.17 *5*
^{x}1770.41 *20*		0.25 *2*
1784.58 *23*	(6082.40)	0.22 *4*
1805.35 *11*	(6082.40)	0.40 *2*
1815.6 *5*	2360.473	0.08 *2*
1830.22 *4*	2705.119	2.12 *2*
1834.9 *3*	2379.557	0.26 *2*
1842.1 *3*	(6082.40)	0.49 *2*
^{x}1848.3 *5*		0.14 *2*
1851.28 *18*	1851.53	0.37 *3*
1859.64 *8*	2040.19	1.51 *5*
1861.80 *18*	(6082.40)	0.58 *5*
1878.1 *3*	(6082.40)	0.28 *5*
1901.77 *18*	(6082.40)	0.34 *4*
1906.9 *3*	(6082.40)	0.20 *4*
^{x}1920.7 *3*		0.21 *4*
1931.91 *23*	2705.119	0.31 *5*
1948.81[‡] *10*	(6082.40)	0.61[‡] *13*
1961.16[‡] *8*	(6082.40)	0.63[‡] *20*
1987.6[‡] *6*	3546.91	0.050[‡] *12*
1994.92 *12*	(6082.40)	0.68 *5*
1999.5 *3*	4220.61	0.24 *5*
^{x}2022.67 *20*		0.34 *3*
2040.38 *7*	2040.19	0.71 *4*
2041.6[‡] *7*	2221.66	0.340[‡] *14*
2049.87 *16*	(6082.40)	0.51 *3*
^{x}2059.6 *4*		0.17 *3*
^{x}2066.7 *3*		0.30 *3*
2071.03 *23*	2705.119	0.43 *3*
^{x}2079.5 *3*		0.24 *3*
2086.84 *6*	2267.23	1.32 *3*
^{x}2107.30 *15*		0.44 *4*
^{x}2134.5 *3*		0.18 *3*
^{x}2164.9 *4*		0.14 *3*
2180.12 *3*	2360.473	17.2 *5*
^{x}2194.03 *14*		0.46 *3*
2199.21 *3*	2379.557	5.70 *6*
2216.96 *7*	(6082.40)	0.85 *3*
2221.5[‡] *4*	2221.66	0.98[‡] *14*
2229.63 *13*	(6082.40)	0.53 *2*
2267.1 *9*	2267.23	0.12 *3*
2289.99 *4*	(6082.40)	3.83 *4*
2312.7 *8*	2493.05	0.12 *3*
^{x}2336.4 *3*		0.25 *2*
2343.7 *3*	2524.76	0.19 *2*
2360.42 *3*	2360.473	3.22 *3*
2371.1 *7*	3792.41	0.11 *2*
^{x}2374.71 *20*		0.46 *2*
2379.51 *4*	2379.557	2.06 *4*
2401.74 *22*	2581.67	0.27 *2*
^{x}2410.0 *5*		0.12 *2*
2433.65 *11*	(6082.40)	0.56 *3*
2443.99 *7*	(6082.40)	0.97 *3*
^{x}2480.44 *24*		0.25 *2*
2493.1 *6*	2493.05	0.14 *3*
2518.02 *11*	(6082.40)	1.14 *2*
2524.78[#] *3*	2524.76	1.1[#] *3*
2524.78[#] *3*	2705.119	4.8[#] *3*
2535.47 *9*	(6082.40)	0.79 *3*
^{x}2542.7 *4*		0.16 *2*
2554.0[‡] *5*	3429.8	0.26[‡] *8*
2554.06 *10*	(6082.40)	0.43 *8*
2579.78 *7*	(6082.40)	1.06 *3*
2581.5[‡] *9*	2581.67	0.09[‡] *2*
^{x}2606.89 *20*		0.33 *2*
2627.7 *5*	3502.58	0.12 *2*
2630.0 *11*	3852.71	0.08 *3*
2652.3[#] *4*	3528.28	0.19[#] *6*
	(6082.40)	0.65[#] *6*
2670.4 *6*	3429.8	0.11 *2*
2705.07 *4*	2705.119	3.23 *3*
^{x}2721.6 *5*		0.16 *2*
2726.70 *12*	(6082.40)	0.68 *3*
2741.4 *11*	3502.58	0.07 *2*
2754.8 *7*	3528.28	0.14 *3*
^{x}2837.35 *20*		0.53 *3*
^{x}2878.8 *6*		0.21 *3*
^{x}2898.9 *4*		0.22 *3*
^{x}2989.3 *5*		0.31 *3*
^{x}2994.0 *6*		0.23 *3*
3018.7[‡] *10*	3792.41	0.11[‡] *3*
^{x}3046.5 *3*		0.29 *3*
^{x}3053.7 *3*		0.31 *3*
^{x}3127.1 *3*		0.34 *3*
^{x}3237.3 *9*		0.11 *2*
3250.0 *10*	3429.8	0.10 *2*
3322.0 *4*	3502.58	0.28 *3*
3348.6 *5*	3528.28	0.64 *3*
3355.14 *14*	3355.46	0.73 *4*
3366.3 *6*	3546.91	0.22 *3*
3377.26 *4*	(6082.40)	10.44 *10*
^{x}3391.2 *3*		0.27 *3*
^{x}3412.2 *4*		0.27 *3*
3457.6 *3*	3638.38	0.33 *3*
3468.7 *3*	3648.77	0.39 *5*
3500.59 *12*	(6082.40)	0.86 *4*
3528.4 *4*	3528.28	0.54 *8*
^{x}3545.1 *5*		0.17 *3*
3546.6[‡] *11*	3546.91	0.050[‡] *12*
3557.60 *9*	(6082.40)	1.16 *3*
3564.71 *14*	3564.51	1.04 *4*
3589.41 *17*	(6082.40)	0.52 *3*
^{x}3601.1 *10*		0.08 *3*
3612.02 *6*	3792.41	2.14 *4*
3638.36 *13*	3638.38	0.69 *3*
3672.2 *3*	3852.71	0.26 *3*
3684.74 *14*	3865.37	0.55 *3*
3702.82 *6*	(6082.40)	10.33 *10*
3721.87 *5*	(6082.40)	19.54 *20*
^{x}3787.7 *7*		0.14 *2*
3792.4 *3*	3792.41	0.39 *2*
3815.14 *6*	(6082.40)	2.39 *5*
^{x}3824.1 *7*		0.12 *2*
^{x}3849.8 *6*		0.24 *3*
3853.6 *7*	4032.59	0.50 *3*
3860.59 *10*	(6082.40)	1.00 *3*
^{x}3876.7 *7*		0.13 *2*
^{x}3882.2 *4*		0.30 *2*
^{x}3888.7 *6*		0.14 *2*
^{x}3902.14 *12*		0.85 *3*

Continued on next page (footnotes at end of table)

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

γ(^{129}Te) (continued)

Eγ	E(level)	Iγ[†][§]
3907.2 *5*	4087.54	0.25 *2*
3940.4 *4*	4121.19	0.24 *2*
3952.8 *4*	4133.50	0.26 *2*
4001.5 *8*	4180.67	0.22 *2*
4042.11 *7*	(6082.40)	2.09 *4*
4060.5 *5*	4240.5	0.21 *2*
[x]4076.7 *6*		0.15 *2*
4096.5[‡] *3*	4277.02	0.10[‡] *3*
4120.5[‡] *4*	4121.19	0.060[‡] *13*
4133.23 *19*	4133.50	0.46 *2*
4174.6[@] *6*	4175.3	0.32[@] *3*
	4356.13	0.32[@] *3*
4184.0 *3*	4364.57	0.44 *3*
4204.0 *9*	4204.3	0.21 *4*
4208.4 *4*	4388.93	0.44 *4*
[x]4246.0 *8*		0.24 *3*
4252.0 *6*	4432.93	0.23 *2*
4297.7 *6*	4297.80	0.17 *2*
4364.38 *15*	4364.57	0.83 *2*
4374.6 *12*	4374.0	0.07 *2*
[x]4390.1 *4*		0.24 *2*
[x]4407.0 *5*		0.22 *2*
4426.8 *7*	(6082.40)	0.23 *3*
4433.6 *5*	4432.93	0.65 *3*
4523.0 *5*	(6082.40)	0.23 *2*
4588.5 *5*	4588.48	0.21 *3*
[x]4859.8 *11*		0.08 *2*
[x]4903.4 *8*		0.21 *3*
[x]4919.6 *10*		0.11 *2*
[x]5049.7 *9*		0.12 *2*
[x]5133.8 *8*		0.17 *2*
5449.4 *6*	(6082.40)	0.22 *2*
5901.55 *24*	(6082.40)	0.59 *3*
6082.0 *3*	(6082.40)	0.39 *2*

[†] Intensities are per 100 neutron captures; a systematic uncertainty of 10% should be added in quadrature for absolute intensities, probably due to unplaced or missing γ rays. Intensities for 10 primary γ rays and 31 secondary γ rays are listed in 1991StZX, but several of these γ rays have not been reported in 2003Wi02. Relative intensities are listed in 1991StZX. To match these to absolute scale as in 2003Wi02, multiply by a factor of 30.5.

[‡] From γγ coin spectra.

[§] Absolute intensity per 100 neutron captures.

[#] Multiply placed; intensity suitably divided.

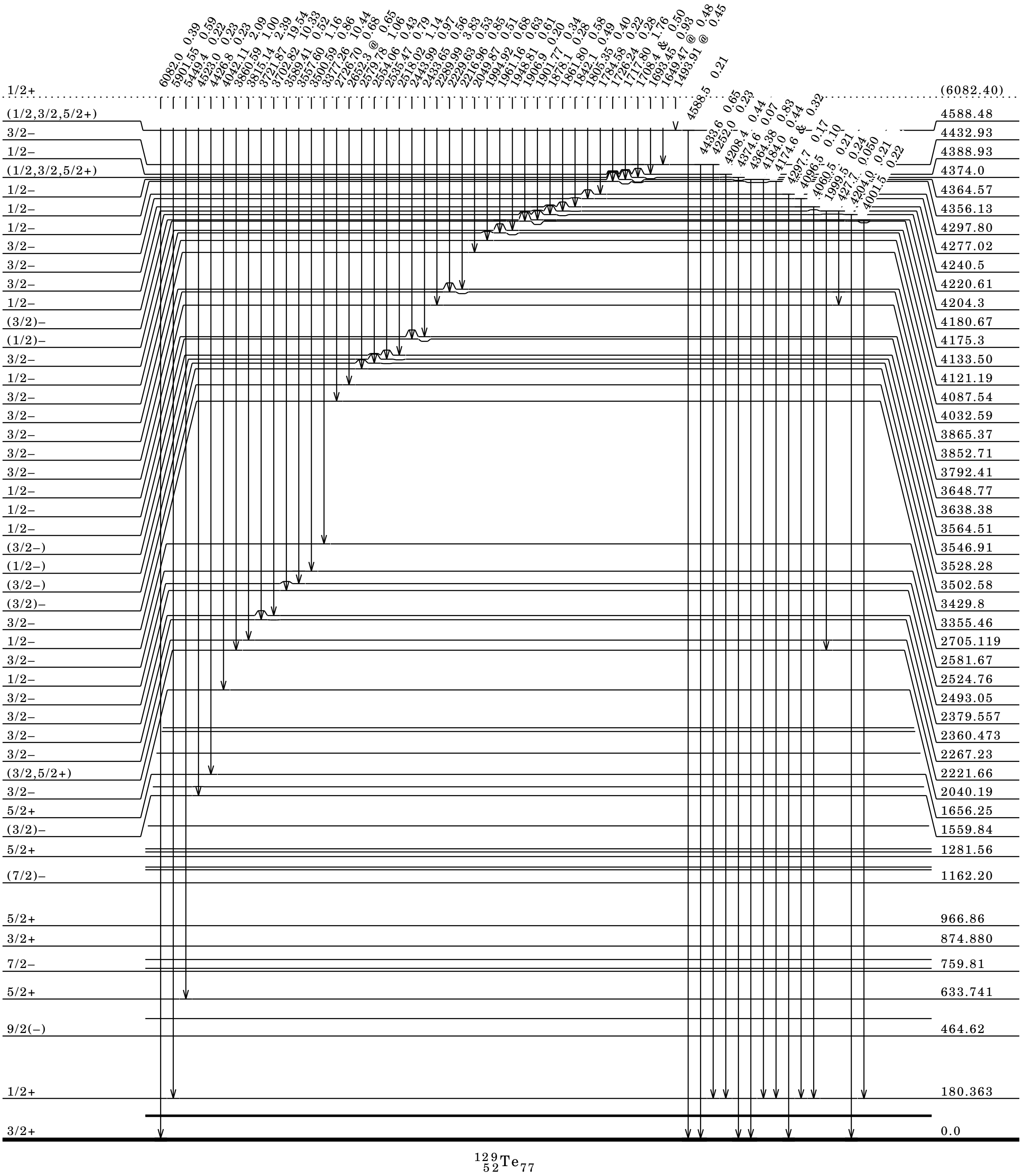
[@] Multiply placed; undivided intensity given.

[x] γ ray not placed in level scheme.

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

Level Scheme

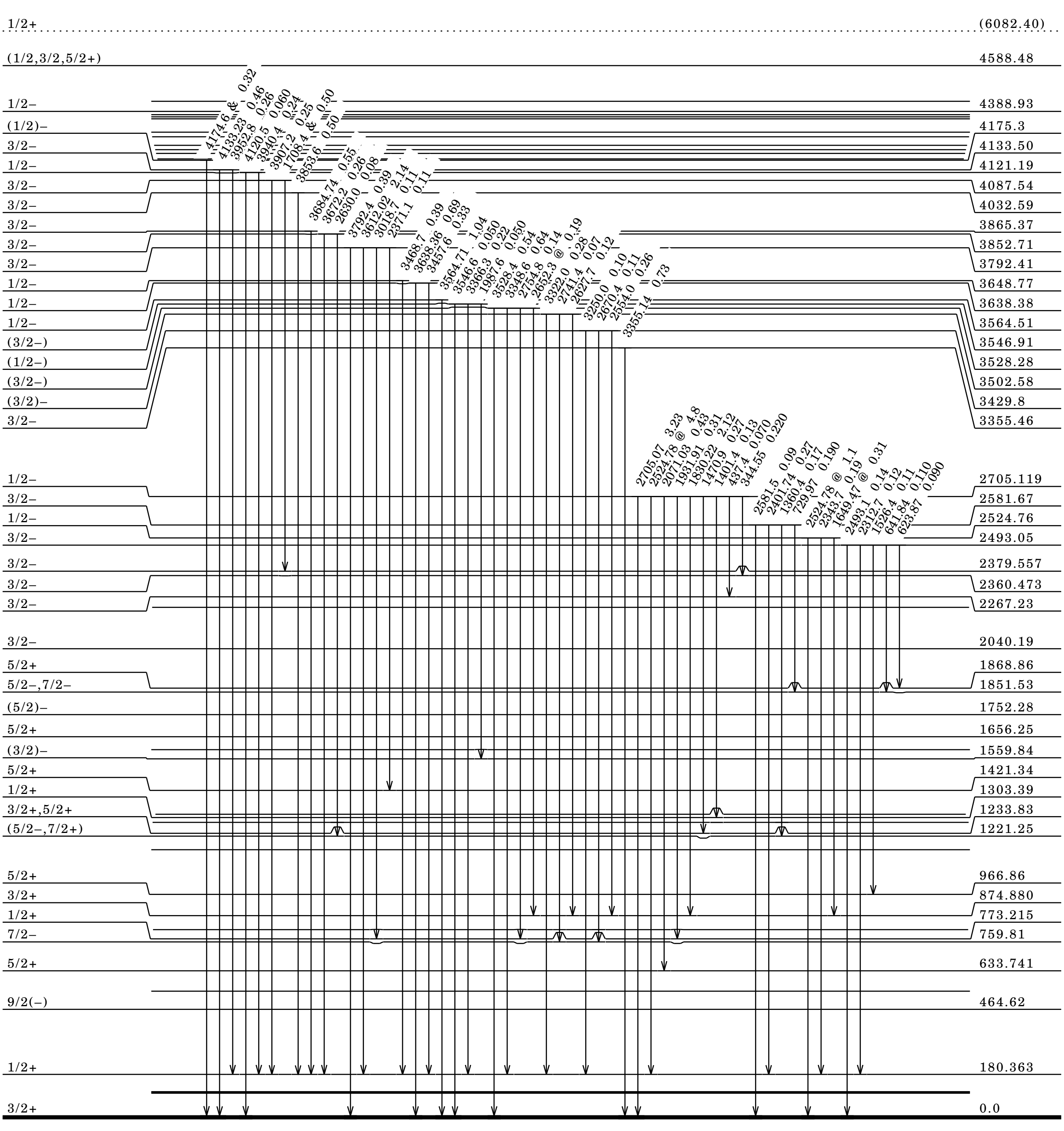
Intensities: Iγ per 100 neutron captures
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

Level Scheme (continued)

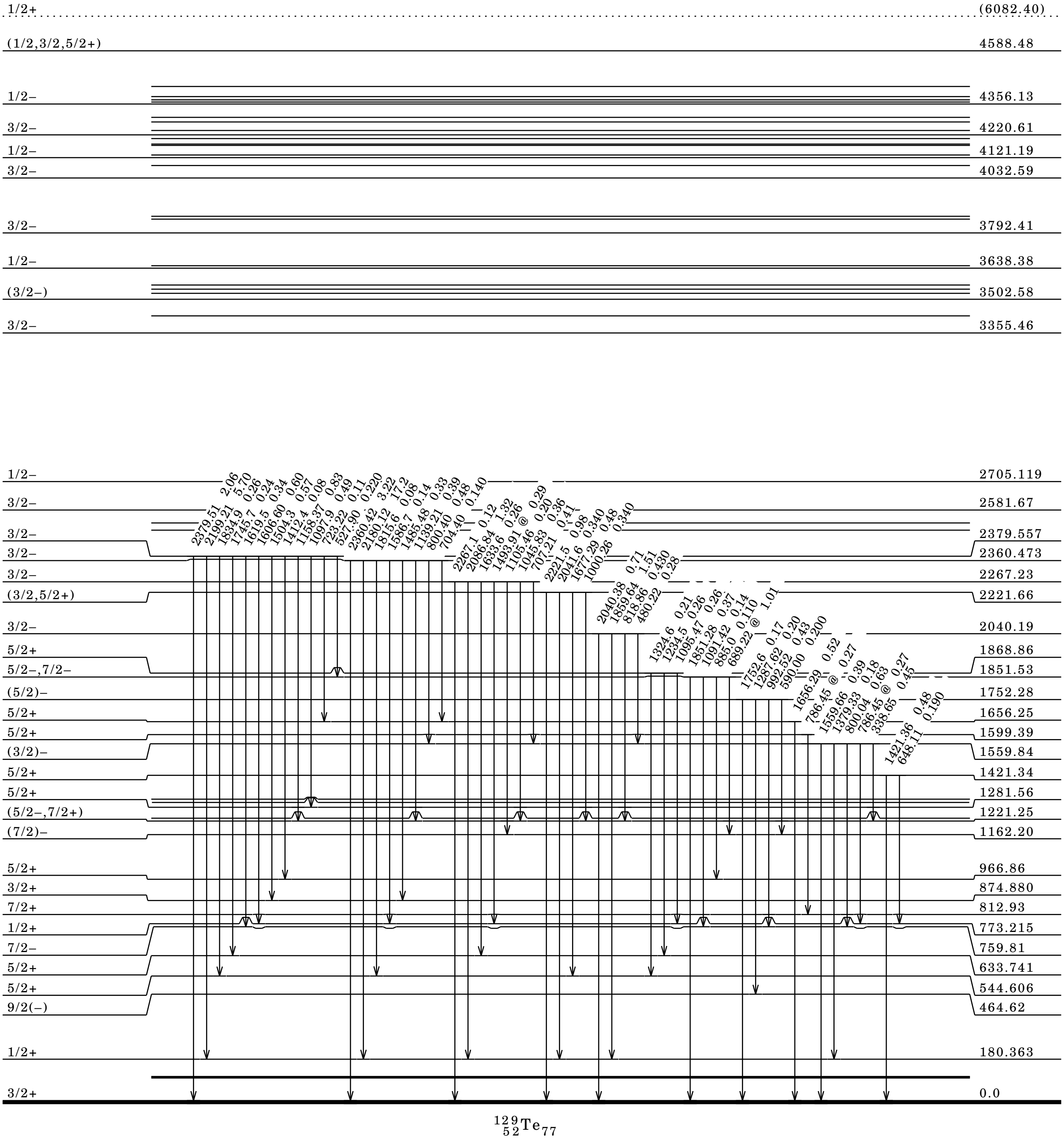
Intensities: Iγ per 100 neutron captures
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



$^{128}Te(n,\gamma)$ E=thermal 2003Wi02 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 neutron captures
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given

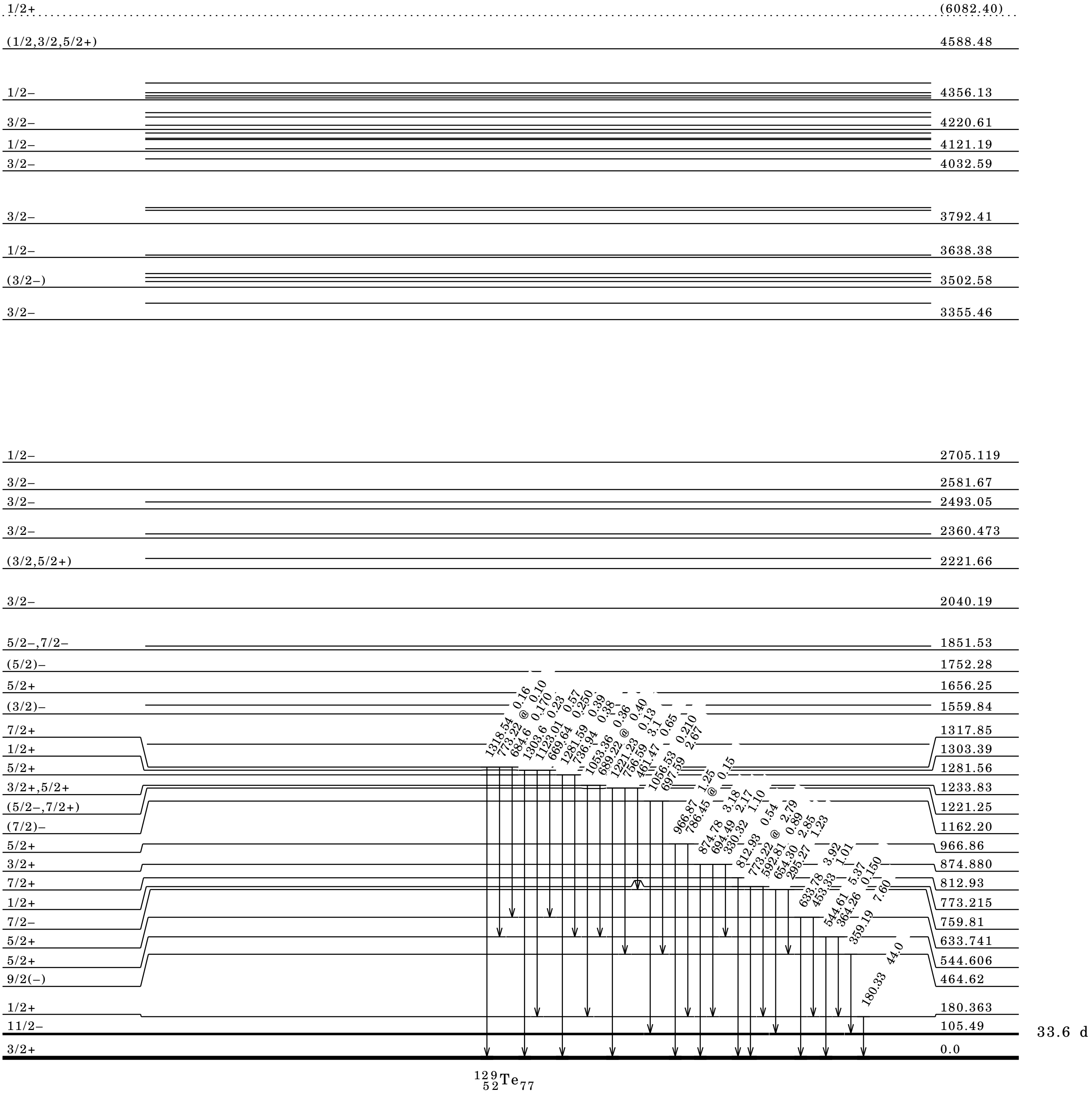


From NNDC(BNL)
program ENSDAT

^{128}Te(n,γ) E=thermal 2003Wi02 (continued)

Level Scheme (continued)

Intensities: Iγ per 100 neutron captures
@ Multiply placed; intensity suitably divided
& Multiply placed; undivided intensity given



^{128}Te(n,γ),(n,n): Resonances 2006MuZX

Measurements:
1973Br29: E=0.5–7000 eV; measured σ(E), deduced resonances, level–widths.
All data are from 2006MuZX evaluation.

^{129}Te Levels

E(level)†	Jπ	L	$g\Gamma_n\Gamma_\gamma/\Gamma$ (eV)	Comments
S(n)−0.162?	1/2+	0		Γ_γ=(0.0325) eV.
S(n)+0.3481 *5*		[1]	0.00024 *10*	$g\Gamma_n$=0.00024 eV *10*, Γ_γ=0.15 eV *10*.
S(n)+0.4240 *5*	1/2	[0]	0.020 *4*	$g\Gamma_n$=0.0610 eV *25*, Γ_γ=0.029 eV *10*.
S(n)+0.4355 *5*	1/2−	1	0.0126 *25*	$g\Gamma_n$=0.01850 eV *25*, Γ_γ=0.158 eV *20*.
S(n)+0.9410 *5*	1/2−	1	0.0104 *21*	$g\Gamma_n$=0.0147 eV *2*, Γ_γ=0.19 eV *6*.
S(n)+1.3205 *5*		[1]	0.0079 *16*	$g\Gamma_n$=0.0102 eV *21*.
S(n)+1.459 *1*		[0]	0.032 *6*	$g\Gamma_n$=0.115 eV *5*, Γ_γ=0.044 eV *9*.
S(n)+1.583 *1*		[1]	0.0085 *17*	$g\Gamma_n$=0.0105 eV *10*.
S(n)+1.837 *1*		[0]	0.035 *7*	$g\Gamma_n$=0.725 eV *25*, Γ_γ=0.037 eV *7*.
S(n)+2.971 *3*		[0]	0.030 *6*	$g\Gamma_n$=2.10 eV *12*, Γ_γ=0.030 eV *6*.
S(n)+3.265 *3*	[3/2]	[1]	0.067 *12*	$g\Gamma_n$=0.095 eV *15*, Γ_γ=0.105 eV.
S(n)+3.544 *3*		[1]	0.038 *8*	$g\Gamma_n$=0.021 eV *7*.
S(n)+4.080 *4*		[1]	0.034 *7*	$g\Gamma_n$=0.025 eV *10*.
S(n)+5.330 *5*		[1]	0.24 *10*	$g\Gamma_n$=0.540 eV *50*.
S(n)+6.108 *1*	[3/2]	[1]	0.055 *22*	$g\Gamma_n$=0.213 eV *3*, Γ_γ=0.037 eV *15*.
S(n)+7.076 *7*	[1/2]	[1]	0.055 *22*	$g\Gamma_n$=0.89 eV *10*, Γ_γ=0.034 eV *16*.
S(n)+7.936 *8*		[1]		$g\Gamma_n$=0.140 eV.
S(n)+10.012 *10*		[1]		$g\Gamma_n$=0.86 eV *8*.
S(n)+10.355 *10*		[1]		$g\Gamma_n$=0.100 eV.
S(n)+10.656 *10*		[0]		$g\Gamma_n$=7.45 eV *13*.
S(n)+10.830 *11*		[1]		$g\Gamma_n$=2.0 eV *1*.
S(n)+11.495 *15*		[0]		$g\Gamma_n$=12.40 eV *13*.
S(n)+12.098 *15*		[1]		$g\Gamma_n$=0.300 eV.
S(n)+12.828 *15*		[1]		$g\Gamma_n$=0.500 eV.
S(n)+12.893 *15*		[0]		$g\Gamma_n$=4.98 eV *25*.
S(n)+12.960 *20*		[1]		$g\Gamma_n$=0.250 eV.
S(n)+13.080 *20*		[1]		$g\Gamma_n$=1.36 eV *13*.
S(n)+14.600 *20*		[1]		$g\Gamma_n$=3.2 eV *3*.
S(n)+15.330 *20*		[1]		$g\Gamma_n$=0.500 eV.
S(n)+16.340 *20*		[1]		$g\Gamma_n$=0.700 eV.
S(n)+17.010 *20*		[1]		$g\Gamma_n$=4.1 eV *4*.
S(n)+17.520 *20*		[1]		$g\Gamma_n$=2.8 eV *3*.
S(n)+17.990 *25*		[1]		$g\Gamma_n$=1.69 eV *25*.
S(n)+18.900 *25*		[1]		$g\Gamma_n$=1.000 eV.
S(n)+19.420 *25*		[1]		$g\Gamma_n$=3.5 eV *4*.
S(n)+19.700 *25*		[1]		$g\Gamma_n$=0.500 eV.
S(n)+20.220 *25*		[1]		$g\Gamma_n$=0.500 eV.
S(n)+21.025 *25*		[1]		$g\Gamma_n$=0.500 eV.
S(n)+21.820 *25*		[0]		$g\Gamma_n$=14.2 eV *5*.

† S(n)(^{129}Te)=6082.41 *8* (2012Wa38). Excitation energies are from 6082.25 to 6104.06 keV.

^{128}Te(d,p),(pol d,p) 2003Wi02

2003Wi02: E(d)=24, 18 MeV. Measured protons using a long multiwire proportional counter at ten different angles and a Q3D spectrograph. Measurements done with unpolarized deuteron beam energy of 18 MeV and 24 MeV and polarized deuteron beam energy of 18 MeV. Analyzing powers determined from the cross sections with different polarizations. These analyzing powers were used for unambiguous spin assignment. FWHM=4 keV at 18 MeV and 5 keV at 24 MeV. DWBA calculations.

2013Ka04: (d,p) E=15 MeV beam from Yale tandem accelerator of WNSL facility. Measured proton spectra, σ(θ) using a split–pole spectrograph. FWHM≈30 keV for protons. Deduced levels, ground state configuration of ^{128}Te. DWBA analysis.

1967Mo22: E=7.5 MeV; magnetic spectrograph, σ(θ) θ=7.5°–172.5°, deduced spectroscopic factors; enriched target.

Other: 1964Jo12.

All data are from 2003Wi02. Results from 1967Mo22 agrees with those from 2003Wi02 but are less precise and incomplete.

Continued on next page (footnotes at end of table)

^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

dσ/dΩ in mb/sr from (d,p) at E(d)=15 MeV (2013KaZZ)

Level	7°	18°	34°	42°
0	0.48	1.35	0.44	0.61
106	0.040	0.14	0.17	0.18
180	2.22	0.095	0.69	0.29
545		0.016		0.007
634		0.032		0.013
813		0.012	0.014	0.009
872		0.031	0.017	0.014
967	0.099	0.29	0.12	0.12
1217			0.018	0.018
1281			0.036	0.048
1302			0.045	0.018
1655		0.092		0.035
1752	0.052	0.050		0.038

The statistical uncertainties are less than 1% for strong states and less than 3% for weaker ones. There is additional systematic uncertainty of ≈7%.

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^{129}Te Levels

Cross sections (in μb/sr) in terms of maximum value of σ(θ) distribution are given under comments. For multiple values, first value is for 24 MeV, the second for 18 MeV.

E(level)[†]	Jπ[§]	L[§]	S_{lj}.[#]	Comments
0.0[‡]	3/2+	2	0.337	dσ/dω=2331 μb/sr.
105.2[‡] *4*	11/2−	5	0.188	dσ/dω=384 μb/sr.
179.35[‡] *28*		0	0.202	dσ/dω=1021 μb/sr.
544.06[‡] *9*	5/2+	2	0.003	dσ/dω=34 μb/sr.
633.51[‡] *7*		2	0.007	dσ/dω=50 μb/sr.
760.25 *5*	7/2−	3	0.012	dσ/dω=179 μb/sr.
773.07 *14*		0	0.007	dσ/dω=40.
812.93[‡] *8*	7/2+	4	0.008	dσ/dω=15.
865.35 *12*	(7/2+)	(4)	(0.003)	dσ/dω=8.
874.73[‡] *21*		2	0.004	dσ/dω=33.
966.76[‡] *4*	5/2+	2	0.034	dσ/dω=405.
1162.14 *15*		3	0.001	dσ/dω=8.
1211.8[‡] *6*	7/2+	4	0.017	dσ/dω=33. E(level): 1212.7 *3* in (d,p) (2003Wi02), 1217 (2013Ka04,2013KaZZ). Jπ: 3/2+,5/2+ quoted by 2013Ka04, 2013KaZZ from earlier NDS.
1234.32 *17*		2	0.001	dσ/dω=7.
1282.0[‡] *5*	5/2+	2	0.010	dσ/dω=126.
1303.32[‡] *12*		0	0.011	dσ/dω=55. E(level),Jπ: 1302 with Jπ=7/2+,9/2+ given in 2013Ka04, which on the basis of Jπ assignment seems to correspond to 1319 level here.
1319.01 *8*	7/2+	4	0.002	dσ/dω=4.
1419.4 *8*	5/2+	2	0.002	dσ/dω=30.
1483.56 *16*	7/2+	4	0.002	dσ/dω=5.
1559.98 *23*		1	0.002	dσ/dω=12.
1582.1 *4*	7/2+	4	0.001	dσ/dω=4.
1599.65 *20*	5/2+	2	0.0003	dσ/dω=5.
1655.72[‡] *22*	5/2+	2	0.009	dσ/dω=121.
1752.68[‡] *9*		3	0.013	dσ/dω=146. E(level),Jπ: 1752 with Jπ=5/2+ given in 2013Ka04, which on the basis of Jπ assignment seems to correspond to 1779.9 level here.
1779.95 *13*	5/2+	2	0.003	dσ/dω=35.
1812.80 *25*	7/2+	4	0.001	dσ/dω=9.
1839.2 *4*				dσ/dω=6.
1852.9 *4*		3	0.006	dσ/dω=5.
1869.57 *6*		3	0.006	dσ/dω=67.
1992.44 *14*		(3)	0.001	dσ/dω=8.
2040.2 *6*	3/2−	1	0.008	dσ/dω=126,112. S_{lj}.: 0.00779.

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^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)†	Jπ§	L§	S_{lj}.#	Comments
2072.43 *11*	7/2−	3	0.009	dσ/dω=153,70. S_{lj}.: 0.00850.
2106.60 *7*	7/2−	3	0.120	dσ/dω=2146,995. S_{lj}.: 0.11836.
2132.69 *11*	7/2−	3	0.004	dσ/dω=70,35. S_{lj}.: 0.00383.
2221.28 *8*	7/2−	3	0.169	dσ/dω=3009,1361. S_{lj}.: 0.16329.
2232.23 *7*		3	0.029	dσ/dω=362,188. S_{lj}.: 0.03178.
2267.61 *17*	3/2−	1	0.010	dσ/dω=156,134. S_{lj}.: 0.00984.
2312.17 *12*	7/2−	3	0.003	dσ/dω=58,28. S_{lj}.: 0.00308.
2360.05 *6*	3/2−	1	0.092	dσ/dω=1302,1199. S_{lj}.: 0.09303.
2379.95 *8*	3/2−	1	0.050	dσ/dω=711,640. S_{lj}.: 0.05081.
2427.21 *13*	7/2−	3	0.002	dσ/dω=38,23. S_{lj}.: 0.00223.
2462.49 *14*	7/2−	3	0.003	dσ/dω=62,36. S_{lj}.: 0.00347.
2491.64 *10*	3/2−	1	0.002	dσ/dω=27,27. S_{lj}.: 0.00214.
2507.09 *13*		(3)	(0.002)	dσ/dω=27,24. S_{lj}.: (0.00270).
2511.04 *13*		(3)	(0.003)	dσ/dω=35,18. S_{lj}.: (0.00270).
2524.39 *32*	1/2−	1	0.004	dσ/dω=30,32. S_{lj}.: 0.00505.
2581.14 *9*	3/2−	1	0.003	dσ/dω=32,37. S_{lj}.: 0.00299.
2612.43 *10*		(3)	(0.001)	dσ/dω=7,5. S_{lj}.: (0.00065).
2641.3 *4*		(3)	(0.001)	dσ/dω=4,4. S_{lj}.: for 7/2−.
2705.76 *6*	1/2−	1	0.081	dσ/dω=610,614. S_{lj}.: 0.09764.
2728.21 *10*		1	0.003	dσ/dω=25,18. S_{lj}.: 0.00318.
2736.55 *15*	(3/2−)	(1)	(0.002)	dσ/dω=20,18. S_{lj}.: (0.00126).
2765.28 *13*		(3)	(0.002)	dσ/dω=33,8. S_{lj}.: (0.00154).
2811.67 *7*		(5)	(0.011)	dσ/dω=19,14. S_{lj}.: (0.01817).
2819.45 *12*		(3)	(0.006)	dσ/dω=96,49. S_{lj}.: (0.00617).
2835.22 *13*		(3)	(0.004)	dσ/dω=56,27. S_{lj}.: (0.00378).
2853.69 *7*		(3)	(0.007)	dσ/dω=102,49. S_{lj}.: (0.00676).
2859.54 *11*		(3)	(0.002)	dσ/dω=39,16. S_{lj}.: (0.00219).
2871.21 *7*	(5/2−)	(3)	(0.005)	dσ/dω=73,36. S_{lj}.: (0.00493).
2889.84 *9*		(3)	(0.003)	dσ/dω=44,26. S_{lj}.: (0.00291).
2899.90 *17*		5	0.004	dσ/dω=16,5. S_{lj}.: 0.00771.
2919.63 *9*	(5/2−)	3	0.007	dσ/dω=103,50. S_{lj}.: 0.00704.

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^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[§]	L[§]	S_{lj}.[#]	Comments
2971.34 *10*	7/2−	3	0.003	dσ/dω=62,28. S_{lj}.: 0.00239.
2979.44 *6*	5/2−	3	0.046	dσ/dω=713,353. S_{lj}.: 0.04705.
2999.62 *27*				dσ/dω=6.
3009.43 *9*				dσ/dω=7.
3023.78 *26*				dσ/dω=3.
3029.07 *8*				dσ/dω=23.
3046.25 *8*				dσ/dω=15.
3056.36 *13*				dσ/dω=6.
3070.43 *3*				dσ/dω=6.
3089.26 *9*				dσ/dω=48.
3102.75 *9*				dσ/dω=40.
3128.47 *29*				dσ/dω=10.
3133.45 *6*				dσ/dω=35.
3150.71 *10*				dσ/dω=16.
3163.3 *4*				dσ/dω=3.
3182.02 *18*				dσ/dω=15.
3202.32 *26*				dσ/dω=7.
3211.79 *29*				dσ/dω=4.
3230.49 *13*				dσ/dω=61.
3246.07 *11*				dσ/dω=58.
3253.08 *10*				dσ/dω=23.
3260.88 *22*				dσ/dω=10.
3277.1 *5*				dσ/dω=12.
3281.58 *18*				dσ/dω=38.
3295.7 *5*				dσ/dω=3.
3306.39 *11*				dσ/dω=15.
3321.35 *12*				dσ/dω=34.
3326.60 *18*				dσ/dω=9.
3350.26 *17*				dσ/dω=7.
3355.63 *10*	3/2−	1	0.002	dσ/dω=27.
3361.46 *10*				dσ/dω=48.
3364.58 *9*				dσ/dω=98.
3371.62 *10*				dσ/dω=37.
3379.29 *9*				dσ/dω=14.
3384.75 *8*				dσ/dω=92.
3389.76 *29*				dσ/dω=12.
3405.79 *10*				dσ/dω=46.
3414.31 *15*				dσ/dω=27.
3419.88 *12*				dσ/dω=76.
3428.91 *10*	(3/2−)	1	0.011	dσ/dω=105.
3441.00 *9*				dσ/dω=87.
3452.75 *14*				dσ/dω=9.
3461.13 *8*				dσ/dω=126.
3474.79 *13*				dσ/dω=66.
3479.09 *21*				dσ/dω=32.
3489.57 *14*	1/2−	1	0.003	dσ/dω=19.
3503.37 *9*	(3/2−)	(1)	(0.018)	dσ/dω=202.
3511.99 *8*				dσ/dω=73.
3524.24 *15*				dσ/dω=36.
3527.74 *9*	(1/2−)	(1)	(0.007)	dσ/dω=46.
3545.82 *7*	(3/2−)	(1)	(0.010)	dσ/dω=102.
3559.29 *10*				dσ/dω=19.
3564.98 *10*	1/2−	1	0.012	dσ/dω=80.
3569.24 *10*				dσ/dω=53.
3579.66 *15*				dσ/dω=9.
3587.43 *6*				dσ/dω=176.
3593.73 *17*				dσ/dω=20.
3600.49 *7*	(3/2−)	1	0.003	dσ/dω=30.
3615.20 *7*				dσ/dω=77.
3622.88 *26*				dσ/dω=5.
3628.68 *29*				dσ/dω=5.

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^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[§]	L[§]	S_{lj}.[#]	Comments
3634.19 *8*				dσ/dω=57.
3638.44 *6*	1/2−	1	0.014	dσ/dω=77.
3643.26 *5*				dσ/dω=56.
3648.97 *9*	1/2−	1	0.010	dσ/dω=57.
3655.05 *10*				dσ/dω=108.
3666.42 *19*				dσ/dω=6.
3671.50 *11*	3/2−	1	0.002	dσ/dω=19.
3677.85 *6*				dσ/dω=62.
3695.69 *8*				dσ/dω=147.
3707.67 *13*	1/2−	1	0.010	dσ/dω=58.
3713.78 *22*				dσ/dω=19.
3729.32 *19*				dσ/dω=21.
3737.13 *8*				dσ/dω=39.
3744.94 *9*	3/2−	1	0.003	dσ/dω=39.
3752.27 *18*				dσ/dω=16.
3764.98 *9*	(3/2−)	1	0.003	dσ/dω=36.
3769.94 *6*				dσ/dω=49.
3777.52 *14*				dσ/dω=30.
3784.59 *7*				dσ/dω=28.
3792.58 *6*	3/2−	1	0.040	dσ/dω=460.
3800.93 *16*				dσ/dω=24.
3811.7 *4*				dσ/dω=9.
3818.90 *11*				dσ/dω=18.
3826.71 *11*				dσ/dω=11.
3837.66 *6*				dσ/dω=38.
3851.94 *8*	3/2−	1	0.003	dσ/dω=35.
3859.62 *20*				dσ/dω=9.
3865.73 *4*	3/2−	1	0.008	dσ/dω=95.
3873.38 *10*				dσ/dω=182.
3884.50 *16*				dσ/dω=16.
3890.23 *13*				dσ/dω=165.
3899.34 *9*	3/2−	1	0.005	dσ/dω=51.
3906.92 *5*				dσ/dω=66.
3917.0 *4*				dσ/dω=11.
3921.60 *10*				dσ/dω=24.
3929.44 *23*				dσ/dω=6.
3938.45 *12*				dσ/dω=51.
3944.24 *16*				dσ/dω=31.
3948.09 *24*	(3/2−)	(1)	(0.002)	dσ/dω=22.
3952.81 *16*				dσ/dω=48.
3962.33 *15*				dσ/dω=12.
3969.35 *29*	(3/2−)	(1)	(0.002)	dσ/dω=20.
3974.29 *10*	3/2−	1	0.009	dσ/dω=95.
3986.75 *26*				dσ/dω=6.
3993.70 *17*				dσ/dω=21.
3997.60 *14*				dσ/dω=32.
4002.40 *28*				dσ/dω=28.
4005.76 *24*				dσ/dω=48.
4017.11 *11*				dσ/dω=42.
4024.93 *14*				dσ/dω=31.
4032.54 *10*	3/2−	1	0.004	dσ/dω=37.
4043.32 *12*				dσ/dω=24.
4045.78 *16*				dσ/dω=52.
4053.70 *20*				dσ/dω=22.
4059.09 *9*	(1/2−)	1	0.008	dσ/dω=44.
4067.78 *8*	3/2−	1	0.009	dσ/dω=88.
4072.22 *21*				dσ/dω=36.
4082.23 *13*	3/2−	1	0.005	dσ/dω=48.
4086.77 *9*	3/2−	1	0.009	dσ/dω=99.
4092.48 *28*				dσ/dω=13.
4101.8 *4*				dσ/dω=16.
4106.1 *4*				dσ/dω=31.
4110.4 *4*				dσ/dω=32.

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^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)†	Jπ§	L§	S_{lj}#	Comments
4122.07 *10*	1/2−	1	0.015	dσ/dω=90.
4128.98 *12*				dσ/dω=41.
4132.81 *15*	3/2−	1	0.013	dσ/dω=133.
4150.2 *4*				dσ/dω=5.
4161.1 *5*				dσ/dω=8.
4166.21 *10*				dσ/dω=47.
4175.10 *19*	(1/2−)	1	0.006	dσ/dω=33.
4181.18 *9*	(3/2−)	1	0.007	dσ/dω=70.
4200.84 *12*				dσ/dω=59.
4205.89 *6*	1/2−	1	0.010	dσ/dω=47.
4212.43 *12*				dσ/dω=25.
4220.07 *19*	3/2−	1	0.008	dσ/dω=85.
4229.10 *14*				dσ/dω=38.
4239.79 *9*	3/2−	1	0.007	dσ/dω=73.
4251.2 *4*				dσ/dω=23.
4259.33 *23*				dσ/dω=25.
4267.41 *15*	(1/2−)	1	0.003	dσ/dω=19.
4277.37 *10*	3/2−	1	0.009	dσ/dω=105.
4291.21 *29*				dσ/dω=11.
4298.46 *22*	1/2−	1	0.007	dσ/dω=42.
4306.73 *19*				dσ/dω=18.
4311.74 *9*	(1/2−)	1	0.010	dσ/dω=53.
4317.05 *13*				dσ/dω=19.
4326.49 *8*				dσ/dω=85.
4336.16 *19*	(1/2−)	1	0.006	dσ/dω=32.
4349.48 *12*				dσ/dω=43.
4356.27 *9*	1/2−	1	0.021	dσ/dω=105.
4365.34 *11*	1/2−	1	0.043	dσ/dω=238.
4372.60 *17*				dσ/dω=99.
4380.55 *12*				dσ/dω=65.
4389.09 *20*	1/2−	1	0.033	dσ/dω=168.
4402.14 *22*				dσ/dω=47.
4410.53 *17*				dσ/dω=59.
4425.13 *10*	(3/2−)	(1)	(0.005)	dσ/dω=65.
4433.07 *10*	3/2−	1	0.014	dσ/dω=123.
4444.04 *15*				dσ/dω=67.
4456.37 *12*				dσ/dω=81.
4467.43 *15*	(1/2−)	(1)	(0.024)	dσ/dω=106.
4474.7 *4*				dσ/dω=62.
4483.92 *16*				dσ/dω=99.
4496.75 *15*				dσ/dω=76.
4504.21 *17*				dσ/dω=40.
4511.76 *22*				dσ/dω=28.
4522.5 *5*				dσ/dω=53.
4543.28 *25*				dσ/dω=41.
4558.21 *29*				dσ/dω=77.
4572.69 *21*				dσ/dω=64.
4580.26 *23*				dσ/dω=62.
4589.16 *25*				dσ/dω=126.
4595.2 *5*				dσ/dω=67.
4608.4 *4*				dσ/dω=71.
4621.96 *21*				dσ/dω=52.
4634.7 *5*				dσ/dω=30.
4643.2 *4*		(1)	(0.010)	dσ/dω=47.
4652.9 *4*		(1)	(0.007)	dσ/dω=42.
4665.82 *18*		1	0.008	dσ/dω=39.
4682.0 *3*		1	0.004	dσ/dω=20.
4695.4 *5*				dσ/dω=21.
4711.80 *25*		1		dσ/dω=30.
4724.34 *20*				dσ/dω=32.
4743.5 *4*				dσ/dω=55.
4766.2 *5*				dσ/dω=18.
4777.9 *4*		(1)	(0.004)	dσ/dω=27.

Continued on next page (footnotes at end of table)

^{128}Te(d,p),(pol d,p) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)†	L§	S_{lj}.#	Comments
4794.33 *24*			dσ/dω=42.
4807.86 *29*			dσ/dω=33.
4840.4 *4*			dσ/dω=112.
4849.6 *6*			dσ/dω=18.
4868.2 *5*			dσ/dω=57.
4879.66 *24*			dσ/dω=38.
4907.4 *5*			dσ/dω=96.
4917.0 *5*	(1)	(0.013)	dσ/dω=86.
4929.4 *5*			dσ/dω=112.
4946.8 *4*			dσ/dω=68.
4958.3 *3*			dσ/dω=88.
4975.3 *4*			dσ/dω=56.
5002.3 *4*			dσ/dω=44.
5013.3 *7*			dσ/dω=44.

† The values are weighted averages of all measurements at different angles with independent energy calibrations from ^{128}Te(d,p), ^{128}Te(pol d,p) and ^{130}Te(pol d,t). Quoted uncertainty is statistical; a systematic uncertainty of 0.5 keV should be added in quadrature (2003Wi02).

‡ Precise cross section measured by 2013Ka04 (also 2013KaZZ).

§ L from ^{128}Te(d,p), ^{128}Te(pol d,p) and/or ^{130}Te(pol d,t). J from L and analyzing power.

\# Authors give too many significant digits, the values have been rounded by evaluators. Two values are given when spin is either L−1/2 or L+1/2; the value for the latter choice is given under comments.

^{128}Te(t,d) 1981Sh02

1981Sh02: E=16 MeV; magnetic spectrograph, σ(E,θ), deduced spectroscopic factors; FWHM=13–15 keV, enriched target.

^{129}Te Levels

E(level)	L	S†‡	Comments
0.0	2	0.317	S: if $2d_{3/2}$.
106 *5*	5	0.238	S: if $1h_{11/2}$.
179 *5*	0	0.197	S: if $3s_{1/2}$.
542 *5*	2	0.004,0.002	
635 *5*	2	0.008,0.004	
763 *5*	3	0.026,0.015	
814 *5*	(4)	0.010,0.005	
878 *5*	3	0.006,0.003	
967 *5*	2	0.032	S: if $2d_{5/2}$.
1155 *5*	0	0.002	
1210 *5*	4	0.015,0.006	
1284 *5*	2	0.015,0.009	
1306 *5*	4	0.022,0.011	
1435 *5*	(2)	0.003,0.002	
1487 *5*	4	0.002,0.001	
1558 *5*	1	0.003,0.001	
1654 *5*	0	0.035	
1753 *5*	2	0.019,0.010	
1776 *5*	(2)	0.004,0.002	
1837 *5*	(0)	0.003	
1869 *5*	3	0.007,0.004	
2040 *5*	1	0.029,0.014	
2071 *5*	3	0.018,0.010	
2108 *5*	3	0.216,0.128	
2131 *5*	(0)	0.040	
2221 *5*	3	0.360,0.214	
2261 *5*	1	0.037,0.017	
2314 *5*	(0)	0.026	
2360 *5*	1	0.337,0.159	

Continued on next page (footnotes at end of table)

^{128}Te(t,d) 1981Sh02 (continued)

^{129}Te Levels (continued)

E(level)	L	S[†][‡]
2379 *5*	1	0.223,0.105
2491 *5*	0	0.032

[†] C^{2}s from DWBA.
[‡] First value for L−1/2, second for L+1/2.

^{128}Te(α,^{3}He) 2013Ka04

2013Ka04: E(α)=50 MeV beam from Yale tandem accelerator of WNSL facility. Measured ^{3}He spectra, σ(θ) using a split−pole spectrograph. FWHM ≈ 70 keV. Deduced levels, ground state configuration of ^{128}Te. DWBA analysis.

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 dσ/dΩ in mb/sr (2013KaZZ)

Level   5°    22.5°

0              0.057
106    1.21    0.33
545    0.087
2108           0.043
2221           0.062
3085   0.12    0.017
3655   0.064
3790   0.090
4121   0.61

The statistical uncertainties are less
  than 1% for strong states and less than
  3% for weaker ones. There is additional
  systematic uncertainty of ≈7%.
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^{129}Te Levels

E(level)	Jπ[†]	Comments
0.0	3/2+	
106	11/2−	
545	5/2+	
2108	7/2−	
2221	7/2−	
3085		E(level): 3077 *15* with (3/2+,5/2+) assignment and 3089.3 *5* with no Jπ assignment in Adopted Levels.
3655		
3790	3/2−	
4121	1/2−	

[†] From Adopted Levels.

Coulomb Excitation 2005Yu07

2005Yu07: HRIBF facility provided A=129 radioactive beam hit ^{50}Ti target at 400 MeV. γ rays detected by 10 Ge detectors. Recoils detected by CsI detectors.

^{129}Te Levels

E(level)	Jπ[†]	$T_{1/2}$[†]
0.0	3/2+	
106	11/2−	33.6 d *1*
180	1/2+	
465	9/2(−)	
544	5/2+	
634	5/2+	
760	7/2−	
813	7/2+	
867	(15/2−)	
876	3/2+	

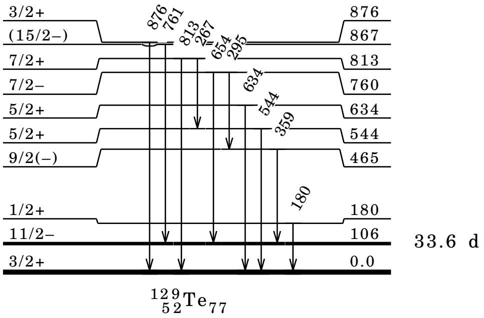
[†] From Adopted Levels.

γ(^{129}Te)

Eγ	E(level)
180	180
267	813
295	760
359	465
544	544
634	634
654	760
761	867
813	813
876	876

Coulomb Excitation 2005Yu07 (continued)

Level Scheme



^{130}Te(p,d) 1982Ga18

1982Ga18: E=42 MeV; measured deuteron spectra with a magnetic spectrometer, σ(θ) at 7°, 15°, 25°. FWHM=30–40 keV. DWBA analysis.

2013Ka04, 2013KaZZ: E(p)=23 MeV beam from Yale tandem accelerator of WNSL facility. Measured deuteron spectra, σ(θ) using a split–pole spectrograph. FWHM ≈ 30 keV. Deduced levels, configuration of g.s. of ^{130}Te. DWBA analysis.

1971SeZH: E=17 MeV; magnetic spectrograph, FWHM=10–15 keV, θ=30 '; enriched target.

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dσ/dΩ in mb/sr from (p,d) E=23 MeV (2013KaZZ)

Level	5°	20°	35°	42°
0	0.11	0.26	0.31	0.49
106	0.36	0.30	0.56	0.61
180	8.30	1.74	1.10	0.68
360		0.015	0.004	0.008
545	0.022	0.026	0.007	0.012
760	0.045	0.064	0.042	0.045
813			0.022	0.014
872	0.045	0.066	0.028	0.041
967	0.64	1.60	0.44	0.70
1210	0.037	0.16	0.16	0.12
1281	0.50	1.03	0.30	0.49
1435	0.10	0.19	0.049	0.088
1487	0.013	0.029	0.028	0.024
1599	0.033	0.054	0.018	0.019
1672	0.52	0.94	0.28	0.47
1782	0.16	0.26	0.075	0.12
1892	0.21	0.16	0.058	0.066
2085	0.054	0.023	0.006	0.009
2140	0.12	0.051	0.017	0.022
2288	0.072	0.031	0.013	0.018
2340	0.099	0.040	0.026	0.023
2395	0.23	0.090	0.017	0.012

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^{129}Te Levels

E(level)	L	Comments
0.0†	2	
107† *5*	5	
181† *5*	0	
250 *5*		

Continued on next page (footnotes at end of table)

^{130}Te(p,d) 1982Ga18 (continued)

^{129}Te Levels (continued)

E(level)	L	Comments
360[†] *5*		
455 *5*	4	
539[†] *5*		
775[†] *5*	(0+2)	
819[†] *5*	(2)	
872[†] *5*	(2)	
971[†] *5*	2	
1217[†] *5*	2	
1290[†] *5*	(2+4)	
1430[†] *5*		
1490[†] *5*		
1599[†] *10*	2[§]	
1672[†] *10*	2[§]	
1797[†] *10*		
1892[†] *10*	(4+2)	
2085[‡]		
2140[†] *10*	(0+2)	
2220 *10*	(0+2)	
2288[†] *10*	(0+2)	
2370 *10*	(4+2)	E(level): strong peak at 2370 in 1982Ga18 is assumed to correspond to 2340 in 2013Ka04, 2013KaZZ.
2395[‡]		
2450 *10*		
2524 *15*	(2)	
2620 *15*	(0+2)	
2735 *15*	(4+2)	
2891 *15*	(4+2)	
3077 *15*	(2)	
3240 *15*	(4+2)	
3310 *15*		
3395 *15*		
3450 *15*		
3520 *15*		

[†] Level also reported in 2013Ka04, 2013KaZZ.

[‡] Level from 2013Ka04, 2013KaZZ only.

[§] From σ(θ) data in 2013Ka04, 2013KaZZ.

^{130}Te(d,t),(pol d,t) 2003Wi02

2003Wi02: E=24 MeV. Measured tritons, σ(θ), A_y(θ) using Q3D spectrograph and a long multiwire proportional counter at ten different angles. FWHM=5–6 keV. Analyzing powers determined from the cross sections with different polarizations. These analyzing powers were used for unambiguous spin assignment. DWBA calculations.

All data are from 2003Wi02. 1964JO12 agrees with the results from 2003WI02 but less precise and contains less data.

1964Jo12: E=14.8 MeV; magnetic spectrograph, σ(θ) θ=45° and 60°, enriched target.

^{129}Te Levels

Cross sections (in μb/sr) in terms of maximum value of σ(θ) distribution are given under comments.

E(level)[†]	Jπ[‡]	L[‡]	(2J+1)s_{lj}.[§]	Comments
0.0	3/2+	2	1.08	dσ/dω=7269.
105.2 *4*	11/2−	5	3.020	dσ/dω=1340. E(level): 106 in (d,t).
179.35 *28*	1/2+	0	0.524	dσ/dω=7749. E(level): 180 in (d,t).
544.06 *9*	5/2+	2	0.007	dσ/dω=67. E(level): 545 in (d,t).
760.25 *5*	7/2−	3	0.082	dσ/dω=151. E(level): 760.2 *3* in (d,t).

Continued on next page (footnotes at end of table)

^{130}Te(d,t),(pol d,t) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)†	Jπ‡	L‡	$(2J+1)s_{lj}$.§	Comments
812.93 *8*	7/2+	4	0.092	dσ/dω=60. E(level): 812.9 *3* in (d,t).
865.35 *12*	(7/2+)	(4)	(0.032)	dσ/dω=16. E(level): 865.2 *3* in (d,t).
874.73 *21*		2	0.006	dσ/dω=51. $(2J+1)s_{lj}$.: 0.0046. E(level): 875.1 *3* in (d,t).
966.76 *4*	5/2+	2	0.334	dσ/dω=3616. E(level): 966.7 *3* in (d,t).
1211.8 *6*	7/2+	4	0.537	dσ/dω=365. E(level): 1211.5 *3* in (d,t).
1282.0 *5*	5/2+	2	0.176	dσ/dω=2047. E(level): 1282.4 *3* in (d,t).
1303.32 *12*	1/2+	0	0.002	dσ/dω=55. E(level): 1303.2 *3* in (d,t).
1319.01 *8*	7/2+	4	0.021	dσ/dω=15. E(level): 1319.0 *3* in (d,t).
1419.4 *8*	5/2+	2	0.035	dσ/dω=442. E(level): 1418.8 *3* in (d,t).
1483.56 *16*	7/2+	4	0.091	dσ/dω=66. E(level): 1483.6 *3* in (d,t).
1582.1 *4*	7/2+	4	0.049	dσ/dω=36. E(level): 1582.1 *3* in (d,t).
1599.65 *20*	5/2+	2	0.005	dσ/dω=57. E(level): 1599.7 *3* in (d,t).
1655.72 *22*	5/2+	2	0.169	dσ/dω=2204. E(level): 1656.0 *3* in (d,t).
1723.53 *5*	5/2+	2	0.004	dσ/dω=46.
1739.72 *11*		2	0.002	dσ/dω=23. $(2J+1)s_{lj}$.: 0.0015.
1754.24 *9*	7/2+	4	0.084	dσ/dω=57.
1779.95 *13*	5/2+	2	0.041	dσ/dω=559. E(level): 1779.9 *3* in (d,t).
1812.80 *25*	7/2+	4	0.050	dσ/dω=37. E(level): 1812.7 *3* in (d,t).
1843.64 *15*		1+5		dσ/dω=16.
1869.91 *10*	5/2+	2	0.025	dσ/dω=320.
1887.52 *25*		(1,2)		dσ/dω=14.
1918.7 *5*	(3/2+)	(2)	(0.001)	dσ/dω=16.
2040.2 *6*	3/2−	1	0.001	dσ/dω=29. v3$p_{3/2}$ orbital. E(level): 2038.4 *3* in (d,t).
2059.31 *9*	1/2+	0	0.001	dσ/dω=40.
2071.52 *9*	3/2+	2	0.003	dσ/dω=40.
2089.90 *10*		(4)	(0.010)	$(2J+1)s_{lj}$.: 0.0062≈ dσ/dω=9.
2106.60 *7*	7/2−	3	0.006	dσ/dω=55. v2$f_{7/2}$ orbital. E(level): 2106.6 *3* in (d,t).
2113.91 *12*	1/2+	0	0.004	dσ/dω=112.
2132.95 *10*		5	0.031	dσ/dω=11. $(2J+1)s_{lj}$.: 0.0172.
2141.81 *15*	7/2+	4	0.023	dσ/dω=17.
2182.62 *8*	3/2+	2	0.003	dσ/dω=40.
2197.7 *5*		(3)	≈0.007	dσ/dω=16. $(2J+1)s_{lj}$.: 0.0054≈
2220.15 *13*				dσ/dω=31.
2255.05 *25*	1/2+	0	0.002	dσ/dω=65.
2266.61 *19*	(3/2+)	(2)	≈0.004	dσ/dω=57.
2278.52 *13*	(7/2+)	4	0.017	dσ/dω=14.
2303.7 *4*		5	0.037	dσ/dω=12. $(2J+1)s_{lj}$.: 0.0202.
2309.73 *7*	1/2+	0	0.003	dσ/dω=86.

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^{130}Te(d,t),(pol d,t) 2003Wi02 (continued)

^{129}Te Levels (continued)

E(level)[†]	Jπ[‡]	L[‡]	(2J+1)s_{lj}.[§]	Comments
2316.60 *12*	(11/2−)	5	0.041	$d\sigma/d\omega$=24.
2353.75 *23*	1/2+	0	0.006	$d\sigma/d\omega$=199.
2362.6 *6*	(1/2−)	1	0.001	$d\sigma/d\omega$=28.
2370.5 *5*	(3/2+)	2	0.001	$d\sigma/d\omega$=20.
2377.4 *4*	(1/2−)	1	0.001	$d\sigma/d\omega$=24.
2416.12 *7*	5/2+	2	0.006	$d\sigma/d\omega$=94.
2431.59 *21*	1/2+	0	0.001	$d\sigma/d\omega$=22.
2454.28 *13*		4	0.009	$d\sigma/d\omega$=7. (2J+1)s_{lj}.: 0.0057.
2465.29 *23*		(2)	≈0.001	$d\sigma/d\omega$=7. (2J+1)s_{lj}.: (0.0005).
2477.0 *4*		(2)	≈0.0010	$d\sigma/d\omega$=15. (2J+1)s_{lj}.: (0.0008).
2481.62 *29*		4	0.034	$d\sigma/d\omega$=28. (2J+1)s_{lj}.: 0.0221.
2506.66 *13*	(3/2+)	2	0.002	$d\sigma/d\omega$=22.
2518.61 *16*	3/2+	2	0.002	$d\sigma/d\omega$=23.
2555.75 *18*	5/2+	2	0.003	$d\sigma/d\omega$=45.
2584.3 *3*	(3/2+)	2	0.001	$d\sigma/d\omega$=14.
2615.91 *13*		(2)	≈0.001	$d\sigma/d\omega$=13. (2J+1)s_{lj}.: (0.0007).
2632.44 *33*	5/2+	2	0.001	$d\sigma/d\omega$=22.
2670.86 *29*		(2)	≈0.0003	$d\sigma/d\omega$=5. (2J+1)s_{lj}.: (0.0003).
2680.6 *4*	9/2+	4	0.006	$d\sigma/d\omega$=9.
2701.8 *4*	1/2−	1	0.0003	$d\sigma/d\omega$=11.
2710.79 *28*	5/2+	2	0.002	$d\sigma/d\omega$=34.
2746.77 *16*		2	0.003	$d\sigma/d\omega$=42. (2J+1)s_{lj}.: 0.0024.
2756.74 *9*	(3/2+)	2	0.002	$d\sigma/d\omega$=33.
2766.62 *23*	(5/2+)	2	0.001	$d\sigma/d\omega$=19.
2823.60 *24*		4	0.019	$d\sigma/d\omega$=18. (2J+1)s_{lj}.: 0.0123.
2831.1 *6*	(3/2+)	(2)	≈0.001	$d\sigma/d\omega$=12.
2844.1 *5*		2	0.001	$d\sigma/d\omega$=6. (2J+1)s_{lj}.: 0.0004.
2855.67 *12*	5/2+	2	0.002	$d\sigma/d\omega$=36.

[†] The values are weighted averages of all measurements at different angles with independent energy calibrations from ^{128}Te(d,p), ^{128}Te(pol d,p) and ^{130}Te(pol d,t). Quoted uncertainty is statistical. A systematic uncertainty of 0.5– keV increasing with excitation energy should be added in quadrature. From column 9 in Table 6 of 2003Wi02, these uncertainties are estimated as follows: 0.5 keV up to 2 MeV excitation; 1 keV from 2.0–2.2 MeV; 1.5 keV from 2.2–2.4 MeV; 2.0 keV from 2.4–2.5 MeV; 3 keV from 2.5–2.6 MeV; 4 keV from 2.6–2.8 MeV; 5 keV above 2.8 MeV.

[‡] L from ^{128}Te(d,p), ^{128}Te(pol d,p) and/or ^{130}Te(pol d,t). J from L and analyzing power.

[§] Authors give too many significant digits, they are rounded by evaluators. Two values are given when spin is either L−1/2 or L+1/2; the value for the latter choice is given under comments.

^{130}Te(^{3}He,α) 1982Ga18

1982Ga18: E=70 MeV; measured α spectra with a magnetic spectrometer, σ(θ) at 7°, 15°, 25°. FWHM=70 keV. DWBA analysis.

2013Ka04, 2013KaZZ: E(^{3}He)=40 MeV beam from Yale tandem accelerator of WNSL facility. Measured α spectra, σ(θ) using a split-pole. magnetic spectrograph. FWHM ≈ 70 keV. Deduced cross section for 105, 11/2− level.

^{129}Te Levels

E(level)	L	S[†]	Comments
0.0	2	2.1	S: if $2d_{3/2}$.

Continued on next page (footnotes at end of table)

^{130}Te(^{3}He,α) 1982Ga18 (continued)

^{129}Te Levels (continued)

E(level)	L	S†	Comments
105 *10*	5	7.2	E(level): level reported in 2013Ka04 and 2013KaZZ with dσ/dΩ=5.16 mb/sr at 5° and 1.11 mb/sr at 22.5°. S: if $1h_{11/2}$.
372 *10*	(2)		
461 *10*	4	0.21	S: if $1g_{7/2}$.
783 *10*	(2)	0.26	
880 *10*	2	0.28	
970 *10*	2	1.7	S: if $2d_{5/2}$.
1280 *10*	4	3.6	S: if $1g_{7/2}$.
1535 *10*	4	0.65	S: if $1g_{7/2}$.
1845 *10*	4	1.04	S: if $1g_{7/2}$.
1920 *10*	2	0.71	S: if $2d_{5/2}$.
2180 *25*	(2+4)	0.2+0.3	S: <0.2, <0.3 if $2d_{5/2}$+$1g_{7/2}$.
2370 *25*	4,5	0.8,0.4	S: if $1g_{7/2}$, $1h_{11/2}$.
2515 *25*	5	0.28	S: if $1h_{11/2}$.
2745 *25*	(4)		
2980 *25*	4	0.51	S: if $1g_{7/2}$.
3500 *25*	4	0.47	S: if $1g_{7/2}$.

† C^2s from DWBA.

^{130}Te(^{64}Ni,Xγ) 1998Zh09,1995Zh37

1998Zh09, 1995Zh37: E=275 MeV. Deep inelastic reaction. Measured γ, γγ using GASP array. Angular distribution of γ rays also determined. 19 γ transitions detected but level scheme is constructed for the yrast states only using 11 of the γ rays.

^{129}Te Levels

E(level)	Jπ†	$T_{1/2}$	Comments
0.0	3/2+‡		
106.0 *1*	11/2−‡	33.6 d *1*	$T_{1/2}$: from Adopted Levels.
866.0 *1*	(15/2−)		
1524.0 *1*	(19/2−)		
1655.0 *1*	(17/2−)		Jπ: three quasiparticle configuration=$\pi g_{7/2}{}^{2}\otimes\nu h_{11/2}$.
1887.0 *1*	(21/2−)		
1958.0 *1*	(21/2−)		Jπ: from Adopted Levels. Configuration=$\pi(g_{7/2},d_{5/2})\otimes\nu h_{11/2}$ (1998Zh09).
2138.0 *1*	(23/2+)	33 ns *3*	$T_{1/2}$: from γ(t). Jπ: from level systematics with 128Te and 130Te by 1998Zh09.
2511.0 *1*	(23/2−)		Jπ: possible configuration=$\pi g_{7/2}{}^{2}\otimes\nu h_{11/2}$.
3052.0 *1*			

† From 1998Zh09 for levels above 11/2− based on γ(θ) and high–spin cascade, consistent with similar structures in neighboring nuclides.

‡ From Adopted Levels.

γ(^{129}Te)

Eγ	E(level)	Iγ	Mult.	α	Comments
106.0 *1*	106.0		M4	419 *7*	Eγ: from level–energy difference. Mult.: from Adopted Gammas.
131.1 *3*	1655.0	2.52 *25*			
180.6 *3*	2138.0	1.56 *16*			
232.3 *1*	1887.0	3.6 *4*			
251.2 *1*	2138.0	4.6 *5*			
363.4 *1*	1887.0	18.2 *18*	(D)		Mult.: possible ΔJ=1, (M1) from γ(θ) in 1998Zh09.

Continued on next page (footnotes at end of table)

^{130}Te(^{64}Ni,Xγ) 1998Zh09,1995Zh37 (continued)

γ(^{129}Te) (continued)

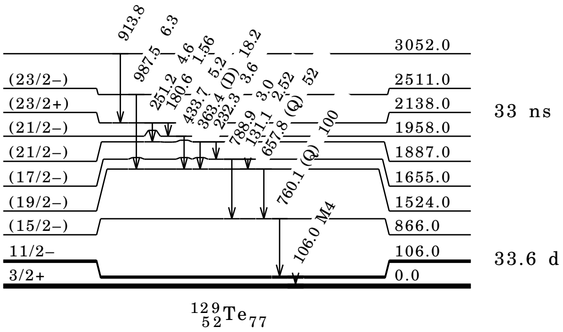
Eγ	E(level)	Iγ	Mult.
433.7 *1*	1958.0	5.2 *5*	
657.8 *1*	1524.0	52 *5*	(Q)[†]
760.1 *1*	866.0	100 *10*	(Q)[†]
788.9 *1*	1655.0	3.0 *3*	
913.8 *3*	3052.0		
987.5 *1*	2511.0	6.3 *6*	

[†] ΔJ=2, (E2) suggested from γ(θ) (1998Zh09), but no angular distribution coefficients are listed in the paper.

^{130}Te(^{64}Ni,Xγ) 1998Zh09,1995Zh37 (continued)

Level Scheme

Intensities: relative Iγ



^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ) 2014AsAA

2014AsAA: E(^{12}C)=90 MeV, E(^{18}O=85 MeV. Targets=47 mg/cm^2 ^{238}U and 100 mg/cm^2 ^{208}Pb. Measured Eγ, Iγ, γγ-coin, level half-lives by delayed coincidence techniques using SAPhIR and Euroball arrays at Legnaro XTU accelerator for ^{12}C beam and IReS Vivitron facility in Strasbourg. Deduced levels, J, π. Comparison with shell-model calculations.

^{129}Te Levels

E(level)†	Jπ‡	T$_{1/2}$	Comments
0.0@	3/2+		
105.51# *3*	11/2–	33.6 d *1*	E(level),Jπ,T$_{1/2}$: from Adopted Levels.
812.4@ *6*	(7/2+)§		
864.9# *2*	15/2–		
1515.7@ *9*	(11/2+)		
1522.4# *3*	19/2–		
1653.6 *4*	(19/2–)		
1727.1@ *10*	(15/2+)		
1885.3 *4*	21/2–		
1955.8 *4*	21/2–		
2135.8& *4*	23/2+	33 ns *3*	T$_{1/2}$: from Adopted Levels.
2509.9# *5*	23/2–		
2840.3# *6*	27/2–		
2883.8 *8*			
3049.9& *6*	27/2+		
3512.9# *7*	29/2–		
3617.0 *9*	(31/2–)		
3636.7& *7*	(29/2+)		
4033.1& *9*	(31/2+)		
4155.6 *9*	(31/2+)		
4435.3# *10*	(33/2–)		
4696.8 *10*	(33/2+)		
4825.2# *11*	(35/2–)		

† From least-squares fit to Eγ data.

‡ As proposed in 2014AsAA based on previous assignments for low-lying levels, and decay pattern.

§ From Adopted Levels.

(A): γ sequence based on 11/2– isomer.

@ (B): γ sequence based on 3/2+.

& (C): γ sequence based on 23/2+ isomer.

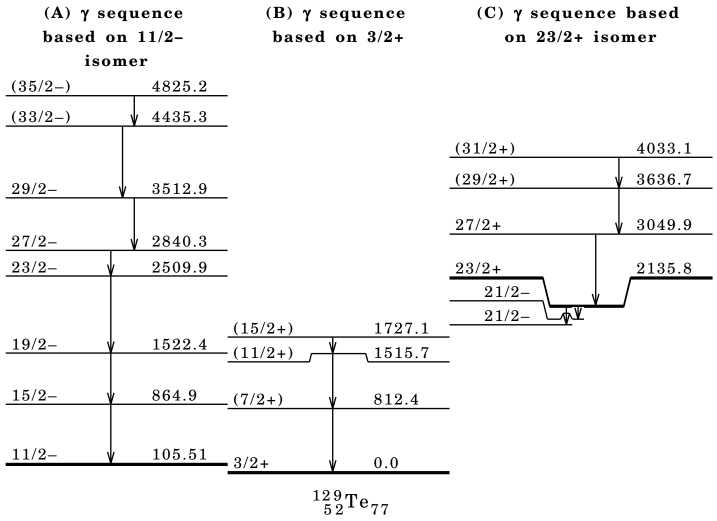
^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ) 2014AsAA (continued)

γ(^{129}Te)

Eγ	E(level)	Iγ	Mult.†	Comments
130.9 *5*	1653.6	4 *2*		
180.1 *4*	2135.8	9.4 *28*	D	
211.4 *5*	1727.1	1.4 *7*		
231.6 *3*	1885.3	8 *2*		
250.5 *3*	2135.8	17 *4*	D	
330.4 *3*	2840.3	19 *5*	Q	(330.4γ)(759.4γ)(θ): R(22°)=1.10 *5*, R(46°)=1.06 *3*, R(75°)=1.00. (330.4γ)(987.5γ)(θ): R(22°)=1.15 *9*, R(46°)=1.07 *5*, R(75°)=1.00.
362.9 *3*	1885.3	23 *5*	D	
389.9 *5*	4825.2	1.4 *7*		
396.4 *5*	4033.1	2.7 *13*		
433.4 *3*	1955.8	16 *4*	D	(433.4γ)(759.4γ)(θ): R(22°)=0.87 *8*, R(46°)=0.96 *4*, R(75°)=1.00.
541.2 *5*	4696.8	2 *1*		
586.8 *4*	3636.7	6.4 *19*		
657.5 *2*	1522.4	82 *12*	Q	
672.6 *4*	3512.9	10 *3*	D	(672.6γ)(759.4γ)(θ): R(22°)=0.8 *1*, R(46°)=0.90 *7*, R(75°)=1.00.
703.3 *6*	1515.7	>1.4		
748.0 *6*	2883.8	1.8 *9*		
759.4 *2*	864.9	100	Q	
776.7 *6*	3617.0	2 *1*		
788.8 *6*	1653.6	5 *2*		
812.4 *6*	812.4	>1.4		
914.1 *4*	3049.9	13 *3*	Q	(914.1γ)(759.4γ)(θ): R(22°)=1.17 *8*, R(46°)=1.08 *4*, R(75°)=1.00. (914.1γ)(180.1γ)(θ): R(22°)=0.91 *5*, R(46°)=0.95 *5*, R(75°)=1.00. (914.1γ)(250.5.1γ)(θ): R(22°)=0.92 *6*, R(46°)=0.89 *8*, R(75°)=1.00. (914.1γ)(362.9γ)(θ): R(22°)=0.8 *1*, R(46°)=0.92 *6*, R(75°)=1.00. (914.1γ)(657.5γ)(θ): R(22°)=1.16 *8*, R(46°)=1.05 *4*, R(75°)=1.00.
922.4 *6*	4435.3	2 *1*		
987.5 *4*	2509.9	22 *4*	Q	(987.5γ)(759.4γ)(θ): R(22°)=1.12 *6*, R(46°)=1.04 *3*, R(75°)=1.00.
1105.7 *6*	4155.6	3.0 *12*		

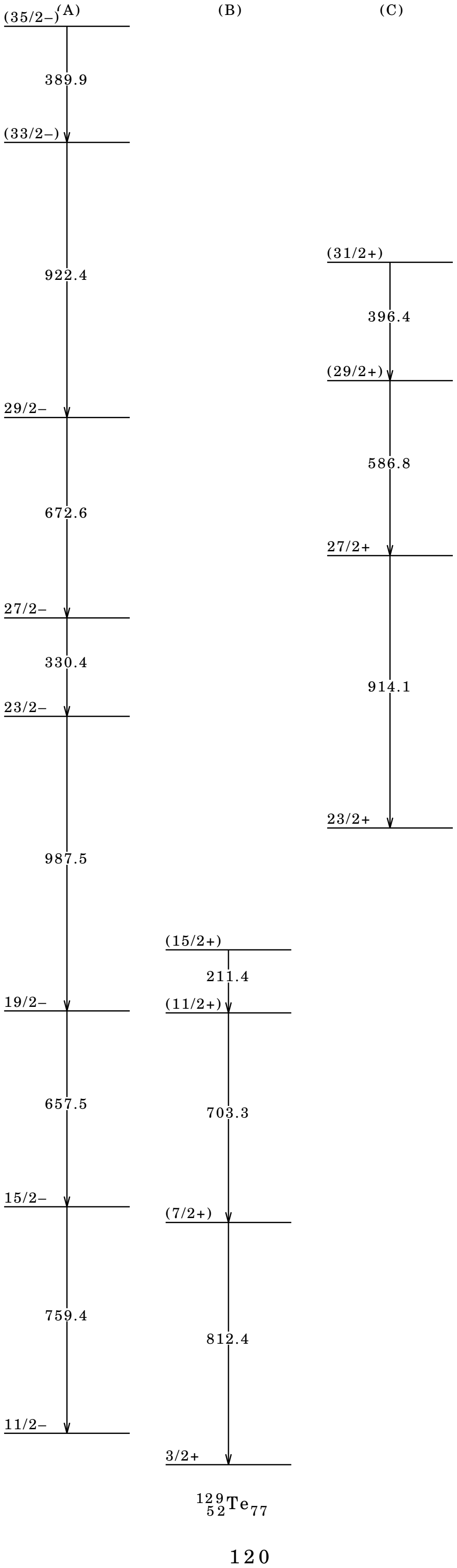
† From γγ(θ) data, mult=Q corresponds ΔJ=2, most likely E2.

^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ) 2014AsAA (continued)



$^{238}U(^{12}C,F\gamma),^{208}Pb(^{18}O,F\gamma)$ 2014AsAA (continued)

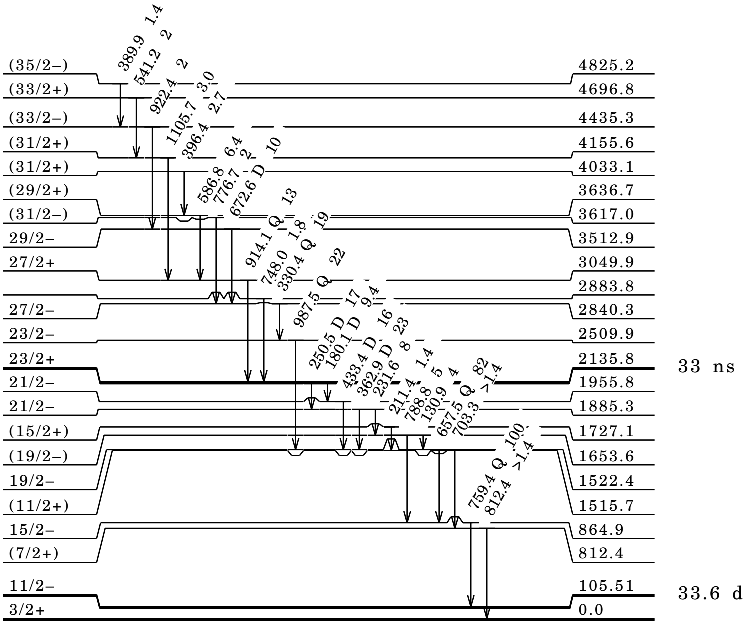
Bands for ^{129}Te



^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ) 2014AsAA (continued)

Level Scheme

Intensities: relative Iγ



$^{129}_{52}$Te$_{77}$

Adopted Levels, Gammas

Q(β^-)=189 *3*; S(n)=8840 *5*; S(p)=6802 *3*; Q(α)=−2676 *4* 2012Wa38.
S(2n)=15666 *5*, S(2p)=16386 *6* (2012Wa38).
^{129}I identified by 1949Pa19, 1949Li09 and 1951Ka16; also an earlier preliminary report by S. Katcoff in Phys. Rev. 71, 826 (1947).

^{129}I Levels

Cross Reference (XREF) Flags

A ^{129}Te β^- Decay (69.6 min)
B ^{129}Te β^- Decay (33.6 d)
C ^{124}Sn(^{7}Li,2nγ)
D ^{128}Te(p,p),(p,p') IAR
E Coulomb Excitation
F ^{128}Te(^{3}He,d)
G ^{128}Te(α,t)

E(level)†	Jπ‡	XREF	$T_{1/2}$	Comments
0.0	7/2+	ABC EFG	1.57×10^7 y *4*	%β^-=100. μ=+2.6210 *3* (1951Wa12,2014StZZ). Q=−0.488 *8* (1953Li16,2013StZZ,2014StZZ). μ: From NMR (1951Wa12). Q: quadrupole resonance, microwave absorption (1953Li16). Value recommended by 2013StZZ evaluation of original value of −0.553 from 1953Li16. Others: −0.498 *7* (2001Bi17, re-evaluated from measured Q(^{129}I)/Q(^{127}I)=0.701213 *15* (1953LI16)); −0.482 *10* (reanalysis of Q_2 for ^{127}I by 2000Ha64). Jπ: spin from microwave spectroscopy (1949Li09). Parity from L(^{3}He,d)=4. $T_{1/2}$: from specific activity (1972Em01). Others: 1.97×10^7 y 14 (1973Ku17), 1.56×10^7 y *6* (1957Ru65), 1.72×10^7 y *9* (1951Ka16), 3.0×10^7 y (1949Pa19), ≈10^8 y (S. Katcoff, Phys. Rev. 71, 826 (1947).
27.793 *20*	5/2+	ABC EFG	16.8 ns *2*	μ=+2.8045 *26* (1981De35,2014StZZ). Q=−0.604 *10* (1972Ro41,2013StZZ,2014StZZ). μ: Mossbauer effect (1981De35). Q: Mossbauer effect, value recommended by 2013StZZ evaluation of original value of −0.685 from 1972Ro41. Others: −0.616 *9* (2001Bi17 re-evaluated data from 1972Ro41); −0.598 *13* (reanalysis of 1972Ro41 data and Q_2 for ^{127}I by 2000Ha64); −0.42 *2* (1987Gr28, Mossbauer effect measurement). Jπ: L(^{3}He,d)=2; M1+E2 γ to 7/2+. $T_{1/2}$: from (β)(0.0278 ce(L))(t) (1966Sa06). Others (from $\beta\gamma$(t) or $\gamma\gamma$(t)): 16.4 ns *11* (1965Pa04), 14.4 ns 5 (1964Ka09), 14.4 ns *7* (1964Jh02), 15.9 ns 13 (1963Go17), 18.6 ns 11 (1962De18).
278.381 *23*	3/2+	AB EFG	0.104 ns *12*	Jπ: L(^{3}He,d)=2; E2 γ to 7/2+; γ from 1/2+. $T_{1/2}$: from delayed γ (1969BoZR). 0.27 ns is deduced from B(E2) in Coulomb ex.
487.346 *25*	5/2+	AB EFG	11.6 ps *27*	Jπ: L(^{3}He,d)=2; M1+E2 gammas to 7/2+, 5/2+ and 3/2+. $T_{1/2}$: deduced by compilers from B(E2)(↑)=0.016 *3* in Coulomb excitation. Other: 0.05 ns (from γ)t),1969BoZR).
559.61 *3*	1/2+	A FG		Jπ: L(^{3}He,d)=0.
695.89 *5*	11/2+	BC E	4.3 ps *5*	Jπ: ΔJ=2, (E2) g to 7/2+; Coulomb excited; population in (^{7}Li,2nγ) supports 11/2 over 3/2. $T_{1/2}$: deduced by compilers from B(E2)=0.122 *13* in Coulomb ex.
729.57 *3*	(9/2)+	ABC E	3.8 ps *4*	Jπ: log *ft*=9.9 from 11/2−; M1+E2 γ to 7/2+. $T_{1/2}$: deduced by compilers from B(E2)=0.078 *8* in Coul. ex.
768.75 *3*	(7/2)+	AB E		Jπ: log $f^{1u}t$=11.6 from 11/2−; M1+E2 γ to 5/2+.
829.91 *3*	3/2+,5/2+	A E		Jπ: log *ft*=7.2 from 3/2+; Coulomb excited.
844.82 *3*	(7/2)+	ABC E G		Jπ: log $f^{1u}t$=11.9 from 11/2−; M1+E2 γ to 5/2+; Coulomb excited. J=(9/2) proposed in (^{7}Li,2nγ) is inconsistent with M1+E2 G to 5/2+.
1047.35 *4*	3/2+,5/2+	A FG		XREF: F(1052). Jπ: L(^{3}He,d)=2.
1050.21 *3*	(7/2)+	AB E		Jπ: log $f^{1u}t$=10.6 from 11/2−; M1+E2 γ to 5/2+.
1111.645 *25*	5/2+	A FG		Jπ: L(^{3}He,d)=2; M1+E2 gammas to 7/2+.
1196.65 *13*		A		
1203.71 *9*	(7/2+)	B		Jπ: log $f^{1u}t$=11.8 from 11/2−; gammas to 7/2+ and 3/2+.
1209.80 *10*	1/2+	A FG		Jπ: L(^{3}He,d)=0.

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Adopted Levels, Gammas (continued)

^{129}I Levels (continued)

E(level)†	Jπ‡	XREF	Comments
1260.65 *3*	3/2+,5/2+	A FG	Jπ: L(^{3}He,d)=2.
1281.99 *4*	(7/2+)	B G	Jπ: log $f^{1u}t$=11.4 from 11/2–; γ to 3/2+.
1291.94 *4*	(3/2+,5/2+)	A	Jπ: log *ft*=6.3 from 3/2+; gammas to 1/2+ and 7/2+.
1376.2 *2*	(13/2+)	C	Jπ: ΔJ=2, Q γ to (9/2)+; ΔJ=1 γ to 11/2+.
1401.43 *3*	(9/2)–	BC FG	Jπ: L(α,t)=5; ΔJ=1, dipole γ to (7/2)+. J=(11/2) proposed in (^{7}Li,2nγ) is not likely with (7/2) assignment for 845 level.
1469.7 *3*	(15/2+)	C	Jπ: ΔJ=2, Q γ to 11/2+.
1483 *5*	1/2+	FG	Jπ: L(^{3}He,d)=0.
1521 *6*	(7/2 to 11/2)	G	Jπ: L(α,t)=(4,5).
1566 *10*	3/2+,5/2+	FG	XREF: G(1569). Jπ: L(^{3}He,d)=2.
1621 *10*	3/2+,5/2+	FG	XREF: G(1619). Jπ: L(^{3}He,d)=2.
1666.9 *4*	(13/2+)	C	Jπ: ΔJ=(2) γ to (9/2)+.
1741 *10*		FG	E(level): possible doublet. L(^{3}He,d)=0; L(α,t)=(4+0).
1823 *10*	1/2+	F	Jπ: L(^{3}He,d)=0.
1833.5 *3*	(15/2+)	C	Jπ: ΔJ=1 γ to (13/2+); γ to (15/2)+.
1850.2 *4*	(15/2)	C	Jπ: gammas to (13/2+) and (15/2+).
1861 *10*	3/2+,5/2+	FG	XREF: G(1867). Jπ: L(^{3}He,d)=2.
1909 *8*		G	
1940 *8*		G	
1963 *10*		FG	
2002 *8*		G	
2012 *10*	1/2+	F	Jπ: L(^{3}He,d)=0.
2026 *8*		G	
2050 *8*		G	
2073 *10*	3/2+,5/2+	FG	XREF: G(2071). Jπ: L(^{3}He,d)=2.
2099.3 *5*	(17/2+)	C	Jπ: ΔJ=1 γ to (15/2+).
2150 *8*		G	
2208 *10*	1/2+	F	Jπ: L(^{3}He,d)=0.
2324.7 *4*	(19/2+)	C	Jπ: ΔJ=2 γ to (15/2+).
2400 *10*	1/2+	F	Jπ: L(^{3}He,d)=0.
2529.6 *5*		C	Jπ: γ to (19/2+) suggests 19/2, 21/2, 23/2+.
2569? *1*		C	
2590 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
2633.1 *4*	(23/2+)	C	Jπ: ΔJ=2 γ to (19/2+).
2790 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
2850 *20*	3/2+,5/2+	F	Jπ: L(^{3}He,d)=2.
2882.3 *7*		C	
2910 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
2924? *1*		C	
2933.8 *5*	(25/2+)	C	Jπ: ΔJ=1 γ to (23/2+).
2950 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
3200 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
3250 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
3350 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
3408? *1*		C	
3450 *20*	1/2+	F	Jπ: L(^{3}He,d)=0.
14666 *20*	3/2+,5/2+	D	Jπ: L=2 in (p,p') IAR.
14854 *20*	1/2+	D	Jπ: L=0 in (p,p') IAR.
15643 *20*	3/2+,5/2+	D	Jπ: L=2 in (p,p') IAR.
15969 *20*	3/2+,5/2+	D	Jπ: L=2 in (p,p') IAR.
16759 *20*	5/2–,7/2–	D	Jπ: L=3 in (p,p') IAR.
16869 *20*	5/2–,7/2–	D	Jπ: L=3 in (p,p') IAR.
16915 *25*	1/2–,3/2–	D	Jπ: L=1 in (p,p') IAR.
16998 *20*	1/2–,3/2–	D	Jπ: L=1 in (p,p') IAR.
17344 *20*	1/2–,3/2–	D	Jπ: L=1 in (p,p') IAR.
17622 *20*	(5/2–,7/2–)	D	Jπ: L=(3) in (p,p') IAR.
18409 *20*	1/2–,3/2–	D	Jπ: L=1 in (p,p') IAR.

[†] From least–squares fit to the adopted Eγ values for levels populated in γ–ray studies. For others weighted averages are taken.

Footnotes continued on next page

Adopted Levels, Gammas (continued)

^{129}I Levels (continued)

‡ For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

γ(^{129}I)

E(level)	Eγ†	Iγ†	Mult.†	δ†	α	Comments
27.793	27.81 *5*	100	M1+E2	−0.045 *14*	4.9 *4*	α(L)=3.9 *3*; α(M)=0.79 *6*. α(N)=0.160 *11*; α(O)=0.0181 *10*. B(M1)(W.u.)=0.0103 *8*; B(E2)(W.u.)=18 *12*.
278.381	250.62 *5*	68 *2*	M1+E2	+0.50 *+19−13*	0.0623 *18*	α(K)=0.0531 *12*; α(L)=0.0074 *5*; α(M)=0.00150 *11*. α(N)=0.000302 *21*; α(O)=3.43×10^{-5} *18*. B(M1)(W.u.)=0.0041 *8*; B(E2)(W.u.)=11 *7*.
	278.43 *5*	100 *3*	E2		0.0512	B(E2)(W.u.)=47 *6*. α(K)=0.0422 *6*; α(L)=0.00723 *11*; α(M)=0.001483 *21*. α(N)=0.000293 *5*; α(O)=3.12×10^{-5} *5*.
487.346	208.96 *5*	2.34 *7*	M1+E2	−0.18 *3*	0.0983 *15*	α(K)=0.0844 *13*; α(L)=0.01110 *20*; α(M)=0.00224 *4*. α(N)=0.000452 *8*; α(O)=5.27×10^{-5} *9*. B(M1)(W.u.)=0.0039 *10*; B(E2)(W.u.)=1.9 *8*.
	459.60 *5*	100 *3*	M1+E2	−0.12 *4*	0.01259	α(K)=0.01089 *16*; α(L)=0.001369 *20*; α(M)=0.000275 *4*. α(N)=5.57×10^{-5} *8*; α(O)=6.56×10^{-6} *10*. B(M1)(W.u.)=0.016 *4*; B(E2)(W.u.)=0.7 *5*.
	487.39 *5*	18.4 *6*	M1+E2	+0.50 *+17−10*	0.01057 *24*	α(K)=0.00911 *22*; α(L)=0.001169 *18*; α(M)=0.000235 *4*. α(N)=4.75×10^{-5} *8*; α(O)=5.55×10^{-6} *10*. B(M1)(W.u.)=0.0020 *6*; B(E2)(W.u.)=1.4 *9*.
559.61	281.26 *5*	100 *3*	M1+E2	−0.08 *4*	0.0442	α(K)=0.0381 *6*; α(L)=0.00487 *7*; α(M)=0.000980 *15*. α(N)=0.000199 *3*; α(O)=2.33×10^{-5} *4*.
	531.83 *5*	53 *2*	[E2]			α=0.00722 *11*; α(K)=0.00614 *9*; α(L)=0.000862 *12*; α(M)=0.0001745 *25*. α(N)=3.50×10^{-5} *5*; α(O)=3.94×10^{-6} *6*.
695.89	695.88 *6*	100	(E2)			B(E2)(W.u.)=20.8 *25*.
729.57	242.2 *1*	0.094 *13*	[E2]		0.0812	α(K)=0.0661 *10*; α(L)=0.01207 *17*; α(M)=0.00248 *4*. α(N)=0.000490 *7*; α(O)=5.13×10^{-5} *8*. B(E2)(W.u.)=4.2 *8*.
	701.76 *5*	3.56 *13*	[E2]			B(E2)(W.u.)=0.78 *10*.
	729.57 *5*	100 *4*	M1+E2	−0.34 *6*		B(M1)(W.u.)=0.0129 *16*; B(E2)(W.u.)=1.9 *7*.
768.75	281.38 *20*	<0.34				
	490.34 *20*	<0.86				
	740.96 *5*	100 *3*	M1+E2	−0.27 *10*		
	768.77 *5*	10 *1*				
829.91	270.37 *6*	2.4 *2*				
	342.54 *5*	4.4 *4*				
	551.50 *5*	1.9 *2*				
	802.10 *5*	100 *3*				
	829.93 *5*	3.3 *12*				
844.82	76.10 *5*	0.35 *8*	[M1+E2]		3.1 *15*	α(K)=2.1 *7*; α(L)=0.8 *7*; α(M)=0.18 *15*. α(N)=0.03 *3*; α(O)=0.0032 *24*.
	115.30 *16*	0.29 *9*	[M1+E2]		0.8 *3*	α(K)=0.59 *17*; α(L)=0.15 *10*; α(M)=0.031 *20*. α(N)=0.006 *4*; α(O)=0.0006 *4*.
	357.48 *20*	≤0.15				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}I) (continued)

E(level)	Eγ†	Iγ†	Mult.†	δ†	α	Comments
844.82	817.04 *5*	100 *3*	M1+E2	+0.46 *4*		
	844.81 *5*	37.6 *21*				
1047.35	560.05 *6*	100 *6*				
	769.01 *5*	11.8 *11*				
	1019.43 *6*	37 *9*				
1050.21	281.44 *5*	2.9 *3*	[M1+E2]		0.047 *3*	α(K)=0.0394 *15*; α(L)=0.0059 *11*; α(M)=0.00120 *23*. α(N)=0.00024 *5*; α(O)=2.7×10^{-5} *4*.
	320.64 *11*	3.4 *5*	[M1+E2]		0.0319 *7*	α(K)=0.0271 *4*; α(L)=0.0039 *5*; α(M)=0.00079 *11*. α(N)=0.000159 *19*; α(O)=1.78×10^{-5} *14*.
	562.82 *20*	≤2.6				
	771.80 *16*	1.7 *2*				
	1022.43 *5*	97 *5*	M1(+E2)	−0.02 *2*		
	1050.21 *5*	100 *8*				
1111.645	281.7 *1*	0.31 *6*				
	342.88 *5*	10.0 *1*	[M1+E2]		0.0264	α(K)=0.0224 *6*; α(L)=0.0032 *3*; α(M)=0.00065 *7*. α(N)=0.000129 *12*; α(O)=1.46×10^{-5} *8*.
	382.08 *14*	0.13 *5*	[E2]		0.0188	α(K)=0.01579 *23*; α(L)=0.00242 *4*; α(M)=0.000492 *7*. α(N)=9.81×10^{-5} *14*; α(O)=1.077×10^{-5} *16*.
	551.98 *5*	0.28 *5*	[E2]			α=0.00652 *10*; α(K)=0.00555 *8*; α(L)=0.000774 *11*; α(M)=0.0001565 *22*. α(N)=3.14×10^{-5} *5*; α(O)=3.55×10^{-6} *5*.
	624.34 *5*	19.7 *6*	M1(+E2)	+0.10 *26*		α=0.00595 *16*; α(K)=0.00515 *14*; α(L)=0.000641 *14*; α(M)=0.000129 *3*. α(N)=2.60×10^{-5} *6*; α(O)=3.07×10^{-6} *8*.
	833.28 *5*	9.25 *28*				
	1083.85 *5*	100 *3*	M1+E2	+0.56 *+24−14*		
	1111.64 *5*	38.8 *16*	M1(+E2)	+0.06 *5*		
1196.65	918.29 *15*	100 *25*				
	1168.8 *2*	≤7.5				
1203.71	716.60 *16*	<100				
	924.5 *20*	≤26				
	1176.0 *5*	40 *20*				
	1203.59 *11*	100 *20*				
1209.80	722.5 *2*	≤100				
	931.57 *25*	90 *40*				
	1181.96 *11*	50 *20*				
1260.65	210.66 *19*	8.2 *43*	[M1+E2]		0.113 *18*	α(K)=0.093 *12*; α(L)=0.016 *5*; α(M)=0.0032 *11*. α(N)=0.00063 *21*; α(O)=6.8×10^{-5} *18*.
	415.88 *14*	3.8 *14*				
	491.93 *14*	7.2 *14*				
	701.10 *16*	8.2 *19*				
	773.54 *17*	1.4 *10*				
	982.27 *5*	100 *3*				
	1232.82 *5*	47 *2*				
	1260.63 *5*	70 *4*				
1281.99	552.43 *5*	40 *13*				
	794.60 *21*	80 *20*				
	1003.65 *9*	100 *20*				
	1254.13 *8*	60 *7*				
	1281.96 *11*	31 *5*				
1291.94	462.04 *20*	<1				
	732.62 *16*	6.1 *11*				
	804.60 *13*	100 *1*				
	1013.57 *8*	6.1 *14*				
	1264.16 *5*	37.9 *14*				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{129}I)$ (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[†]	δ[†]	Comments
1291.94	1291.50 *13*	1.29 *18*			Eγ: poor fit, level–energy difference=1291.94; quoted uncertainty may be underestimated.
1376.2	646.5 *3*	29 *5*	Q		
	680.4 *2*	100 *11*	D+Q		
1401.43	556.65 *5*	100 *3*	(E1(+M2))	−0.06 *2*	
	671.84 *5*	21 *8*			
	705.52 *7*	4.4 *4*			
	1373.75 *9*	0.23 *2*			
	1401.36 *6*	2.94 *8*			
1469.7	773.9 *3*	100	Q		
1666.9	937.3 *4*	100	(Q)		
1833.5	363.8 *4*	8.6 *29*			
	457.3 *3*	100 *11*	D+Q		
1850.2	183.2 *4*	21 *7*			
	380.5 *3*	100 *14*			
2099.3	265.8 *3*	100	D+Q		
2324.7	855.0 *2*	100	Q		
2529.6	204.9 *4*	100			
2569?	470[‡]				
2633.1	308.4 *2*	100	Q		
2882.3	352.7 *4*	100			
2924?	825[‡]				
2933.8	300.7 *3*	100	D+Q		
3408?	474[‡]				

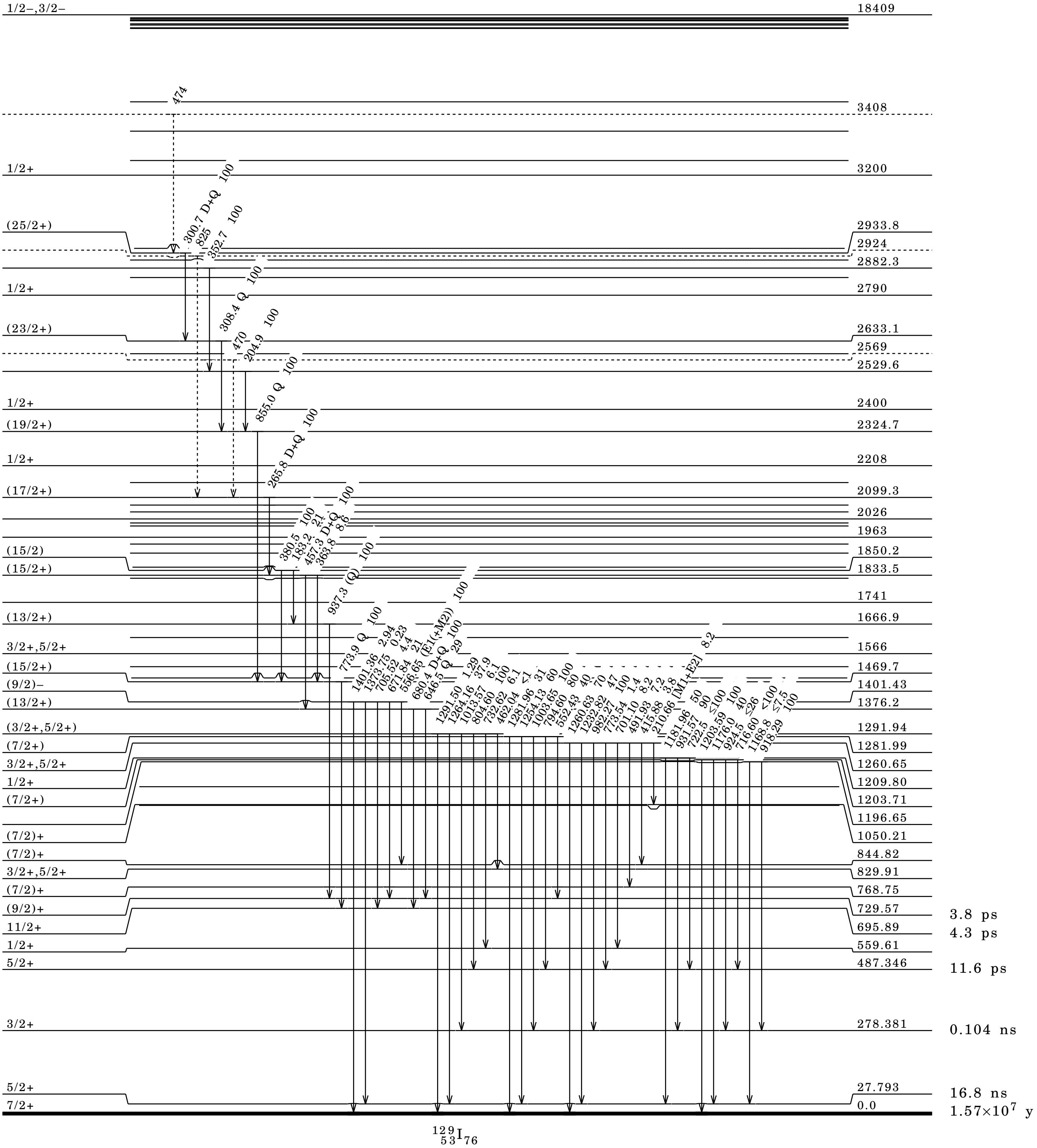
[†] From ^{129}Te β^- decays (1976Ma35) for low–spin (J≤11/2) states and from ^{124}Sn(^{7}Li,2nγ) (2013De02) for high–spin (J≥13/2) states.

[‡] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level

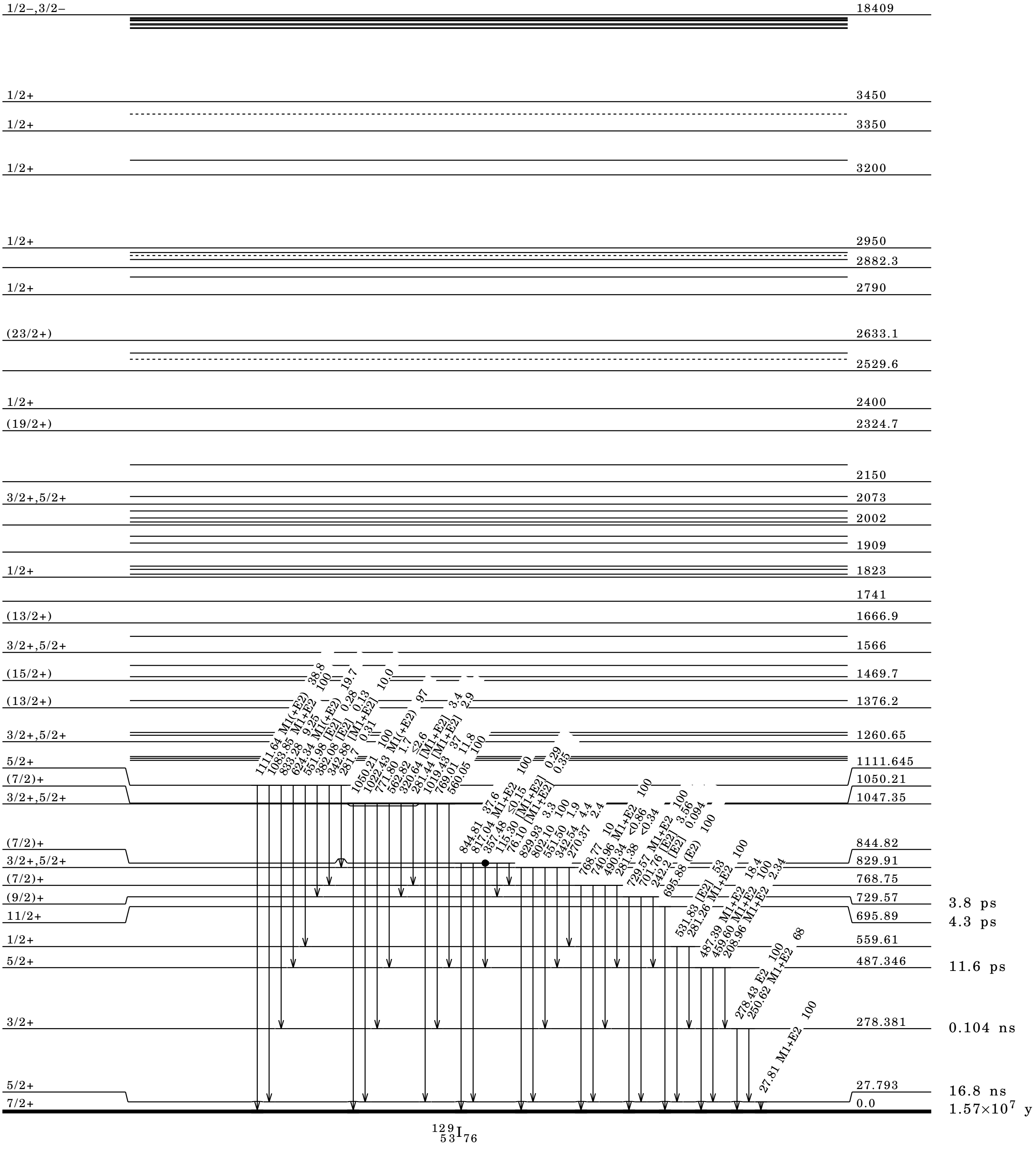


$^{129}_{53}\mathrm{I}_{76}$

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



From NNDC(BNL)
program ENSDAT

^{129}Te β^- Decay (69.6 min) 1976Ma35

Parent ^{129}Te: E=0.0; Jπ=3/2+; $T_{1/2}$=69.6 min *3*; Q(g.s.)=1502 *3*; %β^- decay=100.

^{129}Te–Q(β^-): From 2012Wa38.

^{129}Te–J,$T_{1/2}$: From ^{129}Te Adopted Levels.

1976Ma35: 105 mg enriched ^{128}Te (99.5%) was irradiated at the Pool Type Reactor, Livermore. Measured Eγ, Iγ, γγ–coincidences using two Ge(Li) detectors.

Others:

1964De10: 3 mg of enriched ^{129}Te (97%) irradiated with neutrons in the Apsara reactor and 10 mg of enriched ^{128}Te in the dido reactor, Harwell. NaI(Tl) used for detecting γ rays and determining relative intensities. Resolution was 8.5% at 662 keV. For γ–γ coincidence, two NaI(Tl) were used. Beta spectrum of 129mTE was studied with Siegbahn–Slatis spectrometer. Beta spectrum of short–lived activity was studied with 4π scintillation β ray spectrometer using plastic phosphors. β–γ coincidence was measured. log *ft* values determined.

1969Di01: 100 mg enriched ^{130}Te (99.5%) used in (n,2n) reaction at Livermore 14 MeV neutron generator. 200 mg enriched ^{128}Te (99.46%) irradiated at Livermore pool–type reactor. γ radiation was detected by 6 cm^3 and 20 cm^3 Ge(Li) detectors. Coincidence measurements were performed with two NaI(Tl) detectors.

1973Si14: 20 mg enriched ^{128}Te irradiated with neutrons. ^{3}He–^{4}He dilution refrigerator was used to perform the nuclear orientation measurement; the temperature of the radioactive source was kept between 14 mK and 50 mK. Two Ge(Li) detected the γ rays at 0 and 90 degrees with respect to the magnetic field.

1974De15: ^{129}Te source produced by (n,γ) reaction in the BR2 reactor at Mol, Belgium. Angular correlation measurements was done with two Ge(Li) and one NaI(Tl) detectors.

Other γ–ray measurments: 1968Bu21, 1967Be03, 1965Hu08, 1965Bo12, 1964Ra04, 1963Ra11, 1956Gr10, 1955St94, 1955Ma54, 1955Da37.

Other β and ce measurements: 1968Go34, 1956Gr10.

γγ(θ) measurements: 1969Sa22, 1969Ma33, 1969Ma47, 1967Va37, 1965Gu07, 1964Ka09, 1963Ra11.

Low–temperature nuclear orientation γ(temp,θ): 1973Si06, 1973Si14, 1973Si26,.

^{129}I Levels

E(level)†	Jπ†	$T_{1/2}$	Comments
0.0	7/2+	1.57×10^7 y *4*	
27.80 *2*	5/2+	16.8 ns *2*	$T_{1/2}$: from (β)(0.0278 ce(L))(t) (1966Sa06). Others (from βγ(t) or γγ(t)): 16.4 ns *11* (1965Pa04), 14.4 ns 5 (1964Ka09), 14.4 ns *7* (1964Jh02), 15.9 ns 13 (1963Go17), 18.6 ns 11 (1962De18).
278.38 *3*	3/2+	0.104 ns *12*	
487.35 *3*	5/2+	0.05 ns	
559.62 *3*	1/2+		
729.57 *3*	(9/2)+		
768.76 *3*	(7/2)+		
829.92 *3*	3/2+,5/2+		
844.82 *3*	(7/2)+		
1047.35 *4*	3/2+,5/2+		
1050.21 *3*	(7/2)+		
1111.65 *3*	5/2+		
1196.65 *13*			
1209.80 *10*	1/2+		
1260.66 *3*	3/2+,5/2+		
1291.94 *4*	(3/2+,5/2+)		

† From Adopted Levels.

β^- radiations

Eβ^-	E(level)	Iβ^-†	Log *ft*	Comments
(210 *3*)	1291.94	0.033 *4*	6.32 *6*	av Eβ=58.09 *97*.
(241 *3*)	1260.66	0.039 *3*	6.44 *4*	av Eβ=67.61 *99*.
(292 *3*)	1209.80	0.00055 *11*	8.6 *1*	av Eβ=83.5 *11*.
(305 *3*)	1196.65	0.00066 *16*	8.5 *1*	av Eβ=87.7 *11*.
(390 *3*)	1111.65	0.88 *6*	5.77 *4*	av Eβ=115.7 *11*.
(455 *3*)	1047.35	0.0091 *9*	7.97 *5*	av Eβ=137.7 *12*.
(672 *3*)	829.92	0.213 *16*	7.18 *4*	av Eβ=216.7 *12*.
(772 *3*)	729.57	0.0007 *4*	9.9 *3*	av Eβ=255.1 *13*.
(942 *3*)	559.62	0.252 *18*	7.64 *4*	av Eβ=322.6 *13*.
(1015 *3*)	487.35	9.3 *7*	6.19 *4*	av Eβ=352.0 *14*.
(1224 *3*)	278.38	0.56 *5*	7.71 *4*	av Eβ=439.0 *14*.
(1474 *3*)	27.80	89 *13*	5.82 *7*	av Eβ=546.6 *14*.

Footnotes continued on next page

^{129}Te β$^-$ Decay (69.6 min) 1976Ma35 (continued)

β$^-$ radiations (continued)

† Absolute intensity per 100 decays.

γ(^{129}I)

Iγ normalization: From Σ(γ+ce to ground state)=100.

Eγ	E(level)	Iγ[&]	Mult.[#]	δ[#]	α[@]	Comments
27.81 *5*	27.80	212 *21*	M1+E2	−0.045 *14*	4.9 *4*	α(L)=3.9 *3*; α(M)=0.79 *6*. α(N)=0.160 *11*; α(O)=0.0181 *10*. Iγ: no data given in 1976Ma35. Deduced from the ratio I(27γ)/I(209γ+251γ+278γ+281γ)=12.6 *12* in 1969Di01 by the evaluators.
208.96 *5*	487.35	2.34 *7*	M1+E2	−0.22 *5*	0.0988 *16*	α(K)=0.0848 *13*; α(L)=0.0113 *3*; α(M)=0.00227 *6*. α(N)=0.000459 *12*; α(O)=5.32×10^{-5} *11*.
210.66 *19*	1260.66	0.017 *9*	[M1+E2]		0.113 *18*	α(K)=0.093 *12*; α(L)=0.016 *5*; α(M)=0.0032 *11*. α(N)=0.00063 *21*; α(O)=6.8×10^{-5} *18*.
242.2 *1*	729.57	0.00002 *1*	[E2]		0.0812	α(K)=0.0661 *10*; α(L)=0.01207 *17*; α(M)=0.00248 *4*. α(N)=0.000490 *7*; α(O)=5.13×10^{-5} *8*. Iγ: from I(730γ) and I(242γ)/I(730γ) in 33.6 d decay. ΔIγ: Estimated by evaluators in 33.6 d decay.
250.62 *5*	278.38	4.97 *15*	M1+E2	+0.50 *+19−13*	0.0623 *18*	α(K)=0.0531 *12*; α(L)=0.0074 *5*; α(M)=0.00150 *11*. α(N)=0.000302 *21*; α(O)=3.43×10^{-5} *18*.
270.37 *6*	829.92	0.060 *4*	[M1+E2]		0.053 *4*	α(K)=0.0443 *22*; α(L)=0.0067 *14*; α(M)=0.0014 *3*. α(N)=0.00027 *6*; α(O)=3.0×10^{-5} *5*.
278.43 *5*	278.38	7.36 *22*	E2		0.0512	α(K)=0.0422 *6*; α(L)=0.00723 *11*; α(M)=0.001483 *21*. α(N)=0.000293 *5*; α(O)=3.12×10^{-5} *5*.
281.26 *5*	559.62	2.14 *7*	M1+E2	−0.08 *4*	0.0442	α(K)=0.0381 *6*; α(L)=0.00487 *7*; α(M)=0.000980 *15*. α(N)=0.000199 *3*; α(O)=2.33×10^{-5} *4*.
281.38 *20*	768.76	<0.002				
281.7 *1*	1111.65	0.020[†] *4*				
342.54 *5*	829.92	0.11 *1*	M1+E2	+1.0 *8*	0.0264	α(K)=0.0224 *6*; α(L)=0.0032 *3*; α(M)=0.00065 *6*. α(N)=0.000130 *11*; α(O)=1.47×10^{-5} *8*. δ: from 1974De15.
342.88 *5*	1111.65	0.640 *5*	[M1+E2]		0.0264	α(K)=0.0224 *6*; α(L)=0.0032 *3*; α(M)=0.00065 *7*. α(N)=0.000129 *12*; α(O)=1.46×10^{-5} *8*.
382.08 *14*	1111.65	0.008 *3*	[E2]		0.0188	α(K)=0.01579 *23*; α(L)=0.00242 *4*; α(M)=0.000492 *7*. α(N)=9.81×10^{-5} *14*; α(O)=1.077×10^{-5} *16*.
415.88 *14*	1260.66	0.008 *3*				
459.60 *5*	487.35	100 *3*	M1+E2	−0.08 *4*	0.01260	α(K)=0.01090 *16*; α(L)=0.001369 *20*; α(M)=0.000275 *4*. α(N)=5.57×10^{-5} *8*; α(O)=6.56×10^{-6} *10*. (460γ)(28γ)(θ): A_2=−0.015 *3*, A_4=−0.007 *4* (1969Sa22). Others: 1969Ma33, 1965Gu07.
462.04 *20*	1291.94	<0.003				
487.39 *5*	487.35	18.4 *6*	M1+E2	+0.50 *+17−10*	0.01057 *24*	α(K)=0.00911 *22*; α(L)=0.001169 *18*; α(M)=0.000235 *4*. α(N)=4.75×10^{-5} *8*; α(O)=5.55×10^{-6} *10*.
491.93 *14*	1260.66	0.015 *3*				

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^{129}Te β^- Decay (69.6 min) 1976Ma35 (continued)

$\gamma(^{129}\mathrm{I})$ (continued)

Eγ	E(level)	Iγ[&]	Mult.[#]	δ[#]	Comments
531.83 *5*	559.62	1.14 *4*	[E2]		α=0.00722 *11*; α(K)=0.00614 *9*; α(L)=0.000862 *12*; α(M)=0.0001745 *25*. α(N)=3.50×10^{-5} *5*; α(O)=3.94×10^{-6} *6*.
551.50 *5*	829.92	0.046[‡] *5*	[M1+E2]		α=0.0073 *8*; α(K)=0.0063 *7*; α(L)=0.00082 *5*; α(M)=0.000166 *9*. α(N)=3.34×10^{-5} *20*; α(O)=3.9×10^{-6} *4*.
551.98 *5*	1111.65	0.018[‡] *3*	[E2]		α=0.00652 *10*; α(K)=0.00555 *8*; α(L)=0.000774 *11*; α(M)=0.0001565 *22*. α(N)=3.14×10^{-5} *5*; α(O)=3.55×10^{-6} *5*.
560.05 *6*	1047.35	0.079 *5*			
624.34 *5*	1111.65	1.26 *4*	M1(+E2)	+0.10 *26*	α=0.00595 *16*; α(K)=0.00515 *14*; α(L)=0.000641 *14*; α(M)=0.000129 *3*. α(N)=2.60×10^{-5} *6*; α(O)=3.07×10^{-6} *8*.
701.10 *16*	1260.66	0.017 *4*			
701.76 *5*	729.57	0.0006 *1*	[E2]		α=0.00350 *5*; α(K)=0.00300 *5*; α(L)=0.000399 *6*; α(M)=8.05×10^{-5} *12*. α(N)=1.620×10^{-5} *23*; α(O)=1.86×10^{-6} *3*. Iγ: from I(730γ) and I(701γ)/I(730γ). ΔIγ: Estimated by evaluators.
722.5 *2*	1209.80	≤0.003			
729.57 *5*	729.57	0.016 *4*	M1+E2	−0.34 *6*	α=0.00402 *7*; α(K)=0.00348 *6*; α(L)=0.000432 *7*; α(M)=8.67×10^{-5} *14*. α(N)=1.76×10^{-5} *3*; α(O)=2.07×10^{-6} *4*.
732.62 *16*	1291.94	0.017 *3*			
740.96 *5*	768.76	0.486 *17*	M1+E2	−0.27 *10*	α=0.00390 *8*; α(K)=0.00338 *7*; α(L)=0.000419 *8*; α(M)=8.41×10^{-5} *15*. α(N)=1.70×10^{-5} *3*; α(O)=2.01×10^{-6} *4*.
768.77 *5*	768.76	0.055 *6*			Iγ: from I(768.77γ+769.01γ) and I(769.01γ) from γγ–coin. ΔIγ: Estimated by evaluators.
769.01 *5*	1047.35	0.0093[†] *9*			
773.54 *17*	1260.66	0.003 *2*			
802.10 *5*	829.92	2.49 *8*			
804.60 *13*	1291.94	0.28 *3*			
817.0 *2*	844.82	<0.0008	M1+E2	+0.46 *4*	α=0.00303 *5*; α(K)=0.00262 *4*; α(L)=0.000325 *5*; α(M)=6.52×10^{-5} *10*. α(N)=1.322×10^{-5} *20*; α(O)=1.556×10^{-6} *24*.
829.93 *5*	829.92	0.083 *3*			
833.28 *5*	1111.65	0.590 *18*			
918.29 *15*	1196.65	0.008 *2*			
931.57 *25*	1209.80	0.0027 *12*			
982.27 *5*	1260.66	0.208 *7*			
1013.57 *8*	1291.94	0.017 *4*			
1019.43 *6*	1047.35	0.029 *7*			
1022.43 *5*	1050.21	0.009 *1*	M1+E2	−0.02 *2*	α=0.00188 *3*; α(K)=0.001633 *23*; α(L)=0.000200 *3*; α(M)=4.00×10^{-5} *6*. α(N)=8.12×10^{-6} *12*; α(O)=9.60×10^{-7} *14*.
1050.21 *5*	1050.21	0.009[§] *1*			
1083.85 *5*	1111.65	6.4 *2*	M1+E2	+0.56 *+24−14*	α=0.00156 *6*; α(K)=0.00136 *6*; α(L)=0.000167 *6*; α(M)=3.34×10^{-5} *12*. α(N)=6.76×10^{-6} *24*; α(O)=8.0×10^{-7} *3*.
1111.64 *5*	1111.65	2.48 *10*	M1(+E2)	+0.06 *5*	α=0.001557 *22*; α(K)=0.001351 *19*; α(L)=0.0001650 *24*; α(M)=3.30×10^{-5} *5*. α(N)=6.70×10^{-6} *10*; α(O)=7.92×10^{-7} *12*; α(IPF)=5.96×10^{-7} *9*.
1168.8 *2*	1196.65	≤0.0006			
1181.96 *11*	1209.80	0.0015 *6*			
1232.82 *5*	1260.66	0.097 *4*			
1260.63 *5*	1260.66	0.145 *7*			
1264.16 *5*	1291.94	0.106 *4*			
1291.50 *13*	1291.94	0.0036 *5*			Eγ: poor fit, level–energy difference=1291.94; quoted uncertainty may be underestimated.

[†] From γγ–coin.

Footnotes continued on next page

^{129}Te β^- Decay (69.6 min) 1976Ma35 (continued)

$\gamma(^{129}I)$ (continued)

‡ From I(γ)/I(551.50γ+551.98γ) in γγ–coin, and I(551.50γ+551.98γ)=0.064 *6* in singles.

§ 1976Ma35 missed the data. Estimated from I(1022γ)/I(1050γ) in ^{129}Te β^- decay (33.6 d).

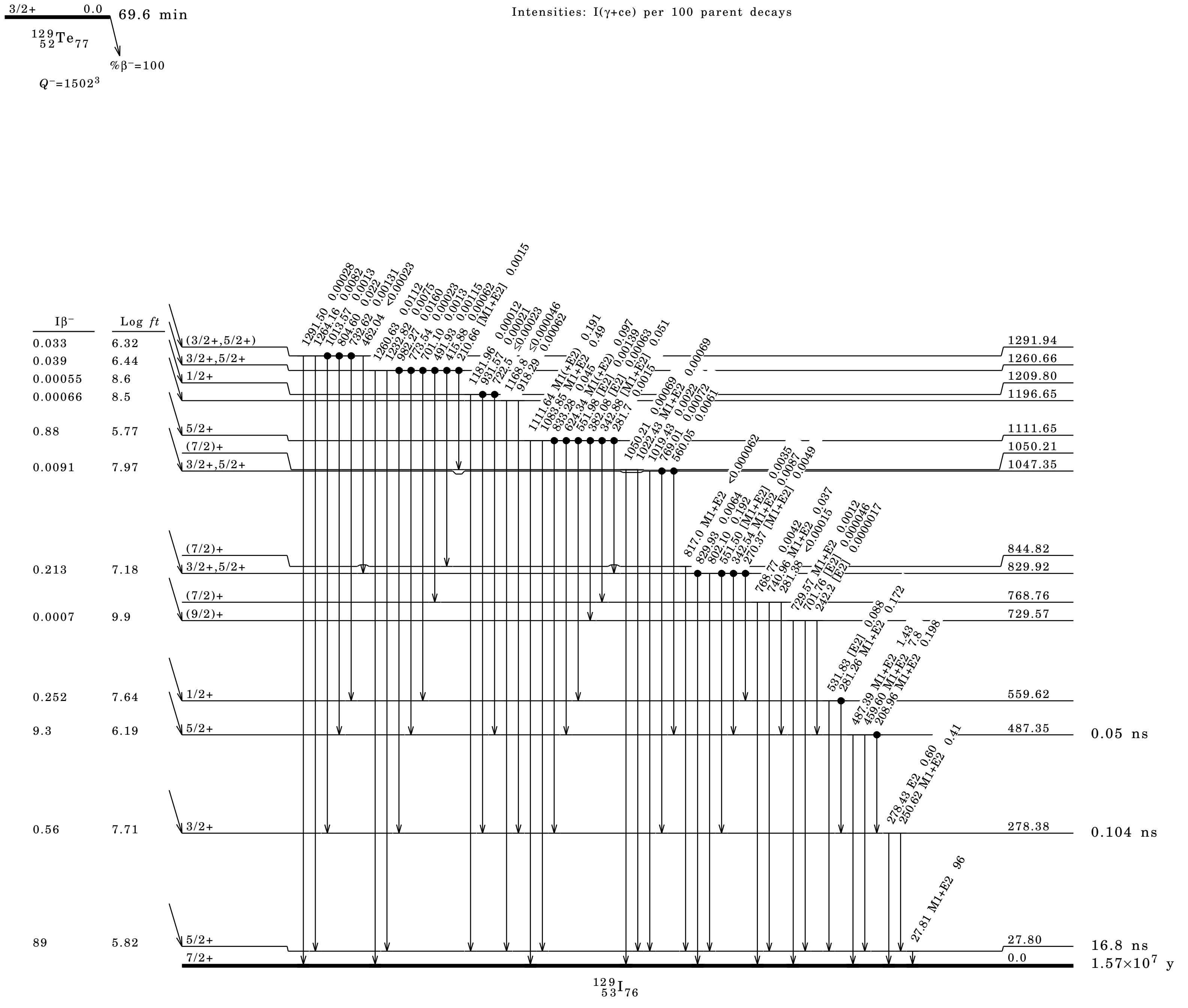
From low–temperature nuclear orientation γ(temp,θ) (1973Si14, also 1973Si06, 1973Si26), unless otherwise stated.

@ For [M1+E2] γ rays with no δ value, α covers M1 and E2.

& For absolute intensity per 100 decays, multiply by 0.077 *5*.

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{129}Te β⁻ Decay (69.6 min) 1976Ma35 (continued)

From NNDC(BNL)
program ENSDAT

^{129}Te β^- Decay (33.6 d) 1976Ma35

Parent ^{129}Te: E=105.51 *3*; Jπ=11/2–; $T_{1/2}$=33.6 d *1*; Q(g.s.)=1502 *3*; %β^- decay=36 *7*.

^{129}Te–Q(β^-): From 2012Wa38.

^{129}Te–E,J,$T_{1/2}$: From ^{129}Te Adopted Levels.

^{129}Te–%β^- decay: Iβ(to g.s.)=32% *8* is deduced from the measured ratio Iβ(to g.s.)/Iβ(to 27 level)=0.58 *12* (1964De10,1969Di01), I(105.5γ from ^{129}Te(33.6 d))=64% and Iβ(to 27 level from ^{129}Te(69.6 min))=89%. Iβ(to 27 level) reported by 1964De10 was assumed as ΣIβ(to 27 and 278 levels). Uncertainty in Iβ(to g.s.)/Iβ(to 27 levels) was estimated as 20% by the evaluators.

1976Ma35: 105 mg enriched ^{128}Te (99.5%) was irradiated at the Pool Type Reactor, Livermore. Measured Eγ, Iγ, γγ–coincidences using two Ge(Li) detectors.

Others:

1964De10: 3 mg of enriched ^{129}Te (97%) irradiated with neutrons in the Apsara reactor and 10 mg of enriched ^{128}Te in the dido reactor, Harwell. NaI(Tl) used for detecting γ rays and determining relative intensities. Resolution was 8.5% at 662 keV. For γ–γ coincidence, two NaI(Tl) were used. Beta spectrum of 129mTE was studied with Siegbahn–Slatis spectrometer. Beta spectrum of short–lived activity was studied with 4π scintillation β ray spectrometer using plastic phosphors. β–γ coincidence was measured. log *ft* values determined.

1969Di01: 100 mg enriched ^{130}Te (99.5%) used in (n,2n) reaction at Livermore 14 MeV neutron generator. 200 mg enriched ^{128}Te (99.46%) irradiated at Livermore pool–type reactor. γ radiation was detected by 6 cm3 and 20 cm3 Ge(Li) detectors. Coincidence measurements were performed with two NaI(Tl) detectors.

1973Si14: 20 mg enriched ^{128}Te irradiated with neutrons. ^{3}He–^{4}He dilution refrigerator was used to perform the nuclear orientation measurement; the temperature of the radioactive source was kept between 14 mK and 50 mK. Two Ge(Li) detected the γ rays at 0 and 90 degrees with respect to the magnetic field.

1974De15: ^{129}Te source produced by (n,γ) reaction in the br2 reactor at Mol, Belgium. Angular correlation measurements was done with two Ge(Li) and one NaI(Tl) detectors.

Other γ–ray measurments: 1967Be03, 1965Hu08, 1965Bo12, 1964Ra04, 1963Ra11.

Other β and ce measurements: 1968Go34, 1956Gr10.

γγ(θ) measurements: 1974De15, 1974Ro32 1965Gu07, 1964Ka09, 1963Ra11.

Low–temperature nuclear orientation γ(temp,θ): 1973Si14.

^{129}I Levels

E(level)†	Jπ†	$T_{1/2}$	E(level)†	Jπ†	E(level)†	Jπ†
0.0	7/2+	1.57×10^7 y *4*	695.89 *5*	11/2+	1050.21 *3*	(7/2)+
27.80 *2*	5/2+		729.57 *3*	(9/2)+	1203.61 *11*	(7/2+)
278.38 *3*	3/2+		768.76 *3*	(7/2)+	1281.99 *4*	(7/2+)
487.35 *3*	5/2+		844.82 *3*	(7/2)+	1401.43 *3*	(9/2)–

† From Adopted Levels.

β^- radiations

Eβ^-	E(level)	Iβ^-†	Log *ft*	Comments
(206 *3*)	1401.43	0.15 *3*	8.47 *9*	av Eβ=56.68 *90*.
(326 *3*)	1281.99	0.0022 *5*	10.7^{1u} *1*	av Eβ=109.5 *11*.
(404 *3*)	1203.61	0.00048 *13*	11.8^{1u} *1*	av Eβ=136.8 *11*.
(557 *3*)	1050.21	0.037 *8*	10.6^{1u} *1*	av Eβ=191.4 *11*.
(763 *3*)	844.82	0.009 *6*	11.9^{1u} *3*	av Eβ=267.3 *12*.
(839 *3*)	768.76	0.028 *6*	11.7^{1u} *1*	av Eβ=296.2 *12*.
(878 *3*)	729.57	0.70 *14*	9.92 *9*	av Eβ=296.4 *12*.
(912 *3*)	695.89	3.0 *6*	9.35 *9*	av Eβ=309.9 *12*.
(1608 *3*)	0.0	32 *8*	10.2^{1u} *1*	av Eβ=609.0 *13*. Iβ^-: Iβ(to g.s.)/Iβ(to 27.8 level)=0.58 *12* for equilibrium source. Uncertainties are not given by the authors (1964De10,1996Di01).

† Absolute intensity per 100 decays.

γ(^{129}I)

Iγ normalization,I(γ+ce) normalization: from level scheme.

Eγ	E(level)	Iγ&	Mult.#	δ#	α@	I(γ+ce)&	Comments
27.81 *5*	27.80	0.71	M1+E2	−0.045 *14*	4.9 *4*	3.5 *1*	α(L)=3.9 *3*; α(M)=0.79 *6*. α(N)=0.160 *11*; α(O)=0.0181 *10*.

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^{129}Te β$^-$ Decay (33.6 d) 1976Ma35 (continued)

γ(^{129}I) (continued)

Eγ	E(level)	Iγ[&]	Mult.[#]	δ[#]	α[@]	Comments
						ce(L)/(γ+ce)=0.663. Eγ: from level energy difference. I(γ+ce): total Iγ+ce feeding the 27.8–keV level. Iγ: deduced from I(γ+ce) and α.
76.10 *5*	844.82	0.0068[§] *15*	[M1+E2]		3.1 *15*	α(K)=2.1 *7*; α(L)=0.8 *7*; α(M)=0.18 *15*. α(N)=0.03 *3*; α(O)=0.0032 *24*. Eγ: from energy level difference.
115.30 *16*	844.82	0.0058[§] *17*	[M1+E2]		0.8 *3*	α(K)=0.59 *17*; α(L)=0.15 *10*; α(M)=0.031 *20*. α(N)=0.006 *4*; α(O)=0.0006 *4*.
208.96 *5*	487.35	0.0006[‡] *1*	M1+E2	−0.22 *5*	0.0988 *16*	α(K)=0.0848 *13*; α(L)=0.0113 *3*; α(M)=0.00227 *6*. α(N)=0.000459 *12*; α(O)=5.32×10^{-5} *11*.
242.2 *1*	729.57	0.014[§] *2*	[E2]		0.0812	α(K)=0.0661 *10*; α(L)=0.01207 *17*; α(M)=0.00248 *4*. α(N)=0.000490 *7*; α(O)=5.13×10^{-5} *8*.
250.62 *5*	278.38	0.0084[†] *17*	M1+E2	+0.50 *+19−13*	0.0623 *18*	α(K)=0.0531 *12*; α(L)=0.0074 *5*; α(M)=0.00150 *11*. α(N)=0.000302 *21*; α(O)=3.43×10^{-5} *18*.
278.43 *5*	278.38	0.0124[†] *25*	E2		0.0512	α(K)=0.0422 *6*; α(L)=0.00723 *11*; α(M)=0.001483 *21*. α(N)=0.000293 *5*; α(O)=3.12×10^{-5} *5*. δ: from W(θ) (1974De15).
281.38 *20*	768.76	<0.002				
281.44 *5*	1050.21	0.011 *1*	[M1+E2]		0.047 *3*	α(K)=0.0394 *15*; α(L)=0.0059 *11*; α(M)=0.00120 *23*. α(N)=0.00024 *5*; α(O)=2.7×10^{-5} *4*.
320.64 *11*	1050.21	0.013[§] *2*	[M1+E2]		0.0319 *7*	α(K)=0.0271 *4*; α(L)=0.0039 *5*; α(M)=0.00079 *11*. α(N)=0.000159 *19*; α(O)=1.78×10^{-5} *14*.
357.48 *20*	844.82	≤0.003				
459.60 *5*	487.35	0.026 *5*	M1+E2	−0.08 *4*	0.01260	α(K)=0.01090 *16*; α(L)=0.001369 *20*; α(M)=0.000275 *4*. α(N)=5.57×10^{-5} *8*; α(O)=6.56×10^{-6} *10*.
487.39 *5*	487.35	0.005 *1*	M1+E2	+0.50 *+17−10*	0.01057 *24*	α(K)=0.00911 *22*; α(L)=0.001169 *18*; α(M)=0.000235 *4*. α(N)=4.75×10^{-5} *8*; α(O)=5.55×10^{-6} *10*.
490.34 *20*	768.76	<0.005				
552.43 *5*	1281.99	0.006[§] *2*				
556.65 *5*	1401.43	2.52 *8*	(E1(+M2))	−0.06 *2*		
562.82 *20*	1050.21	≤0.01[§]				
671.84 *5*	1401.43	0.53 *2*				
695.88 *6*	695.89	63.9 *19*	E2			
701.7 *3*	729.57	0.53 *2*				
705.52 *7*	1401.43	0.11 *1*				
716.60 *16*	1203.61	≤0.005[§]				
729.57 *5*	729.57	14.9 *6*	M1+E2	−0.34 *6*		α=0.00402 *7*; α(K)=0.00348 *6*; α(L)=0.000432 *7*; α(M)=8.67×10^{-5} *14*. α(N)=1.76×10^{-5} *3*; α(O)=2.07×10^{-6} *4*.
740.96 *5*	768.76	0.58 *2*	M1+E2	−0.27 *10*		α=0.00390 *8*; α(K)=0.00338 *7*; α(L)=0.000419 *8*; α(M)=8.41×10^{-5} *15*. α(N)=1.70×10^{-5} *3*; α(O)=2.01×10^{-6} *4*.
768.77 *5*	768.76	0.060 *6*				
771.80 *16*	1050.21	0.0063[§] *7*				
794.60 *21*	1281.99	0.012 *3*				
817.04 *5*	844.82	1.94 *6*	M1+E2	+0.46 *4*		α=0.00303 *5*; α(K)=0.00262 *4*; α(L)=0.000325 *5*; α(M)=6.52×10^{-5} *10*. α(N)=1.322×10^{-5} *20*; α(O)=1.556×10^{-6} *24*.
844.81 *5*	844.82	0.73 *4*				

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^{129}Te β^- Decay (33.6 d) 1976Ma35 (continued)

γ(^{129}I) (continued)

Eγ	E(level)	Iγ[&]	Mult.[#]	δ[#]	Comments
924.5 *20*	1203.61	<0.0013[§]			
1003.65 *9*	1281.99	0.015 *3*			
1022.43 *5*	1050.21	0.37 *2*	M1(+E2)	−0.02 *2*	α=0.00188 *3*; α(K)=0.001633 *23*; α(L)=0.000200 *3*; α(M)=4.00×10^{-5} *6*. α(N)=8.12×10^{-6} *12*; α(O)=9.60×10^{-7} *14*.
1050.21 *5*	1050.21	0.38 *3*			
1176.0 *5*	1203.61	0.002 *1*			
1203.59 *11*	1203.61	0.005 *1*			
1254.13 *8*	1281.99	0.009 *1*			
1281.96 *11*	1281.99	0.0046 *8*			
1373.75 *9*	1401.43	0.0057 *6*			
1401.36 *6*	1401.43	0.074 *2*			

[†] From I(250γ)/I(278γ) in ^{129}Te β^- decay (69.6 min).

[‡] From I(209γ)/I(460γ)/I(487γ) in ^{129}Te β^- decay (69.6 min).

[§] From γγ–coin.

[#] From low–temperature nuclear orientation γ(temp,θ) (1973Si14), unless otherwise stated.

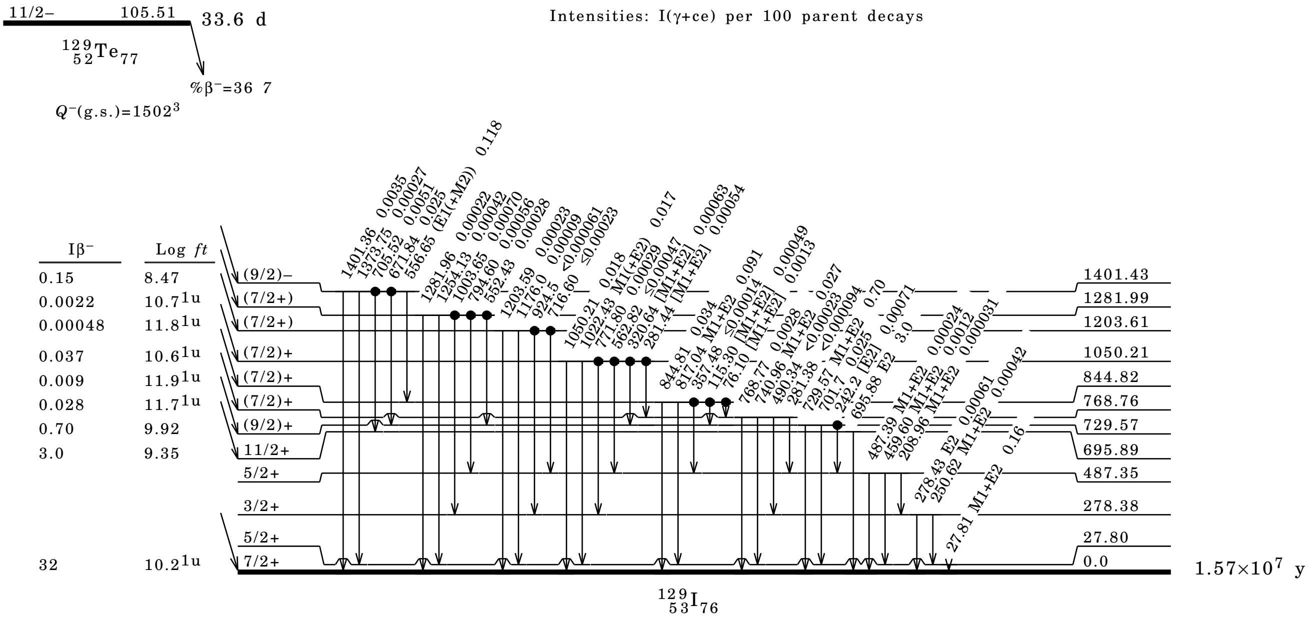
[@] For [M1+E2] γ rays with no δ value, α covers M1 and E2.

[&] For absolute intensity per 100 decays, multiply by 0.047 *9*.

^{129}Te β$^-$ Decay (33.6 d) 1976Ma35 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{124}Sn(^{7}Li,2nγ) 2013De02

2013De02: E=23 MeV. Measured Eγ, Iγ, γγ, DCO using an array of eight HPGe detectors and five LaBr$_3$(Ce) scintillation detectors at Bucharest Tandem Van de Graaff accelerator facility.

^{129}I Levels

E(level)[†]	Jπ[‡]	Comments
0.0	7/2+	
27.7	5/2+	
695.7 *2*	11/2+	
729.6 *2*	9/2+	
844.9 *3*	(9/2)+	Jπ: (7/2)+ in Adopted Levels.
1376.1 *5*	13/2+	
1401.7 *5*	(11/2–)	Jπ: (9/2)– in Adopted Levels.
1469.6 *4*	15/2+	
1666.9 *4*	(13/2+)	
1833.4 *4*	15/2(+)	
1850.1 *5*	(15/2)	
2099.1 *5*	17/2(+)	
2324.6 *8*	19/2+	
2529.5 *6*		
2569?		
2633.0 *5*	23/2+	
2882.2 *6*		
2924?		
2933.6 *5*	25/2+	
3408?		

[†] From least–squares fit to Eγ data.

[‡] As proposed in 2013De02 based on DCO ratios for selected transitions and decay patterns.

^{124}Sn(^{7}Li,2nγ) 2013De02 (continued)

γ(^{129}I)

Eγ	E(level)	Iγ	Mult.†	Comments
183.2 *4*	1850.1	3 *1*		
204.9 *4*	2529.5	7 *2*		
265.8 *3*	2099.1	26 *14*	D+Q	DCO=0.56 *11* for ΔJ=2, quadrupole gate. DCO=0.75 *9* for ΔJ=1, dipole gate.
300.7 *3*	2933.6	10 *2*	D+Q	DCO=0.68 *27*, 0.60 *28* for ΔJ=2, quadrupole gates.
308.4 *2*	2633.0	23 *3*	Q	DCO=1.10 *34*, 1.05 *21* for ΔJ=2, quadrupole gates.
352.7 *4*	2882.2	7 *3*		
363.8 *4*	1833.4	3 *1*		
380.5 *3*	1850.1	14 *2*		
457.3 *3*	1833.4	35 *4*	D+Q	DCO=0.55 *13* for ΔJ=2, quadrupole gate. DCO=1.11 *51* for ΔJ=1, dipole gate.
470‡	2569?			
474‡	3408?			
556.7 *2*	1401.7	21 *10*	D	DCO=0.58 *10* for ΔJ=2, quadrupole gate. DCO=0.47 *25* for ΔJ=1, dipole gate.
646.5 *3*	1376.1	13 *2*	Q	DCO=2.62 *79* for ΔJ=1, dipole gate.
672.2 *3*	1401.7	5 *2*		
680.4 *2*	1376.1	45 *5*	D+Q	DCO=0.50 *6* for ΔJ=2, quadrupole gate. DCO=0.81 *17* for ΔJ=1, dipole gate.
695.7 *2*	695.7	100	Q	DCO=1.00 *10* for ΔJ=2, quadrupole gate. DCO=1.42 *24* for ΔJ=1, dipole gate.
729.6 *2*	729.6	40 *7*		
773.9 *3*	1469.6	66 *6*	Q	DCO=1.04 *13* for ΔJ=2, quadrupole gate.
817.2 *2*	844.9	22 *2*		
825‡	2924?			
844.9 *3*	844.9	8 *2*		Iγ: based on branching ratio in adopted gammas.
855.0 *2*	2324.6	44 *2*	Q	DCO=0.87 *16*, 1.03 *19* for ΔJ=2, quadrupole gates.
937.3 *4*	1666.9	8 *2*	(Q)	DCO=1.55 *87* for ΔJ=1, dipole gate.

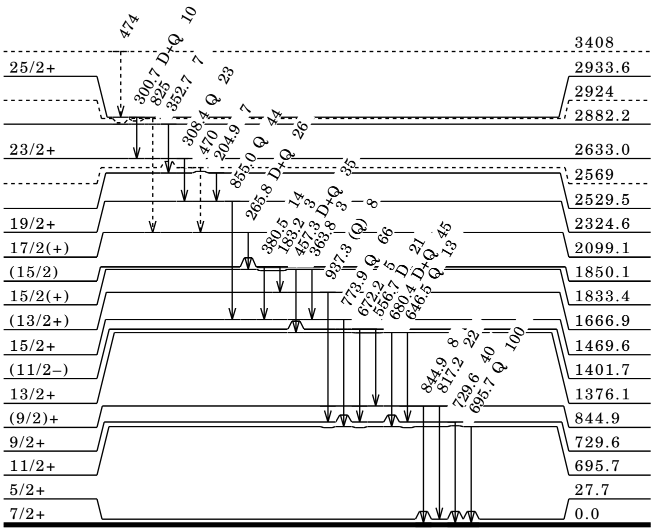
† In 2013De02, mult=Q implies ΔJ=2, E2; mult=D+Q implies M1+E2, and mult=d implies possible E1.

‡ Placement of transition in the level scheme is uncertain.

$^{124}Sn(^{7}Li,2n\gamma)$ 2013De02 (continued)

Level Scheme

Intensities: relative Iγ



$^{129}_{53}I_{76}$

$^{128}Te(p,p),(p,p')$ IAR 1970Bu01,1968Fo08

1970Bu01; E=7.66–11.87 MeV; Ge, enriched target. θ=90°, 125°, 160°.
1968Fo08; E=7.7–10.9 MeV; Ge, enriched target. θ=90.5°, 120.4°, 150.2°, 170.1°.
1967Jo08; E=7.7–8.3 MeV; enriched target. Measured polarization.

^{129}I Levels

E(level)†‡	Jπ	L	S	Comments
14670 *20*	3/2+,5/2+	2	0.23	E(level): IAR of g.s. 3/2+ in ^{129}Te. Γ(total)=40 keV *2*, Γ(p)=4.0 keV *3*. Jπ: from L=2.
14858 *20*	1/2+	0	0.15	E(level): IAR of 181–keV 1/2+ state in ^{129}Te. Γ(total)=42 keV *3*, Γ(p)=7.4 keV *1*. Jπ: from L=0.
15647 *20*	3/2+,5/2+	2	0.045	E(level): IAR of 967–keV 5/2+ state in ^{129}Te. Γ(total)=64 keV *20*, Γ(p)=1.5 keV *5*. Jπ: from L=2.
15973 *20*	3/2+,5/2+	2	0.11	E(level): IAR of 1318–keV 5/2+ state in ^{129}Te. Γ(total)=60 keV *15*. Jπ: from L=2.
16763 *20*	5/2−,7/2−	3	0.11	E(level): IAR of 2108–keV 5/2−, 7/2− state in ^{129}Te. Γ(total)=50 keV *5*, Γ(p)=3.6 keV *5*. Jπ: from L=3.
16873 *20*	5/2−,7/2−	3	0.11	E(level): IAR of 2221–keV 5/2−, 7/2− state in ^{129}Te. Γ(total)=47 keV *5*, Γ(p)=3.9 keV *6*. Jπ: from L=3.
16915 *25*	1/2−,3/2−	1	0.02	E(level): IAR of 2261 keV *1*/2−, 3/2− state in ^{129}Te. Γ(total)=30 keV, Γ(p)=1.0 keV. Jπ: from L=1.
17002 *20*	1/2−,3/2−	1	0.11	E(level): IAR of 2361–keV 1/2−, 3/2− state in ^{129}Te. Γ(total)=95 keV *10*, Γ(p)=10 keV *15*. Jπ: from L=1.
17348 *20*	1/2−,3/2−	1	0.043	E(level): IAR of 2705–keV 1/2−, 3/2− state in ^{129}Te. Γ(total)=88 keV *10*, Γ(p)=4.3 keV *7*. Jπ: from L=1.

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^{128}Te(p,p),(p,p') IAR 1970Bu01,1968Fo08 (continued)

^{129}I Levels (continued)

E(level)[†‡]	Jπ	L	S	Comments
17626 *20*	(5/2−,7/2−)	(3)	0.020	E(level): IAR of 2975-keV, 5/2−,7/2− state in ^{129}Te. Γ(total)=35 keV *10*, Γ(p)=1.0 keV *4*. Jπ: from L=(3).
18413 *20*	1/2−,3/2−	1		E(level): IAR of 3793-keV 1/2−, 3/2− state in ^{129}Te. Jπ: from L=1.

† From 1970Bu01; s(p)(6802 *3*)+E(p)(c.m.); s(p) from 2012Wa38.

‡ Coulomb displacement energy=13.949 MeV.

^{128}Te(^{3}He,d) 1968Au01

1968Au01; E=25 MeV; magnetic spectrograph, FWHM≈25 keV, θ=5°–36°. DWBA analysis.

^{129}I Levels

E(level)	L	C^2S[†]	Comments
0.0	4	0.66	C^2S: if $1g_{7/2}$.
28 *5*	2	0.59	C^2S: if $2d_{5/2}$.
280 *5*	2	0.07	C^2S: if $2d_{3/2}$.
487 *5*	2	0.21	C^2S: if $2d_{5/2}$.
561 *5*	0	0.21	
1052 *5*	2	0.25,0.14	
1111 *5*	2	0.25,0.47	
1210 *5*	0	0.02	
1262 *5*	2	0.05,0.03	
1400 *5*	(5)	0.63	C^2S: if $1h_{11/2}$.
1483 *5*	0	0.21	
1566 *10*	2	0.08,0.04	
1621 *10*	2	0.10,0.05	
1741 *10*	0	0.04	
1823 *10*	0	0.10	
1861 *10*	2	0.10,0.06	
1963 *10*			
2012 *10*	0	0.04	
2073 *10*	2	0.19,0.10	
2208 *10*	0	0.04	
2400 *10*	0	0.03	
2590 *20*	0	0.02	
2790 *20*	0	0.02	
2850 *20*	2	0.05,0.02	
2910 *20*	0	0.02	
2950 *20*	0	0.05	
3200 *20*	0	0.06	
3250 *20*	0	0.04	
3350 *20*	0	0.02	
3450 *20*	0	0.03	

† From DWBA analysis.

^{128}Te(α,t) 1979Sz05

1979Sz05; E=36 MeV; magnetic spectrograph, FWHM=13 keV, θ=3°–25°.

^{129}I Levels

E(level)	L	C^{2}S†	Comments
0.0	4	2.06	C^{2}S: if 1g$_{7/2}$.
28 *4*	2	1.00	C^{2}S: if 2d$_{5/2}$.
280 *4*	2	0.19	C^{2}S: if 2d$_{3/2}$.
489 *4*	2	0.44	C^{2}S: if 2d$_{5/2}$.
560 *4*	0	0.43	
843 *4*	(4)	0.04	C^{2}S: if 1g$_{7/2}$.
1050 *6*	2	0.96	C^{2}S: if 2d$_{3/2}$.
1112 *6*	2	0.50	C^{2}S: if 2d$_{5/2}$.
1208 *6*	(0)	0.07	
1261 *6*	2	0.12	C^{2}S: if 2d$_{5/2}$.
1283 *6*	(4,5)	0.28,0.10	
1401 *6*	5	1.31	C^{2}S: if 1h$_{11/2}$.
1484 *6*	0	0.40	E(level): from ^{130}Te(^{3}He,d), no energy is given in (α,t) reaction.
1521 *6*	(4),(5)		
1569 *6*	2	0.08,0.04	
1619 *6*	2	0.11,0.06	
1743 *6*	(4)+(0)	0.17	C^{2}S: if (1g$_{7/2}$+3s$_{1/2}$).
1867 *8*	(2)	0.25,0.12	
1909 *8*			
1940 *8*			
1963 *8*			
2002 *8*			
2026 *8*			
2050 *8*			
2071 *8*			
2150 *8*			

† Relative values from DWBA analysis.

Coulomb Excitation 1973Re08

1973Re08: ^{129}I(α,α'γ) E=6.0–11.0 MeV.

^{129}I Levels

E(level)	Jπ†	Comments
0.0	7/2+	
27.8 *5*	5/2+	
278.4 *5*	(3/2)+	B(E2)↑=0.035 *4*.
487.8 *5*	(5/2)+	B(E2)↑=0.016 *3*.
696.2 *5*	11/2+	B(E2)↑=0.122 *13*.
729.8 *5*	(9/2)+	B(E2)↑=0.078 *8*.
769.4 *5*	(7/2)+	B(E2)↑=0.011 *4*.
830 *1*	3/2+,5/2+	B(E2)↑=0.004 *2*.
845 *1*	7/2+,9/2+	B(E2)↑=0.015 *3*.
1050 *1*	(7/2)+	B(E2)↑=0.008 *3*.

† from Adopted Levels.

γ(^{129}I)

E(level)	Eγ	Iγ
278.4	250.6 *5*	41 *1*
	278.4 *5*	59 *1*
487.8	459.7 *5*	82 *1*

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Coulomb Excitation 1973Re08 (continued)

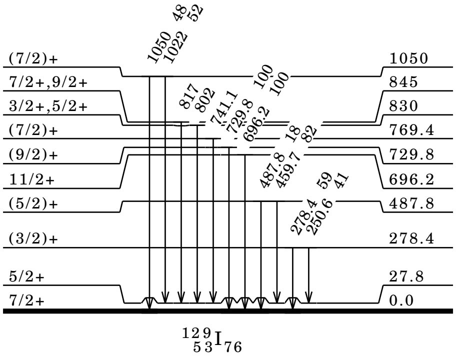
$\gamma(^{129}I)$ (continued)

E(level)	Eγ	Iγ
487.8	487.8 *5*	18 *1*
696.2	696.2 *5*	100
729.8	729.8 *5*	100
769.4	741.1 *5*	
830	802 *1*	
845	817 *1*	
1050	1022 *1*	52 *12*
	1050 *1*	48 *12*

Coulomb Excitation 1973Re08 (continued)

Level Scheme

Intensities: % photon branching from each level



Adopted Levels, Gammas

Q(β^-)=–1197 *5*; S(n)=6907.1 *11*; S(p)=8246 *4*; Q(α)=–2098.0 *15* 2012Wa38.

S(2n)=16517 *4*, S(2p)=14992.3 *15* (2012Wa38).

Measurements (NMR, hyperfine structure, radii, etc.) related to nuclear moments: 2013In03, 2007Ki06, 2005Wo04, 2003Sa20, 2002Ku15, 2001Br28, 2000Da33, 1999Da22, 1998Ja14, 1997To10, 1996Br22, 1996Ma27, 1994Da35, 1994Ge03, 1993Bo21, 1993Ga03, 1993Wa26, 1991Ze02, 1989Pl03, 1988Ge05, 1984Ab03, 1984It02, 1982Bi11, 1981Bo07, 1981Ge06, 1979Hu07, 1976Sc17, 1974VaYZ, 1972Pr02, 1969Le02, 1968Br12, 1964Pe06.

^{129}Xe isotope was identified through mass spectrographic technique by Aston, Nature 106, 468 (1920).

Precise mass measurements: 2009Re03, 2006He29, 2005Sh38. 1990Me08.

^{129}Xe Levels

Cross Reference (XREF) Flags

A ^{129}I β^- Decay (1.57E7 Y)
B ^{129}Xe IT Decay (8.88 d)
C ^{129}Cs ε Decay (32.06 h)
D ^{126}Te(α,nγ)
E ^{128}Xe(n,γ),(n,n): Resonances
F ^{129}Xe(γ,γ')
G Coulomb Excitation

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$	Comments
0.0[#]	1/2+	ABCD FG	stable	μ=–0.7779763 *84* (1968Br12,2014StZZ). μ: NMR (1968Br12). Evaluated rms charge radius=4.7775 fm *50* (2013An02). Charge radius measurement: 1989Bo03. Jπ: spin from optical spectroscopy (1950Ko09,1934Ko02,1934Jo01); parity from comparison of measured μ with predicted values. Experimental search for atomic electric–dipole moment (EDM): 2013In03.
39.5774[&] *19*	3/2+	ABCD G	0.97 ns *2*	μ=+0.58 *8* (1974VaYZ,2014StZZ). Q=–0.393 *10* (1964Pe06,2001Ke15,2014StZZ). Momel: Mossbauer effect (1974VaYZ). Momm2: Mossbauer effect (1964Pe06), 2001Ke15 re–evaluated data of –0.41 *4* from 1964Pe06. Jπ: M1+E2 γ to 1/2+, γγ(θ) (1974Ma24). $T_{1/2}$: weighted average of 0.95 ns *3* (1979Be54), 1.01 ns *4* (1965Ge04) and 0.96 ns *5* (1965Ki01).
236.14[b] *3*	11/2–	B D	8.88 d *2*	%IT=100. μ=–0.891223 *4* (1986Ki16,1974Si07,2014StZZ). Q=+0.63 *2* (1990NeZY,2013StZZ,2014StZZ). μ: NMR and nuclear orientation (1986Ki16,1974Si07). Others: –0.8906 12 (1990NeZY, collinear fast–beam laser spectroscopy), 0.8911 *5* (1987Ed01,NMR). Q: collinear fast–beam laser spectroscopy (1990NeZY); original value of 0.64 *2* evaluated by 2013StZZ. Jπ: M4 – M1+E2 γ cascade to 1/2+. Shell model systematics in odd XE isotopes. $T_{1/2}$: weighted average of 8.89 d *2* (1973Mi08), 8.87 d *3* (1975Ho18) and 8.85 d *4* (1990Ta18).
274.29[c] *18*	(9/2–)	D		Jπ: shell model systematics in odd Xe isotopes.
318.1787[d] *16*	3/2+	CD G	67.5 ps *20*	Jπ: M1+E2 γ to 1/2+. $T_{1/2}$: recoil–distance method (1990Na18).
321.711[@] *4*	5/2+	CD G	44.0 ps *19*	Jπ: M1+E2 γ to 3/2+, E2 γ to 1/2+ and linear pol in (HI,xnγ). $T_{1/2}$: recoil–distance method (1990Na18).
411.4959 *16*	1/2+	CD G	81 ps *26*	Jπ: log *ft*=5.6 from 1/2+, M1+E2 γ to 3/2+, M1 γ to 1/2+; γγ(θ) from 1974Ma24. $T_{1/2}$: delayed coin (1979Be54).
442.20 *14*	(5/2+)	D F		Jπ: ΔJ=1 γ to 3/2+; band structure.
518.70[&] *12*	7/2+	D G		Jπ: stretched E2 γ to 3/2+.
525.26 *17*	(5/2+)	D		Jπ: ΔJ=1, (M1+E2) γ to 3/2+.
572.68[#] *3*	(5/2)+	CD G	2.0 ps *2*	Jπ: strongly Coulomb excited from 1/2+. $T_{1/2}$: recoil–distance method (1990Na18).
588.533 *3*	3/2+	CD G	≤65 ps	Jπ: M1+E2 γ to 1/2+, log *ft*=6.4 from 1/2+. $T_{1/2}$: delayed coin (1979Be54).
624.332 *25*		C		
665.43[a] *11*	7/2+	D G		Jπ: stretched E2 γ to 3/2+.
692.96 *18*	(1/2+ to 7/2+)	D F		Jπ: gammas to 3/2+ and (5/2+).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Xe Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
771.17 *15*	(13/2−)	D	Jπ: ΔJ=1, (M1+E2) γ to 11/2−; band structure.
822.16[@] *10*	9/2+	D G	Jπ: stretched E2 γ to 5/2+; ΔJ=1, M1+E2 γ to 7/2+.
823.00 *17*	(5/2+)	D G	Jπ: ΔJ=1, (M1+E2) γ to 3/2+.
823.29[b] *16*	(15/2−)	D	Jπ: ΔJ=(2) γ to 11/2−; band structure.
868.06[d] *13*	7/2+	D G	Jπ: ΔJ=2 γ to 3/2+; ΔJ=1, M1+E2 γ to 5/2+.
904.318 *8*	3/2+	C G	Jπ: Coulomb excited. log *ft*=7.4 from 1/2+.
908.63 *20*	(9/2,11/2,13/2−)	D	Jπ: gammas to (9/2−) and 11/2−.
946.028 *4*	1/2+,3/2+	C G	Jπ: log *ft*=6.5 from 1/2+; gammas to 3/2+ and 1/2+.
985.7 *4*		D G	
995.7 *3*	(1/2,3/2)	G	Jπ: γ to 1/2+ only.
1022.30 *25*	(7/2+)	D	Jπ: ΔJ=1, (M1+E2) γ to (5/2+).
1032.02[c] *18*	(13/2−)	D	Jπ: odd Xe systematics and band structure.
1059.58 *20*	(9/2+)	D G	Jπ: ΔJ=1, D+Q γ to 7/2+; γ to (9/2−).
1089.48[&] *16*	11/2+	D G	Jπ: stretched E2 to 7/2+; ΔJ=1 γ to 9/2+; band structure.
1194.5 *3*		D	
1194.6[#] *3*	(9/2+)	D	Jπ: γ to (5/2)+; possible band structure.
1197.11 *21*	(5/2,7/2,9/2+)	D	Jπ: γ to (5/2)+.
1229.9 *3*	7/2+	D G	Jπ: ΔJ=0, M1 γ to 7/2+.
1239.0 *10*	1/2,3/2[§]	F	
1241.2 *3*	(1/2,3/2,5/2+)	D	Jπ: γ to 1/2+.
1336.12[a] *23*	(11/2+)	D	Jπ: γ to 7/2+; band structure.
1395.57 *21*	(15/2−)	D	Jπ: ΔJ=1,(M1+E2) γ to (13/2)−.
1414.27[@] *19*	13/2(+)	D G	Jπ: stretched Q to 9/2+; γ to 11/2+; band structure.
1430.28 *22*	(13/2,15/2,17/2−)	D	Jπ: γ to (13/2−).
1497.1[d] *3*	(11/2+)	D	Jπ: γ to (7/2)+; band structure.
1507.19 *22*	(17/2−)	D	Jπ: ΔJ=1,(M1+E2) γ to (15/2−); γ to (13/2−).
1539.4 *3*	(15/2,17/2,19/2−)	D	Jπ: γ to (15/2−).
1570.0 *10*	1/2,3/2[§]	F	
1576.0[b] *3*	(19/2−)	D	Jπ: γ to (15/2−); band structure.
1748.7 *4*	(9/2 to 13/2+)	D	Jπ: γ to (9/2+).
1755.3 *4*	(7/2 to 11/2+)	D	Jπ: γ to (7/2+).
1762.28[&] *22*	(15/2+)	D G	Jπ: ΔJ=(2) γ to 11/2+; γ to 13(+); band structure.
1816.06[c] *21*	(17/2−)	D	Jπ: gammas to (15/2−) and (13/2−); band structure.
1884.0 *10*	1/2,3/2[§]	F	
1888.5? *4*	(9/2 to 13/2+)	D	Jπ: γ to (9/2+).
1972.3 *3*	(17/2−)	D	Jπ: ΔJ=1,(M1+E2) γ to (15/2−).
2036.3 *3*	(13/2 to 17/2−)	D	Jπ: gammas to (13/2−) and (15/2−).
2048.2[a] *4*	(15/2+)	D	Jπ: γ to (11/2+); band structure.
2064.7[@] *3*	(17/2+)	D	Jπ: stretched Q to 13/2(+); band structure.
2172.2 *3*	(15/2 to 19/2−)	D	Jπ: γ to (15/2−).
2180.0 *3*	(19/2−)	D	Jπ: ΔJ=0,(M1+E2) γ to (19/2−).
2186.0 *10*	1/2,3/2[§]	F	
2289.0 *10*	1/2,3/2[§]	F	
2293.1 *3*	(21/2−)	D	Jπ: ΔJ=1, (M1+E2) γ to (19/2−).
2307.3 *4*		D	
2343.0 *10*	1/2,3/2[§]	F	
2355.0 *10*	1/2,3/2[§]	F	
2383.0 *10*	1/2,3/2[§]	F	
2394.0 *10*	1/2,3/2[§]	F	
2425.1 *7*	1/2,3/2[§]	F	
2433.5[&] *4*	(15/2 to 19/2+)	D	Jπ: γ to (15/2+).
2446.3[b] *3*	(23/2−)	D	Jπ: γ to (19/2−); band structure.
2499.0 *10*	1/2,3/2[§]	F	
2554.0 *10*	1/2,3/2[§]	F	
2586.2 *4*	(19/2 to 23/2−)	D	Jπ: γ to (19/2−).
2592.0 *10*	1/2,3/2[§]	F	
2674.0 *10*	1/2,3/2[§]	F	
2724.0 *10*	1/2,3/2[§]	F	
2744.0 *7*	1/2,3/2[§]	F	
2767.0 *10*	1/2,3/2[§]	F	
2776.0 *10*	1/2,3/2[§]	F	
2793.0 *10*	1/2,3/2[§]	F	
2854.0 *10*	1/2,3/2[§]	F	

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Adopted Levels, Gammas (continued)

^{129}Xe Levels (continued)

E(level)[†]	Jπ[‡]	XREF
2917.0 *10*	1/2,3/2[§]	F
2972.0 *10*	1/2,3/2[§]	F
3015.0 *10*	1/2,3/2[§]	F
3023.0 *10*	1/2,3/2[§]	F
3215.0 *10*	1/2,3/2[§]	F
3783.1 *10*	1/2,3/2[§]	F
3805.1 *10*	1/2,3/2[§]	F
3829.1 *10*	1/2,3/2[§]	F
6907.1 *14*		E
6907.2 *14*		E
6907.3 *14*		E
6907.4 *14*		E
6907.5 *14*		E
6907.6 *14*		E
6907.7 *14*		E
6908.4 *14*		E
6908.4 *14*		E
6908.6 *14*		E
6909.2 *14*		E
6909.7 *14*		E
6909.7 *14*		E
6910.4 *14*		E

[†] From a least–squares fit to the adopted Eγ values, 1 keV uncertainty for Eγ assumed when not stated.

[‡] For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

[§] From dipole excitation in ^{129}Xe(γ,γ') from 1/2+ target.

[#] (A): $\nu s_{1/2}$ α=+1/2.

[@] (B): $\nu d_{3/2}$ α=+1/2.

[&] (C): $\nu d_{3/2}$ α=−1/2.

[a] (D): $\nu g_{7/2}$ α=−1/2.

[b] (E): $\nu h_{11/2}$ α=−1/2. Possible projection=j band in triaxial–rotor model.

[c] (F): $\nu h_{11/2}$ α=+1/2. Possible projection=j−1 band in triaxial–rotor model.

[d] (G): $\nu d_{5/2}$.

γ(^{129}Xe)

E(level)	Eγ[†]	Iγ[†]	Mult.	δ[§]	α	Comments
39.5774	39.578 *4*	100	M1+E2	−0.027 *5*	12.03	α(K)=10.27 *15*; α(L)=1.408 *23*; α(M)=0.286 *5*. α(N)=0.0591 *10*; α(O)=0.00732 *11*. δ: from L subshell ratios and γγ(θ) in ^{129}Xe IT decay. B(M1)(W.u.)=0.0281 *7*; B(E2)(W.u.)=9 *4*.
236.14	196.56 *3*	100	M4		20.3	α(K)=13.65 *20*; α(L)=5.23 *8*; α(M)=1.181 *17*. α(N)=0.242 *4*; α(O)=0.0268 *4*. Mult.: L subshell ratios in ^{129}Xe IT decay. B(M4)(W.u.)=1.777 *25*.
274.29	(38.1)	100				Eγ: γ not observed. Expected from odd Xe systematics. Eγ calculated from E(level) values.
318.1787	278.614 *4*	54 *11*	M1+E2	+0.8 *+10−5*	0.0509 *16*	α(K)=0.0429 *7*; α(L)=0.0063 *9*; α(M)=0.00130 *18*. α(N)=0.00027 *4*; α(O)=3.2×10^{-5} *3*. B(M1)(W.u.)=0.003 *3*; B(E2)(W.u.)=17 *+27−17*.
	318.180 *2*	100 *1*	M1+E2	−1.1 *+13−22*	0.0348 *6*	α(K)=0.0293 *9*; α(L)=0.0044 *5*; α(M)=0.00090 *11*. α(N)=0.000183 *20*; α(O)=2.19×10^{-5} *15*. B(M1)(W.u.)=0.003 *+4−3*; B(E2)(W.u.)=23 *+25−23*.
321.711	282.131 *6*	100 *13*	M1+E2	−0.7 *+4−7*	0.0489 *13*	α(K)=0.0414 *7*; α(L)=0.0060 *7*; α(M)=0.00122 *15*. α(N)=0.00025 *3*; α(O)=3.03×10^{-5} *25*. B(M1)(W.u.)=0.011 *5*; B(E2)(W.u.)=(50 *40*).
	321.700 *25*	29 *3*	E2		0.0335	α(K)=0.0277 *4*; α(L)=0.00461 *7*; α(M)=0.000952 *14*. α(N)=0.000193 *3*; α(O)=2.24×10^{-5} *4*. B(E2)(W.u.)=21 *4*.

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Adopted Levels, Gammas (continued)

γ(^{129}Xe) (continued)

E(level)	Eγ†	Iγ†	Mult.	δ§	α	Comments
411.4959	89.79 *8*	0.008 *2*	[E2]		2.65	α(K)=1.675 *24*; α(L)=0.776 *12*; α(M)=0.1664 *25*. α(N)=0.0329 *5*; α(O)=0.00330 *5*. B(E2)(W.u.)=1.4 *6*.
	93.329 *3*	2.13 *6*	[M1,E2]‡		1.7 *7*	B(M1)(W.u.)=0.0039 *13*. α(K)=1.2 *4*; α(L)=0.4 *3*; α(M)=0.08 *6*. α(N)=0.016 *12*; α(O)=0.0017 *11*.
	371.918 *2*	100.0 *3*	M1+E2	+0.97 *9*	0.0224	α(K)=0.0190 *3*; α(L)=0.00269 *4*; α(M)=0.000549 *9*. α(N)=0.0001129 *17*; α(O)=1.368×10^{-5} *20*. δ: from 1974Ma24. B(M1)(W.u.)=0.0015 *5*; B(E2)(W.u.)=6.7 *23*.
	411.490 *2*	72.9 *3*	M1		0.0181	B(M1)(W.u.)=0.0016 *5*. α(K)=0.01563 *22*; α(L)=0.00199 *3*; α(M)=0.000402 *6*. α(N)=8.34×10^{-5} *12*; α(O)=1.046×10^{-5} *15*.
442.20	402.6 *2*	100 *10*	D(+Q)	0.0 *+3−4*		
	442.2 *3*					
518.70	196.9 *5*	10 *1*	M1(+E2)	−0.03 *11*	0.1248 *22*	α(K)=0.1073 *18*; α(L)=0.0140 *4*; α(M)=0.00284 *8*. α(N)=0.000587 *15*; α(O)=7.34×10^{-5} *16*.
	479.1 *2*	100 *10*	E2		0.01012	α(K)=0.00855 *12*; α(L)=0.001254 *18*; α(M)=0.000257 *4*. α(N)=5.25×10^{-5} *8*; α(O)=6.28×10^{-6} *9*. Iγ: from (1981He04).
525.26	485.7 *2*	100 *10*	(M1+E2)	−0.14 *7*	0.01192 *18*	α(K)=0.01029 *16*; α(L)=0.001305 *19*; α(M)=0.000264 *4*. α(N)=5.47×10^{-5} *8*; α(O)=6.86×10^{-6} *10*.
572.68	250.9 *2*	4.9 *12*				
	254.5 *2*	2.5 *12*				
	533.10 *4*	100 *3*				
	572.73 *11*	16 *1*	[E2]			α=0.00620 *9*; α(K)=0.00528 *8*; α(L)=0.000741 *11*; α(M)=0.0001512 *22*. α(N)=3.10×10^{-5} *5*; α(O)=3.75×10^{-6} *6*. B(E2)(W.u.)=15.4 *19*.
588.533	177.036 *10*	7.9 *1*	M1+E2	+0.44 *13*	0.179 *7*	α(K)=0.151 *5*; α(L)=0.0227 *21*; α(M)=0.0047 *5*. α(N)=0.00095 *9*; α(O)=0.000114 *9*. δ: from 1974Ma24. B(M1)(W.u.)>0.0026; B(E2)(W.u.)>5.9.
	266.820 *7*	8.0 *1*	(M1+E2)‡		0.058 *3*	B(E2)(W.u.)>4.6; B(M1)(W.u.)>0.0005. α(K)=0.0488 *13*; α(L)=0.0076 *15*; α(M)=0.0016 *3*. α(N)=0.00032 *6*; α(O)=3.8×10^{-5} *6*. Mult.: K/L in ^{129}Cs ε decay.
	270.352 *5*	5.9 *8*	(M1+E2)‡		0.056 *3*	B(E2)(W.u.)>3.4; B(M1)(W.u.)>0.00037. α(K)=0.0470 *12*; α(L)=0.0073 *14*; α(M)=0.0015 *3*. α(N)=0.00030 *6*; α(O)=3.6×10^{-5} *5*. Mult.: K/L in ^{129}Cs ε decay.
	548.945 *8*	100 *1*	(M1+E2)‡			B(E2)↓>1.6; B(M1)(W.u.)>0.00071. α=0.0079 *10*; α(K)=0.0068 *9*; α(L)=0.00090 *7*; α(M)=0.000183 *13*. α(N)=3.8×10^{-5} *3*; α(O)=4.6×10^{-6} *5*. Mult.: K/L in ^{129}Cs ε decay.
	588.549 *8*	17.7 *4*	(M1+E2)‡			B(E2)(W.u.)>0.2; B(M1)(W.u.)>0.0001. α=0.0066 *9*; α(K)=0.0057 *8*; α(L)=0.00075 *7*; α(M)=0.000152 *13*. α(N)=3.1×10^{-5} *3*; α(O)=3.9×10^{-6} *4*. Mult.: K/L in ^{129}Cs ε decay.
624.332	302.6# *2*	≤67				

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Adopted Levels, Gammas (continued)

γ(^{129}Xe) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.	δ[§]	α	Comments
624.332	585.0[#] *2*	100				
665.43	146.8 *3*					
	343.7 *2*	74 *22*	M1+E2	+3.1 *+13−9*	0.0273	α(K)=0.0228 *4*; α(L)=0.00362 *7*; α(M)=0.000746 *14*. α(N)=0.000152 *3*; α(O)=1.78×10^{-5} *3*.
	347.3 *2*	100 *10*	E2		0.0263	α(K)=0.0219 *3*; α(L)=0.00354 *5*; α(M)=0.000730 *11*. α(N)=0.0001485 *21*; α(O)=1.730×10^{-5} *25*.
	391.1 *3*					
692.96	167.7 *3*					
	250.8 *3*					
	653.4 *3*					
771.17	535.1 *2*	100	(M1+E2)	−0.5 *+2−16*		α=0.0090 *13*; α(K)=0.0078 *12*; α(L)=0.00100 *8*; α(M)=0.000203 *15*. α(N)=4.2×10^{-5} *4*; α(O)=5.2×10^{-6} *6*.
822.16	156.7 *2*	2.1 *7*				
	249.5 *2*					
	303.5 *2*	21.8 *21*	M1+E2	−0.25 *+9−10*	0.0396	α(K)=0.0340 *5*; α(L)=0.00445 *9*; α(M)=0.000903 *19*. α(N)=0.000187 *4*; α(O)=2.33×10^{-5} *4*.
	500.4 *2*	100 *10*	E2			δ(M3/E2)=+0.09 *2* from (α,nγ). α=0.00896 *13*; α(K)=0.00758 *11*; α(L)=0.001100 *16*; α(M)=0.000225 *4*. α(N)=4.61×10^{-5} *7*; α(O)=5.52×10^{-6} *8*.
823.00	234.3 *3*					
	411.6 *3*					
	504.4 *3*		(M1+E2)			
823.29	587.2 *2*	100	(Q)			
868.06	546.2 *2*	76.1 *23*	M1+E2			
	550.0 *2*	100 *37*	Q			
904.318	492.78 *4*	35 *3*				
	582.60 *11*	3 *2*				
	586.11 *4*	40 *4*				
	864.740 *8*	100 *3*				
	904.31 *6*	26 *2*				
908.63	634.2 *3*					
	672.3 *3*					
946.028	321.700[#] *25*	4 *3*				
	357.52 *6*	2.6 *4*				
	373.36 *15*	6 *6*				
	534.546 *15*	9.6 *4*				
	624.312 *9*	12.8 *3*				
	627.88 *9*	0.78 *16*				
	906.425 *6*	100.0 *7*				
	946.046 *6*	31.6 *3*				
985.7	664.0 *4*	100				
995.7	584.2 *3*	100				
1022.30	580.1 *2*	100	(M1+E2)	−1.2 *+9−7*		α=0.0067 *9*; α(K)=0.0058 *8*; α(L)=0.00077 *7*; α(M)=0.000156 *13*. α(N)=3.2×10^{-5} *3*; α(O)=4.0×10^{-6} *5*.
1032.02	757.8 *3*					
	795.9 *3*					
1059.58	394.1 *2*		D+Q			
	785.4 *3*					
1089.48	267.3 *2*	5.5 *16*	D			
	570.8 *2*	100 *10*	E2			α=0.00626 *9*; α(K)=0.00532 *8*; α(L)=0.000749 *11*; α(M)=0.0001527 *22*. α(N)=3.13×10^{-5} *5*; α(O)=3.79×10^{-6} *6*.
1194.5	675.8 *3*	100				
1194.6	621.9 *3*	100				
1197.11	504.2 *3*					
	671.9 *3*					

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Adopted Levels, Gammas (continued)

γ(^{129}Xe) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.	δ[§]	Comments
1197.11	754.8 *3*				
1229.9	711.2 *3*	100	M1		
1239.0	1239				
1241.2	829.7 *3*	100			
1336.12	671.0 *3*				
	817.1 *3*				
1395.57	624.4 *2*	100 *10*	(M1+E2)	−1.2 *+7−5*	α=0.0056 *6*; α(K)=0.0048 *6*; α(L)=0.00063 *5*; α(M)=0.000128 *10*. α(N)=2.64×10^{-5} *20*; α(O)=3.3×10^{-6} *3*.
1414.27	324.8 *3*				
	592.1 *2*		Q		
1430.28	398.4 *3*				
	521.3 *3*				
	659.3 *3*				
1497.1	629.0 *3*	100			
1507.19	683.9 *2*		(M1+E2)	−1.5 *3*	
	736.0 *3*				
1539.4	716.1 *3*	100			
1570.0	1570				
1576.0	752.7 *2*	100			
1748.7	689.1 *3*	100			
1755.3	733.0 *3*	100			
1762.28	348.0 *3*				
	672.8 *2*		(Q)		
1816.06	420.5 *2*				
	784.0 *3*				
	992.8 *3*				
1884.0	1884				
1888.5?	694.0[#] *3*	100			
1972.3	576.7 *2*	100	(M1+E2)	−2.6 *+17−45*	α=0.0063 *8*; α(K)=0.0054 *7*; α(L)=0.00074 *6*; α(M)=0.000151 *11*. α(N)=3.11×10^{-5} *23*; α(O)=3.8×10^{-6} *4*.
2036.3	1213.1 *3*				
	1265.1 *3*				
2048.2	712.1 *3*	100			
2064.7	650.4 *2*	100	Q		
2172.2	1348.9 *3*	100			
2180.0	604.0 *2*	100	(M1+E2)	−0.14 *+9−7*	α=0.00698 *11*; α(K)=0.00604 *10*; α(L)=0.000759 *11*; α(M)=0.0001534 *23*. α(N)=3.18×10^{-5} *5*; α(O)=3.99×10^{-6} *6*.
2186.0	2186				
2289.0	2289				
2293.1	717.1 *2*	100	(M1+E2)	−1.9 *5*	
2307.3	1110.2 *3*	100			
2343.0	2343				
2355.0	2355				
2383.0	2383				
2394.0	2394				
2425.1	1983	100 *28*			
	2425	93			
2433.5	671.2 *3*	100			
2446.3	870.3 *2*	100			
2499.0	2499				
2554.0	2554				
2586.2	406.2 *2*	100			
2592.0	2592				
2674.0	2674				
2724.0	2724				
2744.0	2051	100 *3*			
	2744	26			
2767.0	2767				
2776.0	2776				
2793.0	2793				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Xe) (continued)

E(level)	Eγ[†]
2854.0	2854
2917.0	2917
2972.0	2972
3015.0	3015
3023.0	3023
3215.0	3215
3783.1	3783
3805.1	3805
3829.1	3829

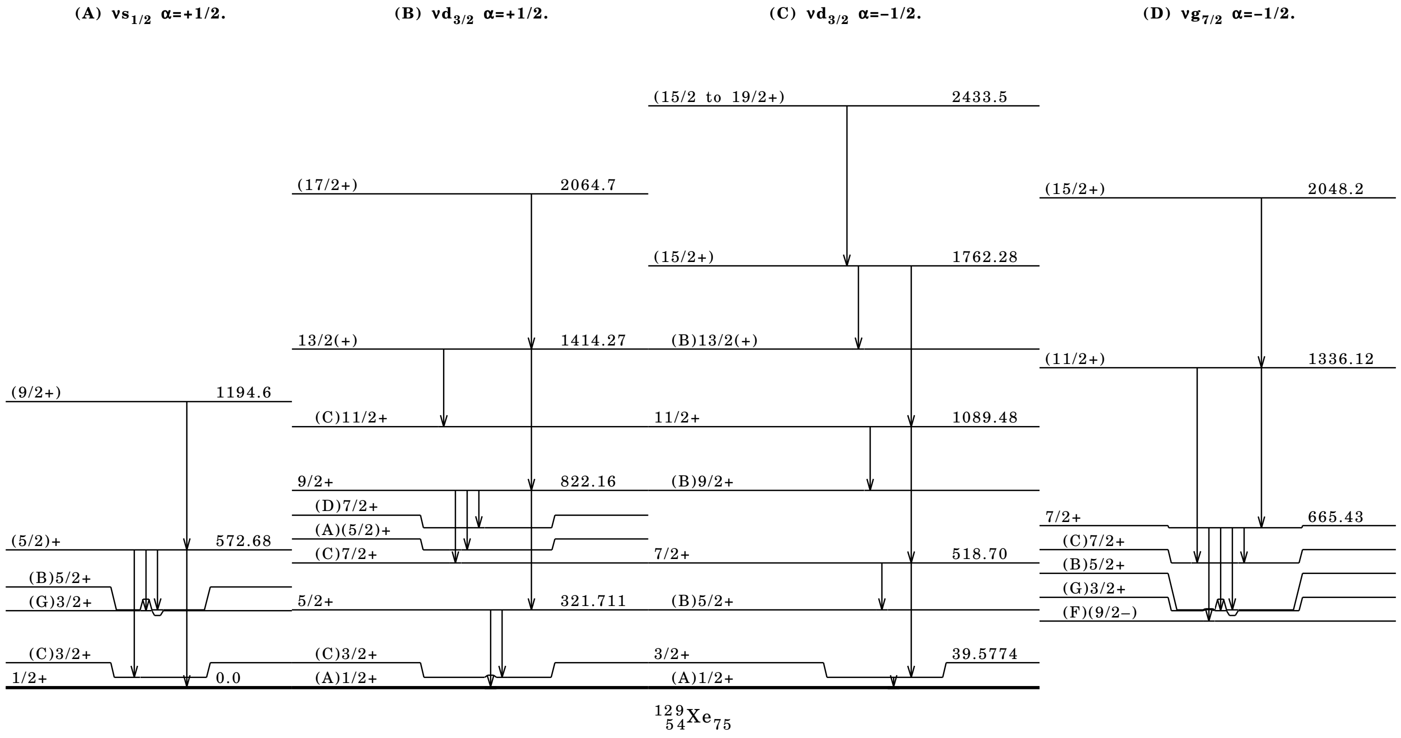
[†] Mainly from ε decay and high–spin levels, gammas.

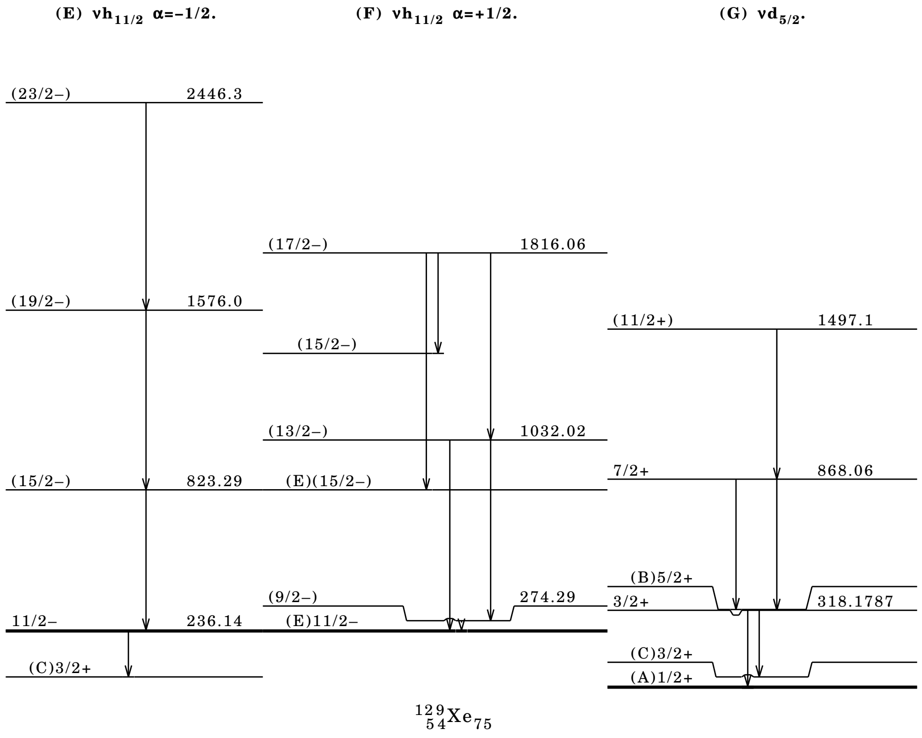
[‡] M1+E2 and δ=1.0 *10* was assumed by the evaluators.

[§] From (HI,xnγ) unless otherwise noted.

[#] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas (continued)

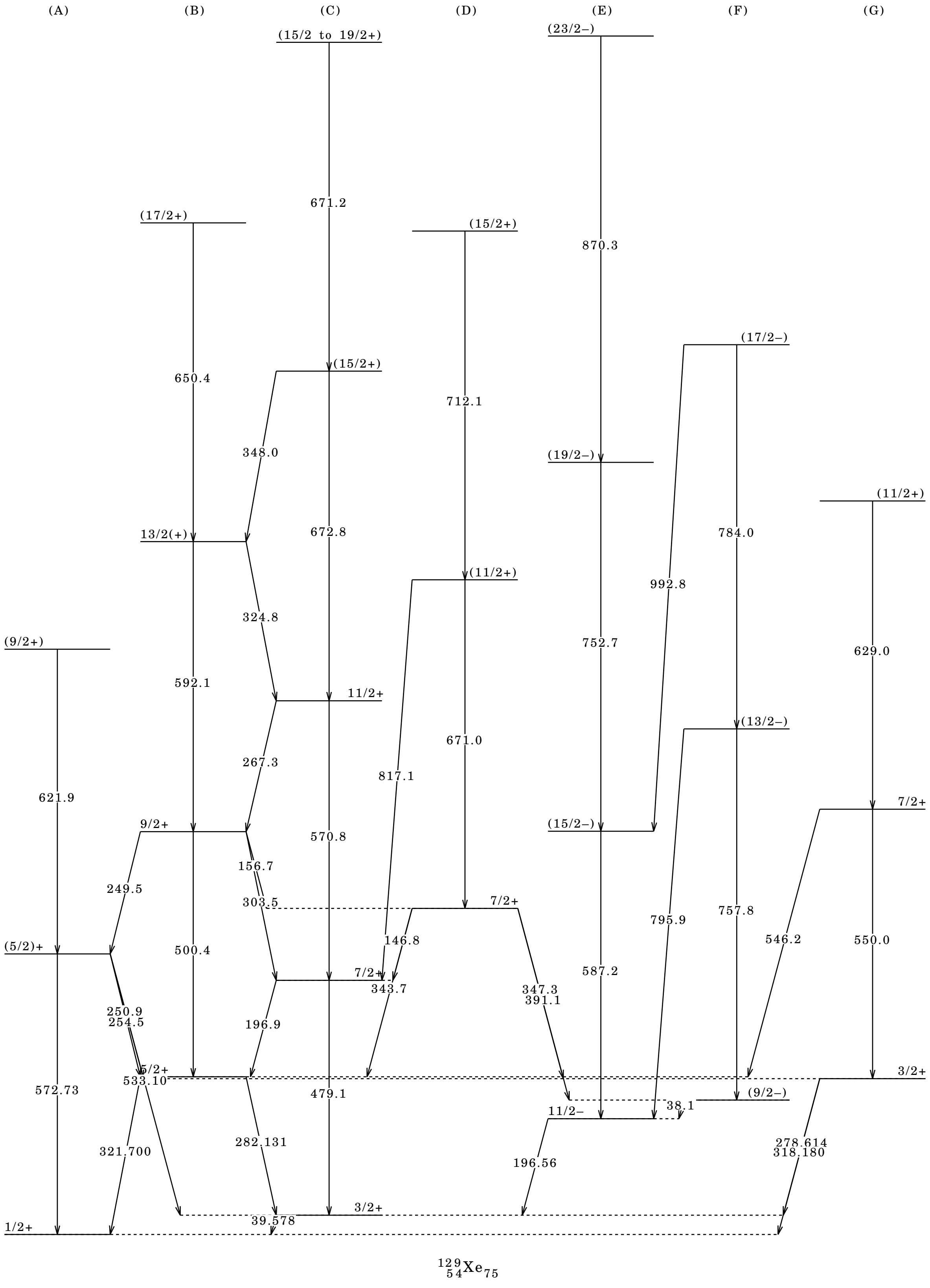




From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

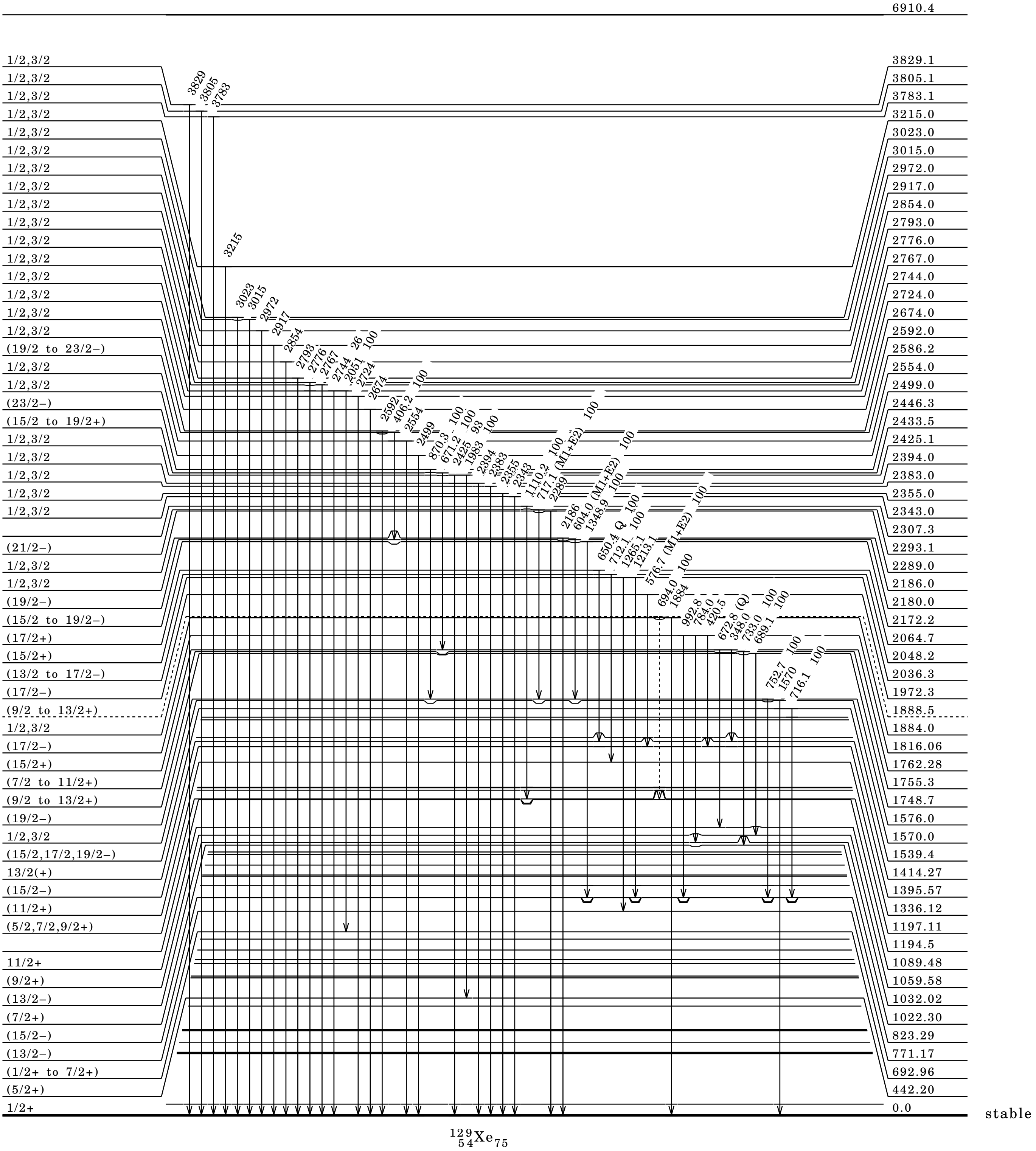
Bands for ^{129}Xe



Adopted Levels, Gammas (continued)

Level Scheme

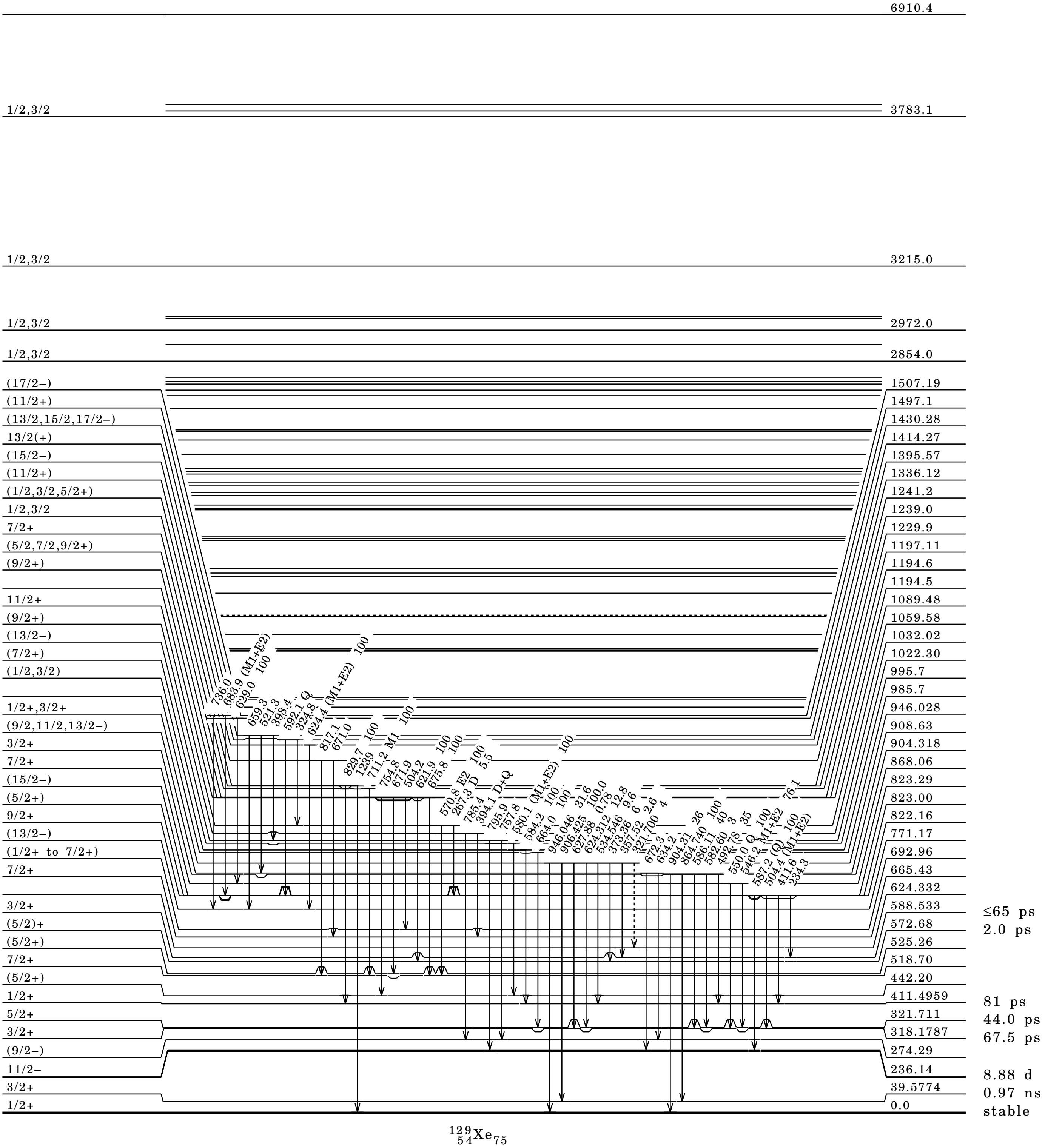
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



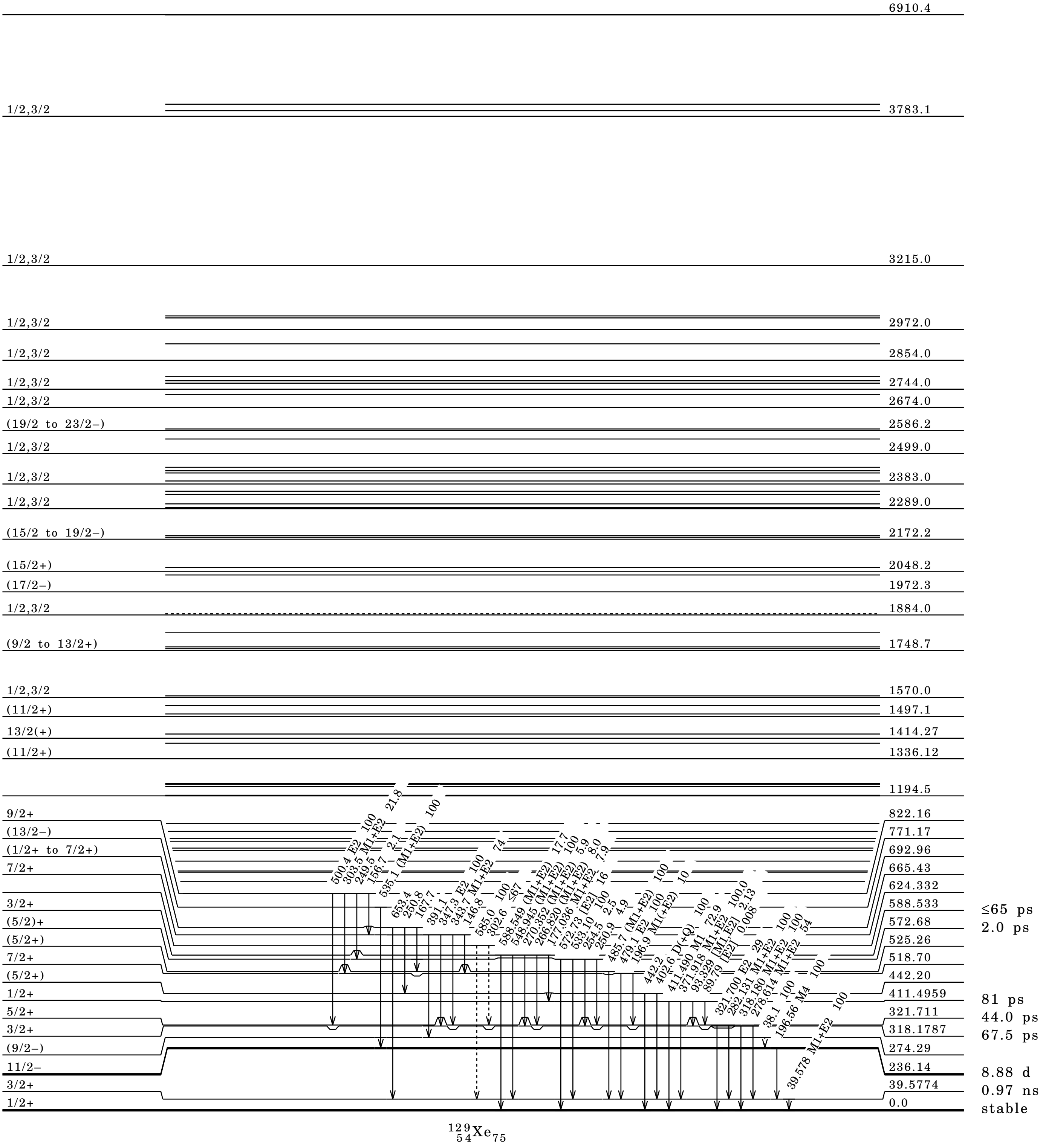
$^{129}_{54}Xe_{75}$

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



From NNDC(BNL)
program ENSDAT

^{129}I β^- Decay (1.57E7 Y) 1985Ba73,1977Ra23

Parent ^{129}I: E=0.0; Jπ=7/2+; $T_{1/2}$=1.57×10^7 y *4*; Q(g.s.)=189 *3*; %β^- decay=100.
^{129}I–Q(β^-): From 2012Wa38.
^{129}I–J,$T_{1/2}$: From ^{129}I Adopted Levels.
^{129}I–%β^- decay: Based on I(γ+ce to g.s.)=100.
1985Ba73: ^{235}U(n,F), E=th; HPGE detector, x-ray, γ.
1977Ra23: ^{235}U(n,F), E=th; Ge, 4π β, x-ray, γ, β.
Others: 1954De17, 1965Wa13, 1968ReZY, 1970SaZI.
See also ^{129}Xe IT decay.

^{129}Xe Levels

E(level)	Jπ†	$T_{1/2}$†
0.0	1/2+	stable
39.578 *2*	3/2+	0.97 ns *2*

† From Adopted Levels.

β^- radiations

No β^- feeding to g.s. (<1%) (1954De17).

Eβ$^-$	E(level)	Iβ$^-$†	Log *ft*	Comments
(149 *3*)	39.578	100 *1*	13.46 *4*	av Eβ=40.03 *92*.

† Absolute intensity per 100 decays.

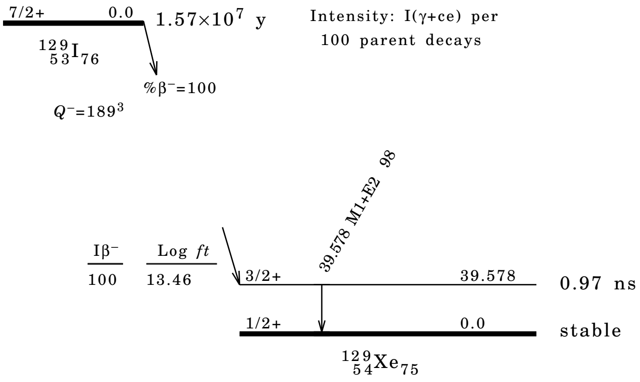
γ(^{129}Xe)

Eγ	E(level)	Iγ†	Mult.	δ	α	Comments
39.578 *4*	39.578	7.51 *23*	M1+E2	−0.027 *5*	12.03	α(K)=10.27 *15*; α(L)=1.408 *23*; α(M)=0.286 *5*. α(N)=0.0591 *10*; α(O)=0.00732 *11*. Eγ: from 1985Ba73. Iγ: from α(t) and I(γ+ce)=100 (1985Ba73). Mult.: from α(K)exp=10.2 *5*, K/L≈8.2 (1977Ra23). Others: α(K)exp=10.60 *44* (1985Ba73), 10.2 *4* (1970SaZI), 10.6 (1968ReZY), 21.0 *10* (1965Wa13), 22 *4* (1954De17); K/L≈10 (1954De17). δ: from ^{129}Cs ε decay (1965Ge04,1974Ma24).

† Absolute intensity per 100 decays.

^{129}I β^- Decay (1.57E7 Y) 1985Ba73,1977Ra23 (continued)

Decay Scheme



Intensity: I(γ+ce) per 100 parent decays

^{129}Xe IT Decay (8.88 d) 1962Ge09,1965Ge04

Parent ^{129}Xe: E=236.14 *3*; Jπ=11/2–; $T_{1/2}$=8.88 d *2*; %IT decay=100.
^{129}Xe–%IT decay: Based on I(γ+ce to g.s.)=100.
1962Ge09: mag β spectrometer, ce(K), ce(L).
1965Ge04: ^{235}U(n,F) mass sep, mag β spectrometer, ce, scin, K x ray, (K x ray)(ce)(t).
1976Le23: ^{127}I(n,γ)^{128}I(β$^-$)^{128}Xe(n,γ) γγ(θ).
Others: 1954Th18, 1958Al98, 1970Gy01.
See also ^{129}I β$^-$ decay.

^{129}Xe Levels

E(level)	Jπ†	$T_{1/2}$†
0.0	1/2+	stable
39.578 *2*	3/2+	0.97 ns *2*
236.14 *3*	11/2–	8.88 d *2*

† From Adopted Levels.

γ(^{129}Xe)

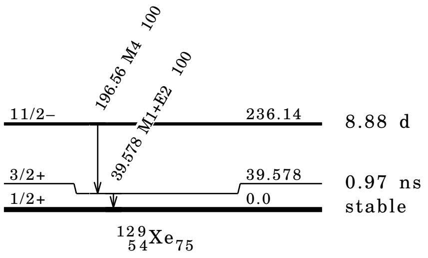
Eγ	E(level)	Iγ†‡	Mult.	δ	α	I(γ+ce)‡	Comments
39.578 *4*	39.578	7.5 *2*	M1+E2	−0.027 *5*	12.03	100	ce(K)/(γ+ce)=0.786 *18*; ce(L)/(γ+ce)=0.109 *3*; ce(M)/(γ+ce)=0.022 *1*. ce(K)/(γ+ce)=0.788 *6*; ce(L)/(γ+ce)=0.1081 *21*; ce(M)/(γ+ce)=0.0220 *5*; ce(N+)/(γ+ce)=0.00510 *11*. ce(N)/(γ+ce)=0.00454 *10*; ce(O)/(γ+ce)=0.000562 *12*. Eγ: from 1985Ba73. δ: from ^{129}Cs ε decay (1965Ge04,1974Ma24). Mult.: from ^{129}I β$^-$ decay.
196.56 *3*	236.14	4.59 *14*	M4		20.3	100	ce(K)/(γ+ce)=0.640 *12*; ce(L)/(γ+ce)=0.245 *7*; ce(M)/(γ+ce)=0.055 *2*. ce(K)/(γ+ce)=0.640 *8*; ce(L)/(γ+ce)=0.245 *4*; ce(M)/(γ+ce)=0.0554 *11*; ce(N+)/(γ+ce)=0.01258 *25*. ce(N)/(γ+ce)=0.01132 *22*; ce(O)/(γ+ce)=0.001257 *25*. Mult.: from K:L1:L2:L3 ratios (1962Ge09), γγ(θ) (1976Le23).

† From I(γ+ce) and α(exp).
‡ Absolute intensity per 100 decays.

^{129}Xe IT Decay (8.88 d) 1962Ge09,1965Ge04 (continued)

Decay Scheme

Intensities: I(γ+ce) per
100 parent decays
%IT=100



^{129}Cs ε Decay (32.06 h) 1976Me16

Parent ^{129}Cs: E=0.0; Jπ=1/2+; $T_{1/2}$=32.06 h *6*; Q(g.s.)=1197 *5*; %ε+%$β^+$ decay=100.
^{129}Cs–Q(ε): From 2012Wa38.
^{129}Cs–J,$T_{1/2}$: From ^{129}Cs Adopted Levels.
^{129}Cs–%ε+%$β^+$ decay: I(ε+β to g.s.)=34% from K x-ray measurement (1976Me16).
1976Me16: ^{127}I(α,2n), chem, mass sep; Ge γ, γγ–coin.
Others: 1955Ni21, 1960Jh02, 1963Fr13, 1965Sh08, 1966Re10, 1967Gr05, 1967Wa11, 1971Ob03, 1972Ge20, 1974Ma24, 1976Me16, 1979Be54.

^{129}Xe Levels

The decay scheme is basically that proposed by 1967Gr05, modified by 1976Me16.

E(level)	Jπ[†]	$T_{1/2}$[†]	Comments
0.0	1/2+	stable	
39.578 *2*	3/2+	0.97 ns *2*	
318.179 *2*	3/2+	67.5 ps *20*	
321.711 *5*	5/2+	44.0 ps *19*	
411.496 *2*	1/2+	81 ps *26*	$T_{1/2}$: delayed coin (1979Be54).
572.68 *4*	(5/2)+	2.0 ps *2*	
588.533 *4*	3/2+	≤65 ps	$T_{1/2}$: delayed coin (1979Be54).
624.5 *2*			
904.318 *8*	3/2+		
946.029 *4*	1/2+,3/2+		

[†] From Adopted Levels, unless otherwise noted.

$β^+$,ε Data

Eε	E(level)	$Iβ^+$[†]	Iε[†]	Log *ft*	I(ε+$β^+$)[†]	Comments
(251 *5*)	946.029		0.355 *23*	6.80 *4*		εK=0.8224 *9*; εL=0.1387 *7*; εM+=0.03889 *21*.
(293 *5*)	904.318		0.066 *4*	7.68 *4*		εK=0.8282 *6*; εL=0.1344 *5*; εM+=0.03749 *15*.
(573 *5*)	624.5		8.×10^{-4} *3*	10.23 *17*		εK=0.8435 *2*; εL=0.1228 *1*; εM+=0.03376 *4*.
(608 *5*)	588.533		4.9 *3*	6.50 *3*		εK=0.8443 *2*; εL=0.12212 *9*; εM+=0.03355 *3*.
(786 *5*)	411.496		55 *3*	5.68 *3*		εK=0.8474; εL=0.11979 *5*; εM+=0.03281 *2*.
(879 *5*)	318.179		2.40 *14*	7.14 *3*		εK=0.8485; εL=0.11896 *4*; εM+=0.03254 *2*.
(1157 *5*)	39.578		2.9 *13*	7.3 *2*	2.9 *13*	εK=0.8507; εL=0.11730 *3*; εM+=0.032010 *8*.
(1197 *5*)	0.0	0.0029 *5*	34 *4*	6.27 *6*	34 *4*	av Eβ=88.2 *23*; εK=0.8508; εL=0.11712 *3*; εM+=0.031954 *7*.

[†] Absolute intensity per 100 decays.

^{129}Cs ε Decay (32.06 h) 1976Me16 (continued)

γ(^{129}Xe)

Eγ†	E(level)	Iγ$^{@}$	Mult.‡	δ§	α	Comments
39.578 *4*	39.578	97 *3*	M1+E2	−0.027 *5*	12.03	α(K)=10.27 *15*; α(L)=1.408 *23*; α(M)=0.286 *5*. α(N)=0.0591 *10*; α(O)=0.00732 *11*. Eγ: from 1985Ba73. δ: from L subshell ratios (1965Ge04), sign from γγ(θ) and K/L (371.9γ) (1974Ma24).
89.79 *8*	411.496	0.08 *2*	[E2]		2.65	α(K)=1.675 *24*; α(L)=0.776 *12*; α(M)=0.1664 *25*. α(N)=0.0329 *5*; α(O)=0.00330 *5*.
93.329 *3*	411.496	21.3 *6*	[M1,E2]		1.7$^{\#}$ *7*	α(K)=1.2 *4*; α(L)=0.4 *3*; α(M)=0.08 *6*. α(N)=0.016 *12*; α(O)=0.0017 *11*.
177.036 *10*	588.533	8.8 *1*	M1+E2	+0.44 *13*	0.179 *7*	α(K)=0.151 *5*; α(L)=0.0227 *21*; α(M)=0.0047 *5*. α(N)=0.00095 *9*; α(O)=0.000114 *9*.
266.820 *7*	588.533	8.9 *1*	(M1+E2)		0.058$^{\#}$ *3*	α(K)=0.0488 *13*; α(L)=0.0076 *15*; α(M)=0.0016 *3*. α(N)=0.00032 *6*; α(O)=3.8×10^{-5} *6*.
270.352 *5*	588.533	6.95 *8*	(M1+E2)		0.056$^{\#}$ *3*	α(K)=0.0470 *12*; α(L)=0.0073 *14*; α(M)=0.0015 *3*. α(N)=0.00030 *6*; α(O)=3.6×10^{-5} *5*.
278.614 *4*	318.179	43.2 *9*	M1+E2	+0.8 *+10−5*	0.0509 *16*	α(K)=0.0429 *7*; α(L)=0.0063 *9*; α(M)=0.00130 *18*. α(N)=0.00027 *4*; α(O)=3.2×10^{-5} *3*. δ: from 1981He04. Others: 0.3<(1974Ma24), +0.03 *+2−3* (1979Ir01).
282.131 *6*	321.711	7.9 *1*	M1+(E2)	−0.7 *+4−7*	0.0489 *13*	α(K)=0.0414 *7*; α(L)=0.0060 *7*; α(M)=0.00122 *15*. α(N)=0.00025 *3*; α(O)=3.03×10^{-5} *25*. δ: from 1981He04. Other: +0.83 *+8−7* (1979Ir01).
302.6 *2*	624.5	≤0.01				
318.180 *2*	318.179	80 *1*	M1+E2	−1.1 *+13−22*	0.0348 *6*	α(K)=0.0293 *9*; α(L)=0.0044 *5*; α(M)=0.00090 *11*. α(N)=0.000183 *20*; α(O)=2.19×10^{-5} *15*. δ: from 1981He04. Others: 0.4 *+6−4* (1974Ma24), −2.11 *+7−11* (1979Ir01).
321.700 *25*	321.711	2.3 *2*	E2		0.0335	α(K)=0.0277 *4*; α(L)=0.00461 *7*; α(M)=0.000952 *14*. α(N)=0.000193 *3*; α(O)=2.24×10^{-5} *4*.
	946.029	0.3 *2*				
357.52 *6*	946.029	0.19 *3*				
371.918 *2*	411.496	1000 *3*	M1+E2	+0.97 *9*	0.0224	α(K)=0.0190 *3*; α(L)=0.00269 *4*; α(M)=0.000549 *9*. α(N)=0.0001129 *17*; α(O)=1.368×10^{-5} *20*.
373.36 *15*	946.029	0.4 *4*				
411.490 *2*	411.496	729 *3*	[M1]		0.0181	α(K)=0.01563 *22*; α(L)=0.00199 *3*; α(M)=0.000402 *6*. α(N)=8.34×10^{-5} *12*; α(O)=1.046×10^{-5} *15*.
492.78 *4*	904.318	0.37 *3*				
533.10 *4*	572.68	0.31 *2*				
534.546 *15*	946.029	0.69 *3*				
548.945 *8*	588.533	111 *1*	(M1+E2)		#	α=0.0079 *10*; α(K)=0.0068 *9*; α(L)=0.00090 *7*; α(M)=0.000183 *13*. α(N)=3.8×10^{-5} *3*; α(O)=4.6×10^{-6} *5*.
572.73 *11*	572.68	0.05 *12*	[E2]			α=0.00620 *9*; α(K)=0.00528 *8*; α(L)=0.000741 *11*; α(M)=0.0001512 *22*. α(N)=3.10×10^{-5} *5*; α(O)=3.75×10^{-6} *6*.
582.60 *11*	904.318	0.03 *2*				
585.0$^{\&}$ *2*	624.5	0.015 *9*				
586.11 *4*	904.318	0.42 *4*				
588.549 *8*	588.533	19.7 *4*	(M1+E2)		#	α=0.0066 *9*; α(K)=0.0057 *8*; α(L)=0.00075 *7*; α(M)=0.000152 *13*. α(N)=3.1×10^{-5} *3*; α(O)=3.9×10^{-6} *4*.
624.312 *9*	946.029	0.92 *2*				

Continued on next page (footnotes at end of table)

^{129}Cs ε Decay (32.06 h) 1976Me16 (continued)

γ(^{129}Xe) (continued)

Eγ[†]	E(level)	Iγ[@]
627.88 *9*	946.029	0.056 *12*
864.740 *8*	904.318	1.05 *3*
904.31 *6*	904.318	0.27 *2*
906.425 *6*	946.029	7.19 *5*
946.046 *6*	946.029	2.27 *2*

[†] From 1976Me16 unless otherwise noted.

[‡] From K/L (1974Ma24).

[§] From γγ(θ) and K/L (1974Ma24) unless otherwise noted.

[#] M1+E2 and δ=1.0 *10* was assumed by the evaluators.

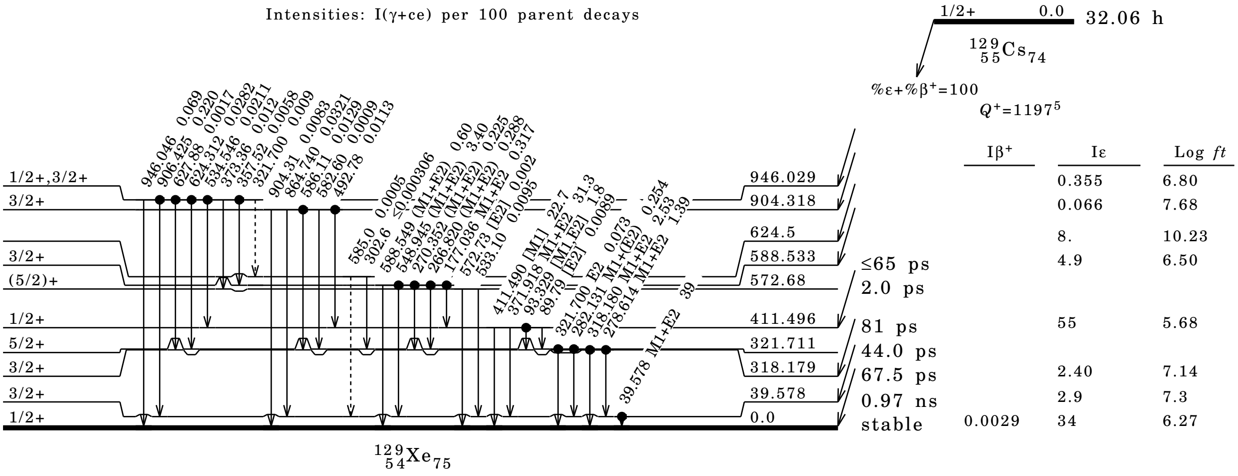
[@] For absolute intensity per 100 decays, multiply by 0.0306 *17*.

[&] Placement of transition in the level scheme is uncertain.

^{129}Cs ε Decay (32.06 h) 1976Me16 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays



^{126}Te(α,nγ) 1988Zh10,1981He04

1988Zh10: ^{126}Te(α,nγ) E=16 MeV, Ge, γγ–coin, excit.

1983Lo08: ^{126}Te(α,nγ) E=16.2 MeV, Ge, γ(θ).

1981He04: ^{126}Te(α,nγ) E=18 MeV, ^{130}Te(^{3}He,4nγ) E=24–27 MeV, Ge, ce, γ(θ), γγ–coin.

1979Ir01: ^{126}Te(α,nγ) E=18 MeV, Ge, γ(θ), γ(linear pol).

1978Pa09: ^{126}Te(α,nγ) E=16 MeV, Ge.

1970Re01: ^{128}Te(α,3nγ) E=28–43 MeV, Ge, γ(θ).

Evaluators adopt the level scheme from 1988Zh10, although it is a short note. Authors reported that they found as many as 180 transitions connecting 110 levels, but showed only a part of level scheme without values for Iγ and ΔE in Eγ. They also showed several band structures giving no detailed discussions. Evaluators consider the level scheme as tentative.

^{129}Xe Levels

Level scheme and band structures are those from 1988Zh10. According to the authors' comment, their results shown in 1988Zh10 are tentative ones.

E(level)†	Jπ‡	$T_{1/2}$§	Comments
0.0$^{\#}$	1/2+		
39.6$^{\&}$ *2*	3/2+	0.97 ns *2*	
236.14^{b} *3*	11/2−	8.88 d *2*	%IT=100.
274.28^{c} *19*	(9/2−)		
318.179^{d} *2*	3/2+	67.5 ps *20*	
321.711$^{@}$ *5*	5/2+	44.0 ps *19*	Jπ: 5/2+ from γ(θ) and linear polarization.
411.496 *2*	1/2+	81 ps *26*	
442.20 *15*	(5/2)+		
518.7$^{\&}$ *2*	7/2+		
525.3 *3*	(5/2)+		
572.7$^{\#}$ *2*	5/2+	2.0 ps *2*	
588.8 *2*	3/2+	≤65 ps	Jπ: 3/2, 5/2 from γ(θ) (1979Ir01).
665.5^{a} *2*	7/2+		
693.0 *3*	(5/2)		
771.1 *4*	13/2−		
822.2$^{@}$ *2*	9/2+		
823.1 *3*	(3/2+)		
823.3^{b} *4*	15/2−		
868.2^{d} *2*	7/2+		
909.9 *3*	7/2,9/2,11/2		
1022.3 *4*	7/2+		
1032.0^{c} *3*	(13/2−)		
1059.6 *3*	9/2+		

Continued on next page (footnotes at end of table)

^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

^{129}Xe Levels (continued)

E(level)†	Jπ‡	Comments
1089.5$^{\&}$ *2*	11/2+	Jπ: 7/2+, 11/2+, 13/2 from γ(θ) and linear polarization.
1194.5 *3*	(9/2,11/2)	E(level): from Adopted Levels.
1194.6$^{\#}$ *3*	(9/2)	E(level): from Adopted Levels.
1197.7 *3*		
1229.9 *4*	(7/2)+	E(level): from 1978Pa09. Jπ: from γ(θ) and linear polarization (1979Ir01).
1241.2 *3*	(5/2)	
1336.5^{a} *3*	(11/2)	
1395.5 *6*	15/2–	
1414.3$^{@}$ *3*	13/2+	
1430.5 *3*	(9/2,11/2)	
1497.2^{d} *3*	(11/2)	
1507.2 *4*	17/2–	
1539.4 *3*	(13/2,15/2)	
1576.0^{b} *4*	19/2–	
1748.7 *3*		
1755.3 *3*		
1762.5$^{\&}$ *3*	(15/2)+	
1816.0^{c} *5*	(17/2,15/2)	
1888.5? *3*		E(level): E(level)=1886.5 is given in 1988Zh10. Corrected by the evaluators assuming Eγ=694.0 from the level as correct.
1972.2 *5*	17/2–	
2036.2 *3*	(15/2,13/2)	
2048.6^{a} *3*	(15/2)	
2064.7$^{@}$ *4*	17/2+	
2172.0 *3*		
2180.0 *5*	19/2–	
2293.1 *5*	21/2–	
2307.4 *3*		
2433.5$^{\&}$ *3*		
2446.3^{b} *5*	(23/2–)	
2586.3 *5*	(23/2–)	E(level): from 1981He04.

† From Adopted Levels.

‡ For band structure, assignments are from side feeding excitation functions and their slopes (1988Zh10). Positive–parity bands are described by core plus quasiparticle model and negative–parity bands are reproduced by triaxial–rotor model (1981He04).

§ From Adopted Levels.

\# (A): $\nu s_{1/2}$,α=+1/2.

@ (B): $\nu d_{3/2}$,α=+1/2.

& (C): $\nu d_{3/2}$,α=–1/2.

[a] (D): $\nu g_{7/2}$,α=–1/2.

[b] (E): $\nu h_{11/2}$,α=–1/2. Possible projection=j band in triaxial–rotor model.

[c] (F): $\nu h_{11/2}$,α=+1/2. Possible projection=j–1 band in triaxial–rotor model.

[d] (G): $\nu d_{5/2}$.

γ(^{129}Xe)

Eγ†	E(level)	Iγ‡	Mult.§	δ#	α	Comments
(38.1)	274.28					Eγ: γ not observed. Expected from systematics of odd Xe nuclei.
(39.6 *2*)	39.6					Eγ: γ not observed. Deduced from Eγ differences deexciting 318.2 and 321.8 levels.
146.8 *3*	665.5					
156.7 *2*	822.2	1.2 *4*				
167.7 *3*	693.0					
177.3 *2*	588.8					A_2=–0.01 *3*, A_4=–0.02 *4*.
196.5 *2*	236.14		M4		20.4	α(K)=13.67 *21*; α(L)=5.24 *8*; α(M)=1.183 *18*. α(N)=0.242 *4*; α(O)=0.0269 *4*. Eγ: from 1981He04.

Continued on next page (footnotes at end of table)

^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

γ(^{129}Xe) (continued)

Eγ†	E(level)	Iγ‡	Mult.§	δ#	α	Comments
196.9 *2*	518.7	10 *1*	(M1(+E2))	−0.03 *11*	0.1248 *20*	α(K)=0.1073 *16*; α(L)=0.0140 *4*; α(M)=0.00284 *7*. α(N)=0.000587 *14*; α(O)=7.34×10^{-5} *15*. A_2=−0.16 *3*, A_4=−0.05 *4* (1981He04).
234.3 *3*	823.1					Eγ: Eγ value missing in 1988Zh10. Deduced by the evaluators.
249.5 *2*	822.2					
250.8 *3*	693.0					
250.9 *2*	572.7					
254.5 *2*	572.7					
267.0 *2*	588.8		D+Q			Reported only by 1979Ir01 and 1978Pa09. A_2=−0.20 *3*, A_4=−0.06 *4* (1979Ir01).
267.3 *2*	1089.5	3.0 *9*	D			A_2 is negative (1981He04).
270.6 *2*	588.8		D+Q			A_2=−0.17 *11*, A_4=−0.30 *16*. A_2=−0.22 *4*, A_4=+0.02 *5* (1979Ir01).
278.6 *2*	318.179	15.8 *16*	M1+E2	+0.8 *+10−5*	0.0509 *16*	α(K)=0.0429 *7*; α(L)=0.0063 *9*; α(M)=0.00130 *18*. α(N)=0.00027 *4*; α(O)=3.2×10^{-5} *3*. A_2=+0.18 *16*, A_4=−0.03 *2*. A_2=+0.13 *2*, A_4=−0.01 *2* (1981He04). A_2=+0.20 *2*, A_4=0.00 *2*, POL=+0.36 *3* (1979Ir01).
282.2 *2*	321.711	80 *8*	M1+E2	−0.7 *+4−7*	0.0488 *13*	α(K)=0.0414 *7*; α(L)=0.0060 *7*; α(M)=0.00122 *15*. α(N)=0.00025 *3*; α(O)=3.03×10^{-5} *25*. A_2=−0.39 *1*, A_4=+0.02 *2*. A_2=−0.34 *3*, A_4=−0.01 *4* (1981He04). A_2=−0.40 *1*, A_4=+0.02 *1*, POL=+0.09 *1* (1979Ir01).
^{x}302.4 *2*		0.5				
303.5 *2*	822.2	12.2 *12*	M1+E2	−0.25 *+9−10*	0.0396	α(K)=0.0340 *5*; α(L)=0.00445 *9*; α(M)=0.000903 *19*. α(N)=0.000187 *4*; α(O)=2.33×10^{-5} *4*. A_2=−0.38 *3*, A_4=−0.03 *5* (1981He04). A_2=−0.52 *2*, A_4=+0.05 *3*, POL=−0.23 *8* (1979Ir01).
318.2 *2*	318.179	23.2 *23*	M1+E2	−1.1 *+13−22*	0.0348 *6*	α(K)=0.0293 *9*; α(L)=0.0044 *5*; α(M)=0.00090 *11*. α(N)=0.000183 *20*; α(O)=2.19×10^{-5} *15*. A_2=−0.12 *13*, A_4=0.00 *2*. A_2=−0.10 *4*, A_4=+0.02 *6* (1981He04). A_2=−0.12 *2*, A_4=0.00 *2*, POL=+0.26 *3* (1979Ir01).
321.8 *2*	321.711	23.4 *23*	E2		0.0334	α(K)=0.0277 *4*; α(L)=0.00460 *7*; α(M)=0.000951 *14*. α(N)=0.000193 *3*; α(O)=2.23×10^{-5} *4*. A_2=0.+19 *1*, A_4=−0.02 *1*. A_2=+0.17 *4*, A_4=−0.01 *5* (1981He04). A_2=+0.18 *1*, A_4=0.00 *1*, POL=+0.26 *5*, δ(M3/E2)=+0.03 *+5−4* (1979Ir01).
324.8 *3*	1414.3					
343.7 *2*	665.5	9.2 *28*	M1+E2	+3.1 *+13−9*	0.0273	α(K)=0.0228 *4*; α(L)=0.00362 *7*; α(M)=0.000746 *14*. α(N)=0.000152 *3*; α(O)=1.78×10^{-5} *3*. A_2=+0.53 *2*, A_4=−0.01 *3*. A_2=+0.25 *2*, A_4=+0.09 *3* (1981He04). A_2=+0.46 *2*, A_4=+0.03 *2*, POL=−0.22 *9* (1979Ir01).

Continued on next page (footnotes at end of table)

^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

γ(^{129}Xe) (continued)

Eγ[†]	E(level)	Iγ[‡]	Mult.[§]	δ[#]	α	Comments
347.3 *2*	665.5	12.4 *12*	E2		0.0263	α(K)=0.0219 *3*; α(L)=0.00354 *5*; α(M)=0.000730 *11*. α(N)=0.0001485 *21*; α(O)=1.730×10^{-5} *25*. A_2=+0.26 *3*, A_4=−0.08 *4*. A_2=+0.17 *5*, A_4=0.06 *6* (1981He04). A_2=+0.21 *2*, A_4=−0.04 *2*, POL=+0.43 *6*, δ(M3/E2)=0.11 *+3−9* (1979Ir01).
348.0 *3*	1762.5					
371.9 *2*	411.496					A_2=−0.02 *2*, A_4=−0.09 *2*. A_2=−0.03 *4*, A_4=−0.06 *5* (1979Ir01).
391.1 *3*	665.5					
394.1 *2*	1059.6	4.0 *12*	D+Q			A_2=−0.13 *2*, A_4=+0.10 *4*.
398.4 *3*	1430.5					
402.6 *2*	442.20	16.1 *16*	D(+Q)	0.0 *+3−4*		A_2=−0.06 *2*, A_4=0.00 *3*. A_2=−0.08 *8*, A_4=0.00 *11* (1981He04).
406.2 *2*	2586.3	10.6 *11*				Eγ: from 1981He04.
411.5 *2*	411.496		M1			A_2=−0.41 *5*, A_4=−0.28 *8*. For 1/2+, A_2 and A_4 are incorrect. A_2=−0.01 *4*, A_4=+0.01 *4*, POL=−0.05 *2* (1979Ir01).
411.6 *3*	823.1					
420.5 *2*	1816.0	4.3 *13*				
442.2 *3*	442.20					
479.1 *2*	518.7	100 *10*	E2		0.01012	α(K)=0.00855 *12*; α(L)=0.001254 *18*; α(M)=0.000257 *4*. α(N)=5.25×10^{-5} *8*; α(O)=6.28×10^{-6} *9*. A_2=+0.21 *3*, A_4=−0.02 *4* (1981He04). A_2=+0.27 *1*, A_4=−0.08 *1*, POL=+0.42 *2*, δ(M3/E2)=+0.01 *+2−4* (1979Ir01).
485.7 *2*	525.3	19.2 *19*	(M1+E2)	−0.14 *7*	0.01192 *18*	A_2=−0.38 *3*, A_4=+0.2 *4*. A_2=−0.18 *2*, A_4=−0.01 *2* (1981He04).
500.4 *2*	822.2	56 *6*	E2			A_2=+0.18 *3*, A_4=−0.03 *5* (1981He04). A_2=+0.26 *1*, A_4=−0.06 *1*, POL=+0.47 *3*, δ(M3/E2)=+0.09 *2* (1979Ir01).
504.2 *3*	1197.7					
504.9 *3*	823.1		(M1+E2)			A_2=−0.11 *6*, A_4=−0.09 *9*, POL=+0.32 *7* (1979Ir01).
521.3 *3*	1430.5					
533.1 *2*	572.7					
535.1 *2*	771.1	72 *7*	(M1+E2)	−0.5 *+2−16*		A_2=−0.65 *5*, A_4=−0.09 *8* (1981He04).
546.2 *2*	868.2	11 *3*	M1+E2			A_2=−0.05 *2*, A_4=−0.07 *2*. A_2=−0.11 *2*, A_4=−0.01 *2*, POL=+0.42 *9* (1979Ir01).
549.2 *2*	588.8					
550.0 *2*	868.2	14 *5*	Q			A_2=+0.21 *2*, A_4=−0.04 *2*.
570.8 *2*	1089.5	55 *6*	E2			A_2=+0.27 *3*, A_4=−0.06 *4* (1981He04). A_2=+0.27 *1*, A_4=−0.07 *1*, POL=0.42 *6* (1979Ir01).
572.7 *2*	572.7					
576.7 *2*	1972.2	5.5 *17*	(M1+E2)	−2.6 *+17−45*		A_2=−0.57 *15*, A_4=+0.15 *24* (1981He04).
580.1 *2*	1022.3	5.9 *18*	(M1+E2)	−1.2 *+9−7*		A_2=−0.68 *3*, A_4=+0.11 *4*. A_2=−0.43 *3*, A_4=+0.12 *5* (1981He04).
^{x}585.0 *2*		6.0				
587.2 *2*	823.3	225 *23*	(Q)			A_2=+0.26 *4*, A_4=−0.02 *6* (1981He04).
588.8 *2*	588.8					
592.1 *2*	1414.3	41 *4*	Q			A_2=+0.29 *2*, A_4=−0.07 *3* (1981He04).
604.0 *2*	2180.0	18.4 *18*	(M1+E2)	−0.14 *+9−7*		A_2=+0.32 *2*, A_4=−0.01 *2* (1981He04).
621.9 *3*	1194.6					
624.4 *2*	1395.5	32 *3*	(M1+E2)	−1.2 *+7−5*		A_2=−0.80 *5*, A_4=+0.12 *8* (1981He04).
629.0 *3*	1497.2					
634.2 *3*	909.9					
650.4 *2*	2064.7	22.2 *22*	Q			A_2=+0.24 *4*, A_4=−0.07 *6* (1981He04).
653.4 *3*	693.0					

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^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

γ(^{129}Xe) (continued)

Eγ[†]	E(level)	Iγ[‡]	Mult.[§]	δ[#]	Comments
659.3 *3*	1430.5				
671.0 *3*	1336.5				
671.2 *3*	2433.5				
671.9 *3*	1197.7				
672.3 *3*	909.9				
672.8 *2*	1762.5	24.0 *24*	(Q)		A_2=+0.11 *6*, A_4=+0.05 *8* (1981He04).
675.8 *3*	1194.5				
683.9 *2*	1507.2	29 *3*	(M1+E2)	−1.5 *3*	A_2=−0.77 *3*, A_4=+0.08 *4* (1981He04).
689.1 *3*	1748.7				
694.0[@] *3*	1888.5?				
711.2 *3*	1229.9		M1		Eγ: from 1978Pa09. A_2=+0.36 *6*, A_4=−0.08 *6*, POL=−0.36 *8* (1979Ir01).
712.1 *3*	2048.6				
716.1 *3*	1539.4				
717.1 *2*	2293.1	9.1 *27*	(M1+E2)	−1.9 *5*	A_2=−0.76 *5*, A_4=+0.20 *7* (1981He04).
733.0 *3*	1755.3				
736.0 *3*	1507.2				
752.7 *2*	1576.0	73 *7*			
754.8 *3*	1197.7				
757.8 *3*	1032.0				
784.0 *3*	1816.0				
785.4 *3*	1059.6				
795.9 *3*	1032.0				
817.1 *3*	1336.5				
829.7 *3*	1241.2				
[x]864.7 *2*		4.6			
870.4 *2*	2446.3	26.2 *26*	(Q)		A_2=+0.11 *9*, A_4=+0.05 *13* (1981He04).
[x]906.4 *2*		4.7			
[x]946.0 *2*		7.1			
992.8 *3*	1816.0				
1110.2 *3*	2307.4				
1213.1 *3*	2036.2				
1265.1 *3*	2036.2				Eγ: missing in 1988Zh10. Deduced by the evaluators.
1348.9 *3*	2172.0				

[†] From 1988Zh10 unless otherwise noted. Unplaced γ rays are from 1983Lo08.

[‡] From 1981He04 at angle 125° to the beam.

[§] Multipolarities were deduced from γ(θ)(1983Lo08); and linear polarization data from 1979Ir01, unless otherwise noted. Mult=(M1+E2) is assigned based on RUL when there is significant mixture of dipole and quadrupole transitions, and (E2) is expected for most quadrupole transitions.

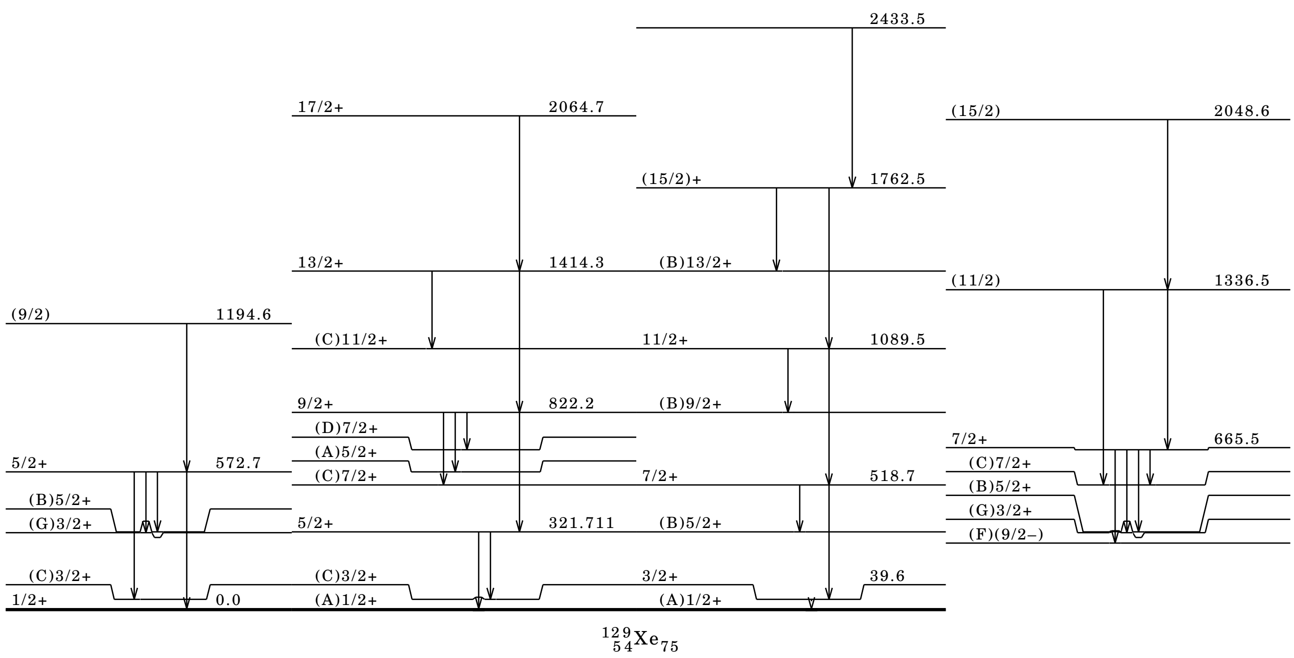
[#] From 1981He04, unless otherwise noted. Because 1979Ir01 adopted Rose–Brink convention, their sign was reversed by the evaluators.

[@] Placement of transition in the level scheme is uncertain.

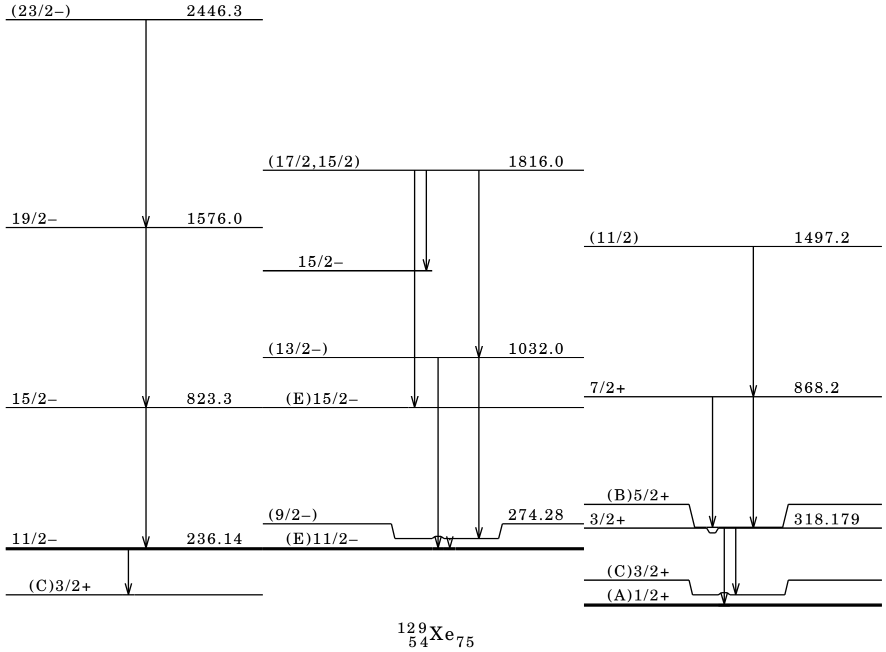
[x] γ ray not placed in level scheme.

^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

(A) ν$s_{1/2}$,α=+1/2. **(B) ν$d_{3/2}$,α=+1/2.** **(C) ν$d_{3/2}$,α=−1/2.** **(D) ν$g_{7/2}$,α=−1/2.**

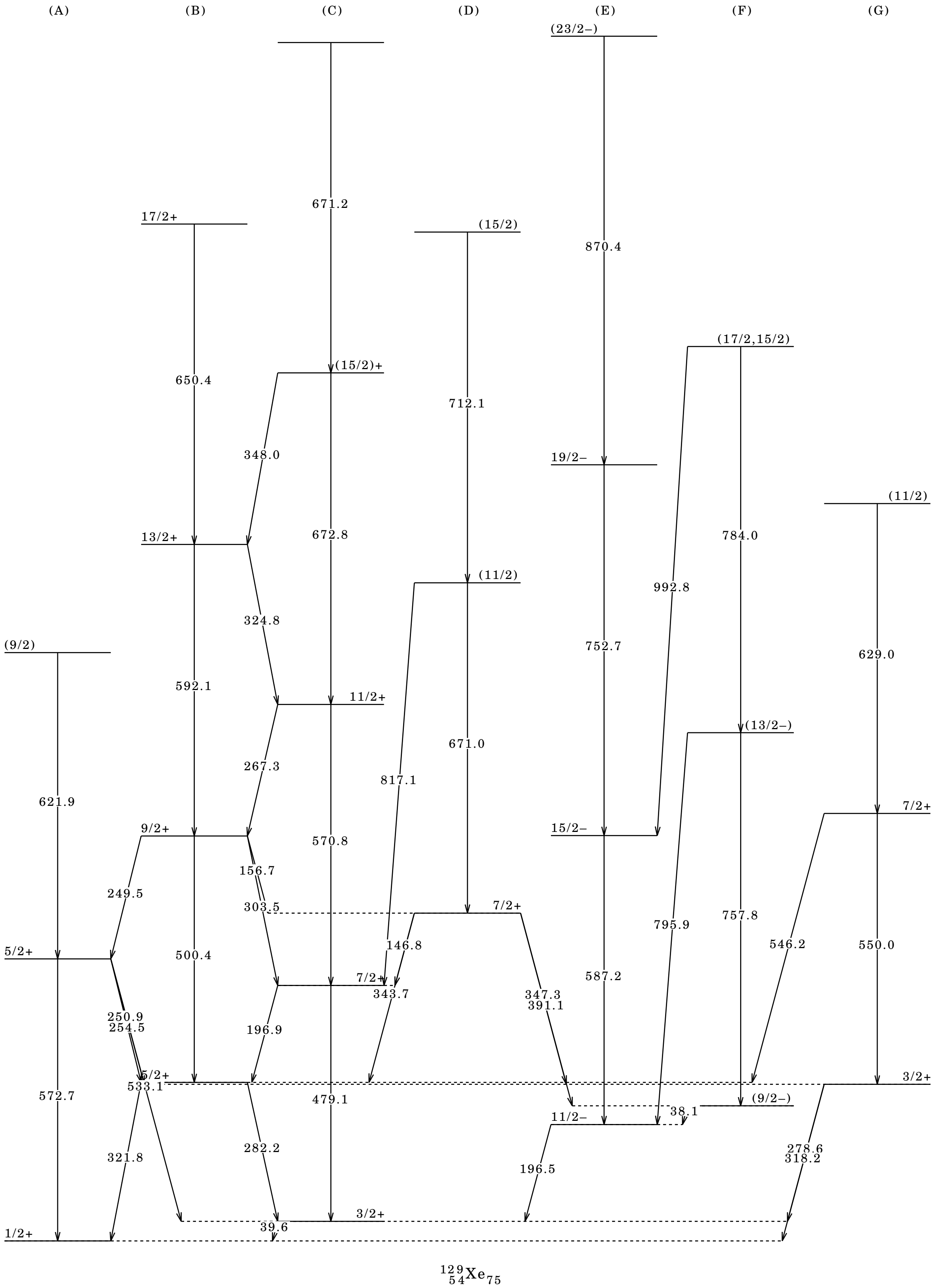


(E) ν$h_{11/2}$,α=−1/2. **(F) ν$h_{11/2}$,α=+1/2.** **(G) ν$d_{5/2}$.**



^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

Bands for ^{129}Xe

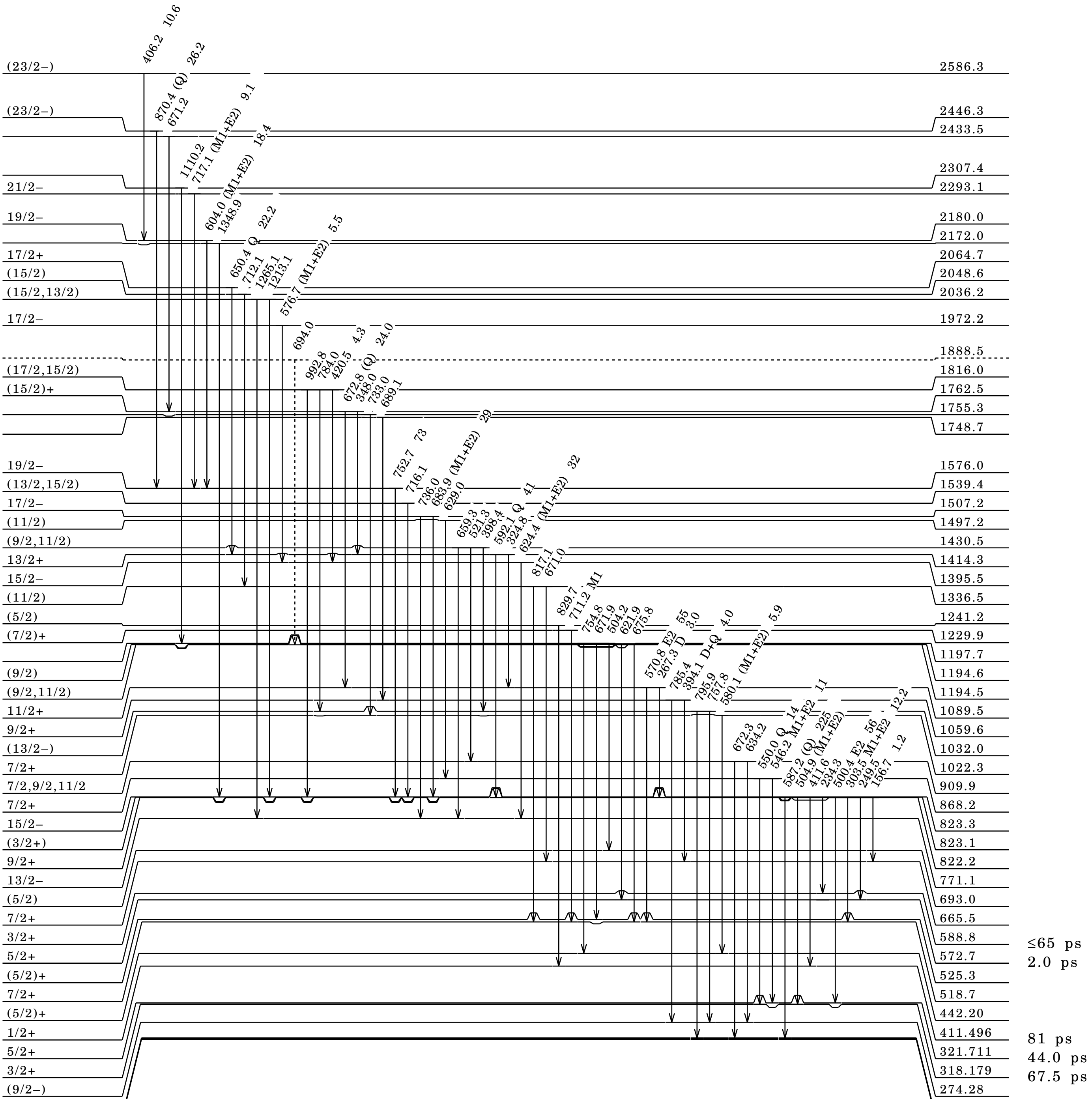


From NNDC(BNL)
program ENSDAT

^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

Level Scheme

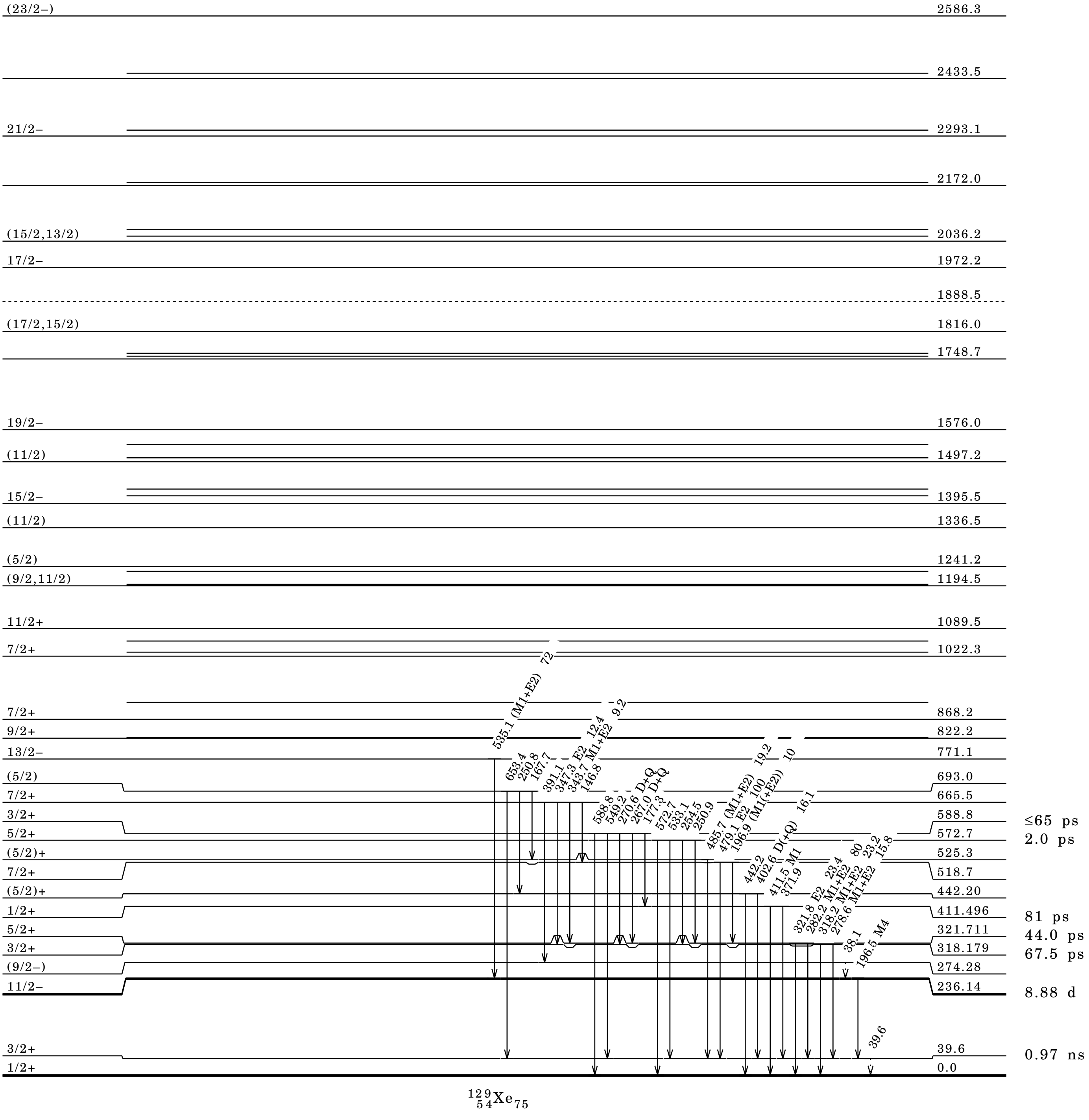
Intensities: relative Iγ



^{126}Te(α,nγ) 1988Zh10,1981He04 (continued)

Level Scheme (continued)

Intensities: relative Iγ



^{128}Xe(n,γ),(n,n): Resonances 2006MuZX

All data are from 2006MuZX evaluation.

^{129}Xe Levels

E(level)†	Jπ	Γ	L	Comments
S(n)−0.0297?	1/2+		0	E(level): fictitious level.
S(n)+0.10017 *10*	1/2+		0	$g\Gamma_n$=0.0063 eV *25*.
S(n)+0.23800 *24*	1/2+	0.39 eV *8*	0	$g\Gamma_n$=0.320 eV *20*.
S(n)+0.3415 *3*	1/2+		0	$g\Gamma_n$=0.038 eV *4*.
S(n)+0.3708 *4*	1/2+		0	$g\Gamma_n$=0.046 eV *10*.
S(n)+0.5174 *5*				
S(n)+0.5545 *6*	1/2+		0	$g\Gamma_n$=0.152 eV *17*.
S(n)+0.7160 *7*	1/2+		0	$g\Gamma_n$=3.60 eV *15*.
S(n)+1.3650 *14*	1/2+		0	$g\Gamma_n$=0.17 eV *3*.
S(n)+1.4084 *14*	1/2+		0	$g\Gamma_n$=0.17 eV *7*.
S(n)+1.6099 *16*	1/2+		0	$g\Gamma_n$=0.39 eV *8*.
S(n)+2.2076 *22*	1/2+		0	$g\Gamma_n$=0.34 eV *5*.
S(n)+2.756 *3*	1/2+		0	$g\Gamma_n$=0.99 eV *25*.
S(n)+2.771 *3*	1/2+		0	$g\Gamma_n$=1.00 eV *25*.
S(n)+3.441 *3*	1/2+		0	$g\Gamma_n$=2.4 eV *4*.

† S(n)(^{129}Xe)=6907.1 *11* (2012Wa38). Excitation energies are from 6906.97 to 6910.41 keV.

^{129}Xe(γ,γ') 2006Vo04

2006Vo04: bremsstrahlung radiation with endpoint energy of 4.1 MeV. Measured Eγ, Iγ, γ(θ) at 90°, 127° and 150° using three Ge detectors. One detector with an anti−Compton shield.

Jπ(^{129}Xe target)=1/2+ from Adopted Levels.

^{129}Xe Levels

g=(2J+1)/(2J$_0$+1), where J$_0$=1/2, J=1/2,3/2.

E(level)	Jπ†	$g\Gamma_0$	$I_{s,0}$‡	Comments
0.0	1/2+			
442.2 *3*				
693.0 *4*				
1239.0 *10*	1/2,3/2	0.82×10^{-3} eV *18*	2.0 *4*	B(M1)↑=0.111 *24*, B(E1)↑=1.2×10^{-5} *3*. $g\Gamma_0^{red}$=0.43×10^{-3} eV/MeV^3 *9*.
1570.0 *10*	1/2,3/2	3.4×10^{-3} eV *3*	5.4 *5*	B(M1)↑=0.230 *23*, B(E1)↑=2.6×10^{-5} *3*. $g\Gamma_0^{red}$=0.89×10^{-3} eV/MeV^3 *9*.
1884.0 *10*	1/2,3/2	1.3×10^{-3} eV *3*	1.4 *3*	B(M1)↑=0.052 *11*, B(E1)↑=0.57×10^{-5} *12*. $g\Gamma_0^{red}$=0.20×10^{-3} eV/MeV^3 *4*.
2186.0 *10*	1/2,3/2	1.1×10^{-3} eV *3*	0.8 *2*	B(M1)↑=0.026 *6*, B(E1)↑=0.29×10^{-5} *7*. $g\Gamma_0^{red}$=0.10×10^{-3} eV/MeV^3 *2*.
2289.0 *10*	1/2,3/2	1.9×10^{-3} eV *4*	1.4 *3*	B(M1)↑=0.040 *8*, B(E1)↑=0.44×10^{-5} *9*. $g\Gamma_0^{red}$=0.15×10^{-3} eV/MeV^3 *3*.
2343.0 *10*	1/2,3/2	5.8×10^{-3} eV *6*	4.1 *4*	B(M1)↑=0.117 *11*, B(E1)↑=1.30×10^{-5} *13*. $g\Gamma_0^{red}$=0.45×10^{-3} eV/MeV^3 *4*.
2355.0 *10*	1/2,3/2	9.2×10^{-3} eV *7*	6.4 *5*	B(M1)↑=0.183 *14*, B(E1)↑=2.03×10^{-5} *16*. $g\Gamma_0^{red}$=0.71×10^{-3} eV/MeV^3 *5*.
2383.0 *10*	1/2,3/2	2.2×10^{-3} eV *4*	1.5 *2*	B(M1)↑=0.042 *7*, B(E1)↑=0.46×10^{-5} *8*. $g\Gamma_0^{red}$=0.16×10^{-3} eV/MeV^3 *3*.
2394.0 *10*	1/2,3/2	7.4×10^{-3} eV *7*	4.9 *5*	B(M1)↑=0.139 *13*, B(E1)↑=1.54×10^{-5} *14*. $g\Gamma_0^{red}$=0.54×10^{-3} eV/MeV^3 *5*.
2425.1 *7*	1/2,3/2	6.3×10^{-3} eV *9*	2.0 *3*	B(M1)↑=0.115 *16*, B(E1)↑=1.268×10^{-5} *18*. $g\Gamma_0^{red}$=0.44×10^{-3} eV/MeV^3 *6*.
2499.0 *10*	1/2,3/2	4.0×10^{-3} eV *4*	2.5 *3*	B(M1)↑=0.067 *7*, B(E1)↑=0.74×10^{-5} *8*. $g\Gamma_0^{red}$=0.26×10^{-3} eV/MeV^3 *3*.
2554.0 *10*	1/2,3/2	2.2×10^{-3} eV *4*	1.3 *2*	B(M1)↑=0.035 *6*, B(E1)↑=0.38×10^{-5} *6*. $g\Gamma_0^{red}$=0.13×10^{-3} eV/MeV^3 *2*.
2592.0 *10*	1/2,3/2	5.3×10^{-3} eV *5*	3.0 *3*	B(M1)↑=0.078 *8*, B(E1)↑=0.86×10^{-5} *9*. $g\Gamma_0^{red}$=0.30×10^{-3} eV/MeV^3 *3*.

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^{129}Xe(γ,γ') 2006Vo04 (continued)

^{129}Xe Levels (continued)

E(level)	Jπ†	$g\Gamma_0$	$I_{s,0}$‡	Comments
2674.0 *10*	1/2,3/2	2.2×10^{-3} eV *4*	1.2 *2*	B(M1)↑=0.030 *5*, B(E1)↑=0.34×10^{-5} *5*. $g\Gamma_0^{red}$=0.12×10^{-3} eV/MeV^3 *2*.
2724.0 *10*	1/2,3/2	2.3×10^{-3} eV *4*	1.2 *2*	B(M1)↑=0.029 *6*, B(E1)↑=0.32×10^{-5} *6*. $g\Gamma_0^{red}$=0.11×10^{-3} eV/MeV^3 *2*.
2744.0 *7*	1/2,3/2	6.3×10^{-3} eV *11*	0.7 *2*	B(M1)↑=0.079 *14*, B(E1)↑=0.874×10^{-5} *16*. $g\Gamma_0^{red}$=0.30×10^{-3} eV/MeV^3 *5*.
2767.0 *10*	1/2,3/2	2.2×10^{-3} eV *5*	1.1 *3*	B(M1)↑=0.026 *6*, B(E1)↑=0.29×10^{-5} *7*. $g\Gamma_0^{red}$=0.10×10^{-3} eV/MeV^3 *2*.
2776.0 *10*	1/2,3/2	2.5×10^{-3} eV *4*	1.2 *2*	B(M1)↑=0.030 *5*, B(E1)↑=0.34×10^{-5} *6*. $g\Gamma_0^{red}$=0.12×10^{-3} eV/MeV^3 *2*.
2793.0 *10*	1/2,3/2	4.7×10^{-3} eV *5*	2.3 *3*	B(M1)↑=0.056 *6*, B(E1)↑=0.62×10^{-5} *7*. $g\Gamma_0^{red}$=0.21×10^{-3} eV/MeV^3 *2*.
2854.0 *10*	1/2,3/2	3.6×10^{-3} eV *5*	1.7 *2*	B(M1)↑=0.040 *5*, B(E1)↑=0.45×10^{-5} *6*. $g\Gamma_0^{red}$=0.16×10^{-3} eV/MeV^3 *2*.
2917.0 *10*	1/2,3/2	1.5×10^{-3} eV *4*	0.7 *2*	B(M1)↑=0.015 *4*, B(E1)↑=0.17×10^{-5} *4*. $g\Gamma_0^{red}$=0.06×10^{-3} eV/MeV^3 *2*.
2972.0 *10*	1/2,3/2	2.2×10^{-3} eV *5*	0.9 *2*	B(M1)↑=0.021 *4*, B(E1)↑=0.24×10^{-5} *5*. $g\Gamma_0^{red}$=0.08×10^{-3} eV/MeV^3 *2*.
3015.0 *10*	1/2,3/2	2.2×10^{-3} eV *4*	0.9 *2*	B(M1)↑=0.021 *4*, B(E1)↑=0.23×10^{-5} *5*. $g\Gamma_0^{red}$=0.08×10^{-3} eV/MeV^3 *2*.
3023.0 *10*	1/2,3/2	2.0×10^{-3} eV *5*	0.8 *2*	B(M1)↑=0.018 *5*, B(E1)↑=0.20×10^{-5} *5*. $g\Gamma_0^{red}$=0.07×10^{-3} eV/MeV^3 *2*.
3215.0 *10*	1/2,3/2	4.6×10^{-3} eV *9*	1.7 *3*	B(M1)↑=0.036 *7*, B(E1)↑=0.40×10^{-5} *7*. $g\Gamma_0^{red}$=0.14×10^{-3} eV/MeV^3 *3*.
3783.1 *10*	1/2,3/2	4.5×10^{-3} eV *13*	1.2 *4*	B(M1)↑=0.021 *6*, B(E1)↑=0.24×10^{-5} *7*. $g\Gamma_0^{red}$=0.08×10^{-3} eV/MeV^3 *2*.
3805.1 *10*	1/2,3/2	4.6×10^{-3} eV *13*	1.2 *3*	B(M1)↑=0.021 *6*, B(E1)↑=0.24×10^{-5} *7*. $g\Gamma_0^{red}$=0.08×10^{-3} eV/MeV^3 *2*.
3829.1 *10*	1/2,3/2	4.5×10^{-3} eV *14*	1.2 *4*	B(M1)↑=0.021 *7*, B(E1)↑=0.23×10^{-5} *7*. $g\Gamma_0^{red}$=0.08×10^{-3} eV/MeV^3 *3*.

† 1/2,3/2 from dipole excitation in 1/2+ target.

‡ Integrated cross section in eV.b units.

γ(^{129}Xe)

E(level)	Eγ†	Iγ	Comments
442.2	442.2‡ *3*		
693.0	250.8‡ *3*		
1239.0	1239		
1570.0	1570		
1884.0	1884		
2186.0	2186		
2289.0	2289		
2343.0	2343		
2355.0	2355		
2383.0	2383		
2394.0	2394		
2425.1	1983	108 *30*	Iγ: Deduced by the evaluators from R(expt) value listed by 2006Vo04.
	2425	100	
2499.0	2499		
2554.0	2554		
2592.0	2592		
2674.0	2674		
2724.0	2724		
2744.0	2051	380 *120*	Iγ: Deduced by the evaluators from R(expt) value listed by 2006Vo04.
	2744	100	
2767.0	2767		
2776.0	2776		
2793.0	2793		
2854.0	2854		

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^{129}Xe(γ,γ′) 2006Vo04 (continued)

γ(^{129}Xe) (continued)

E(level)	Eγ[†]
2917.0	2917
2972.0	2972
3015.0	3015
3023.0	3023
3215.0	3215
3783.1	3783
3805.1	3805
3829.1	3829

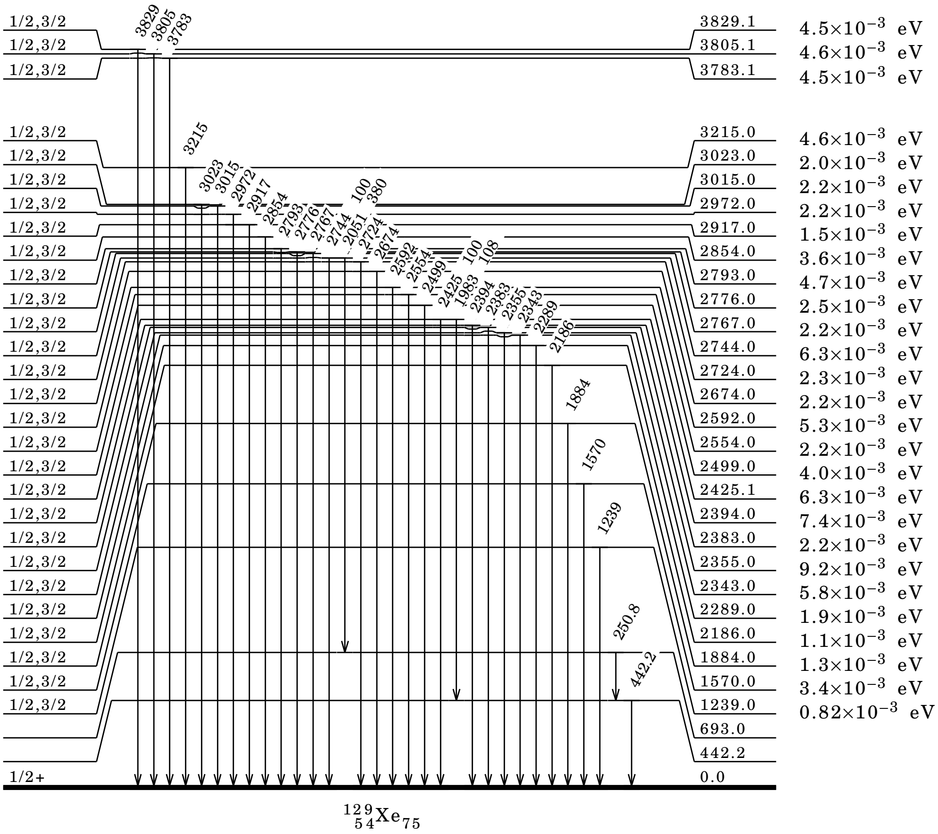
[†] No uncertainty on the gamma ray energies given in 2006Vo04, 1 keV is assumed by evaluators.

[‡] From Adopted Gammas.

^{129}Xe(γ,γ') 2006Vo04 (continued)

Level Scheme

Intensities: relative photon branching from each level



Coulomb Excitation 1978Pa09,1990Na18

1978Pa09: ^{129}Xe(α,α') E=8,10 MeV, ^{129}Xe(^{16}O,^{16}O') E=42 MeV, Ge γ, γγ–coin, B(E2).
1990Na18: Ni(^{129}Xe,^{129}Xe') E=440 MeV, Ge, γ(θ), t, B(λ), recoil–distance.
B(E2) values are those from 1978Pa09.

^{129}Xe Levels

E(level)	Jπ‡	$T_{1/2}$†	Comments
0.0	1/2+	stable	
39.6 *2*	3/2+		
318.2 *1*	3/2+	67.5 ps *20*	B(E2)↑=0.23 *2*.
321.7 *1*	(5/2+)	44.0 ps *19*	B(E2)↑=0.23 *2*.
411.5 *1*	1/2+		
518.7 *2*	7/2+		
572.6 *2*	5/2+	2.0 ps *2*	B(E2)↑=0.17 *1*.
588.7 *2*	3/2+		B(E2)↑=0.0062 *4*.
665.0 *2*	(7/2)+		
822.1 *2*	(9/2)+		
823.00 *17*	(5/2+)		E(level),Jπ: level and placement of 504γ based on Adopted dataset.
867.9 *3*	(7/2)+		

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Coulomb Excitation 1978Pa09,1990Na18 (continued)

^{129}Xe Levels (continued)

E(level)	Jπ‡	Comments
904.2 *2*	3/2+	B(E2)↑=0.0042 *3*. B(E2) is based on the data of 1978Pa09 who do not report the two strongest γ rays from this level, 586 and 865 keV reported by 1979Ir01.
946.0 *2*	1/2+,3/2+	B(E2)↑=0.0010 *3*.
985.7 *3*		
995.7 *3*	(1/2,3/2)	Jπ: γ to 1/2+ only.
1058.9 *3*		
1089.3 *3*	(11/2)+	
1229.9 *4*		
1414.4 *4*	(13/2)+	
1761.8 *4*	(15/2)+	

† From recoil–distance method (1990Na18).

‡ From Adopted Levels unless otherwise noted.

γ(^{129}Xe)

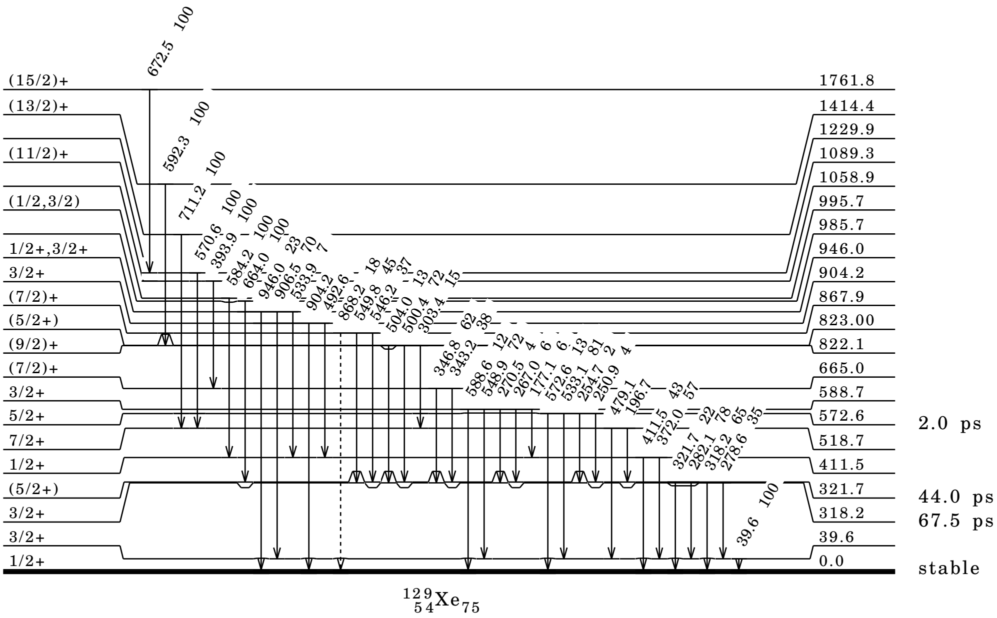
E(level)	Eγ	Iγ	Comments
39.6	39.6 *2*	100	
318.2	278.6 *1*	35 *1*	
	318.2 *1*	65 *1*	
321.7	282.1 *1*	78 *1*	
	321.7 *1*	22 *1*	
411.5	372.0 *1*	57 *2*	
	411.5 *1*	43 *2*	
518.7	196.7 *5*		
	479.1 *1*		
572.6	250.9 *2*	4 *1*	
	254.7 *2*	2 *1*	
	533.1 *2*	81 *2*	
	572.6 *2*	13 *1*	
588.7	177.1 *2*	6 *1*	
	267.0 *2*	6 *1*	
	270.5 *2*	4 *1*	
	548.9 *2*	72 *2*	
	588.6 *3*	12 *2*	
665.0	343.2 *2*	38 *12*	
	346.8 *2*	62 *2*	
822.1	303.4 *1*	15 *2*	
	500.4 *1*	72 *1*	
823.00	504.0 *3*	13 *1*	
867.9	546.2 *3*	37 *17*	
	549.8 *3*	45 *18*	
	868.2† *4*	18 *14*	Eγ: transition to 1/2+ g.s. requiring M3 is unlikely; evaluators consider the placement of this γ suspect since not confirmed in in (α,nγ) study. It is not listed in Adopted dataset.
904.2	492.6 *2*		
	904.2 *3*		
946.0	533.9 *5*	7 *4*	
	906.5 *4*	70 *13*	
	946.0 *2*	23 *8*	
985.7	664.0 *3*	100	
995.7	584.2 *3*	100	
1058.9	393.9 *2*	100	
1089.3	570.6 *2*	100	
1229.9	711.2 *3*	100	
1414.4	592.3 *3*	100	
1761.8	672.5 *3*	100	

† Placement of transition in the level scheme is uncertain.

Coulomb Excitation 1978Pa09,1990Na18 (continued)

Level Scheme

Intensities: % photon branching from each level



Adopted Levels, Gammas

Q(β$^-$)=–2436 *11*; S(n)=9639 *7*; S(p)=4928 *5*; Q(α)=–1087 *5* 2012Wa38.

S(2n)=17402 *7*, S(2p)=13093 *6* (2012Wa38).

1950Fi16: ^{129}Cs produced and identified in bombardment of ^{127}I by ^{3}He beam followed by chemical separation and half–life measurement.

Later decay studies: 1955Ni21, 1960Jh02, 1963Fr13, 1965Sh08, 1966Re10, 1967Gr05, 1967Wa11, 1971Ob03, 1972Ge20, 1974Ma24, 1976Me16, 1979Be54.

Precise mass measurement by Penning trap method: 1999Am04, 1990St25.

1969Ma04: measured isotope shift, atomic beam magnetic resonance.

^{129}Cs Levels

Cross Reference (XREF) Flags

A	^{129}Ba ε Decay (2.23 h)	D	^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ)
B	^{129}Ba ε Decay (2.135 h)	E	^{116}Cd(^{18}O,4npγ)
C	^{129}Cs IT Decay (0.718 μs)	F	^{127}I(α,2nγ)

E(level)†	Jπ‡	XREF	T$_{1/2}$§	Comments
0.0	1/2+	ABCDEF	32.06 h *6*	%ε+%β$^+$=100. μ=+1.491 *8* (1981Th06,2014StZZ). μ: atomic–beam laser spectroscopy (1981Th06). Evaluated rms charge radius=4.7981 fm *50* (2013An02). Jπ: spin from atomic beam (1956Ni16,1958Ni27) and hyperfine structure (1981Th06); parity from log *ft*=5.57 from 1/2+ parent. Charge radius and isotope–shift measurements: 1981Th06, 1978Hu08, 1969Am04. T$_{1/2}$: from 1965Sh08. Others: 33.3 h 6 (1971Ob03), 32.35 h 10 (1967Wa11), 32.4 h 3 (1963Fr13), 30.7 h 5 (1955Ni21), 31 h 1 (1950Fi16).
6.5450[c] *10*	5/2+	ABCDEF	72 ns *6*	Jπ: E2 γ to 1/2+; 3/2+ is not likely since in that case transition is expected to be dominantly M1; bandhead. T$_{1/2}$: from (ce+x ray)γ(t) in ^{129}Ba ε decay.
135.59 *7*	3/2+	ABC		Jπ: M1+E2 γ to 5/2+; M1(+E2) γ to 1/2+; log *ft*=6.39 from 1/2+.
188.91[b] *6*	7/2+	BCDEF	2.26 ns *6*	T$_{1/2}$: from γce(t) in ^{129}Ba ε decay. Jπ: E2 γ to 3/2+; ΔJ=1, M1+E2 γ to 5/2+; band member.
208.81[a] *6*	(5/2)+	ABCDEF		XREF: C(?). Jπ: ΔJ=(0), M1(+E2) γ to 5/2+.
220.78 *6*	3/2+	ABC		XREF: C(?). Jπ: M1(+E2) gammas to 5/2+ and 1/2+; log *ft*=6.1 from 1/2+.
426.47[c] *8*	(9/2)+	BCDEF		Jπ: ΔJ=1, M1 γ to 7/2+; (E2) γ to 5/2+; band member.
551.59 *15*	(5/2+)	B		Jπ: gammas to 1/2+ and 3/2+; possible ε feeding from 7/2+.
554.05 *13*	(1/2,3/2)+	A		Jπ: log *ft*=6.59 from 1/2+; M1,E2 γ to 3/2+.
555.10 *9*	(5/2,7/2)+	B		Jπ: M1,E2 γ to 7/2+ and 3/2+; possible ε feeding from 7/2+.
575.40[d] *14*	(11/2–)	BCDEF	0.718 μs *21*	%IT=100. μ=+6.55 *10* (1978De29,2014StZZ). Jπ: ΔJ=1 (E1) γ to (9/2)+; (M2) γ to 7/2+; systematics of h$_{11/2}$ isomers in this mass region and band member. μ: TDPAD method (1978De29). T$_{1/2}$: from γγ(t) in ^{127}I(α,2nγ); weighted average of 0.734 μs *23* (1978De29), and 0.69 μs *3* (1977Ch23). Other: 0.73 μs *7* (1979Ga01, same group as 1978De29).
603.36[&] *6*	(7/2+)	B DE		Jπ: (M1) γ to (9/2)+; γ to 3/2+.
648.41[b] *8*	(11/2+)	B DEF		Jπ: ΔJ=2, (E2) γ to 7/2+; band member.
690.32[a] *8*	(9/2+)	B DEF		Jπ: ΔJ=2, (E2) γ to (5/2)+; ΔJ=1, (M1) γ to 7/2+.
755.26 *7*	(5/2,7/2)+	B		Jπ: M1,E2 γ to (9/2)+; (M1) γ to 3/2+.
879.31 *10*	(5/2+,7/2+)	B		Jπ: (M1,E2) γ to 5/2+; γ from (9/2)+; γ to 3/2+.
969.23 *7*	(5/2+,7/2+)	B		Jπ: (M1,E2) γ to (9/2)+; γ to 3/2+.
991.97 *9*	(7/2+,9/2+,11/2+)	B		Jπ: (M1,E2) γ to 7/2+; γ to (11/2+).
1023.3[d] *4*	(15/2–)	DEF		Jπ: ΔJ=2, E2 γ to (11/2–) in band.
1032.9[c] *4*	(13/2+)	DEF		Jπ: ΔJ=2 γ to 9/2+; ΔJ=1,(M1+E2) γ to (11/2+).
1150.4[e] *6*	(13/2–)	DEF		Jπ: ΔJ=1 γ to (11/2–); band member.
1156.23 *12*	(5/2+,7/2+)	B		Jπ: γ to 3/2+; weak γ to (9/2)+.
1164.68 *17*	(1/2,3/2)+	A		Jπ: log *ft*=6.65 from 1/2+; (M1,E2) γ to 1/2+.

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Adopted Levels, Gammas (continued)

^{129}Cs Levels (continued)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$[§]	Comments
1231.7[&] *5*	(11/2+)	DE		Jπ: gammas to 9/2+ and 7/2+; band member.
1255.68 *7*	(5/2+,7/2+)	B		Jπ: (M1,E2) γ to 3/2+; γ to (9/2)+.
1279.3[b] *3*	(15/2+)	DEF	0.53 ps *+12−11*	Jπ: ΔJ=2, E2 γ to (11/2+); band member. Q(transition)=6.0 *+8−6*.
1339.8[a] *4*	(13/2+)	DEF		Jπ: ΔJ=2 γ to 9/2+; ΔJ=1 γ to (11/2+).
1609.64 *22*	(1/2,3/2)	A		Jπ: log *ft*=6.95 from 1/2+; γ to 3/2+.
1627.6[d] *5*	(19/2−)	DEF	1.64 ps *+53−35*	Q(transition)=3.6 *+5−4*. Jπ: ΔJ=2, E2 γ to (15/2−); band member.
1648.01 *6*	(9/2)+	B		Jπ: (M1) γ to (5/2,7/2)+; gammas to 5/2+, (11/2−) and (11/2+); ε feeding from 7/2+ is most likely allowed.
1648.56 *22*	(1/2+,3/2)	A		Jπ: log *ft*=7.6 from 1/2+; gammas to 3/2+ and (5/2)+.
1681.60 *9*	(5/2+,7/2+,9/2+)	B		Jπ: gammas to 5/2+ and 9/2+; (M1) γ to (5/2+,7/2+).
1691.6[e] *5*	(17/2−)	DEF		Jπ: ΔJ=1 γ to (15/2−); band member.
1694.18 *23*	(1/2,3/2)	A		Jπ: log *ft*=7.58 from 1/2+; γ to 3/2+.
1700.93 *22*	(1/2+,3/2)	A		Jπ: log *ft*=7.0 from 1/2+; gammas to 1/2+ and 5/2+.
1718.0[g] *5*	(15/2−)	D		Jπ: γ to (11/2−); band member.
1793.0[c] *4*	(17/2+)	DEF		Jπ: ΔJ=2 γ to (13/2+); γ to (15/2+).
1812.56 *8*	(9/2)+	B		Jπ: gammas to 5/2+, (11/2−) and (11/2+); ε feeding from 7/2+ is most likely allowed.
1830.49 *16*	(1/2,3/2)	A		Jπ: log *ft*=5.99 from 1/2+; γ to 1/2+.
1890.8[&] *5*	15/2+	DE		Jπ: ΔJ=2, E2 γ to 11/2+; band member.
1922.83 *16*	(1/2+,3/2)	A		Jπ: log *ft*=6.7 from 1/2+; γ to 1/2+ and 5/2+.
1941.02 *14*	(7/2+,9/2,11/2+)	B		Jπ: gammas to 7/2+ and (11/2+).
1954.03 *14*	(1/2+,3/2+)	A		Jπ: log *ft*=5.8 from 1/2+; gammas to 1/2+ and 5/2+.
2019.12 *19*	(9/2,11/2+)	B		Jπ: gammas to 7/2+, (11/2−) and (11/2+).
2047.4[b] *4*	(19/2+)	DEF	0.30 ps *+12−8*	Q(transition)=4.7 *+8−7*. Jπ: ΔJ=2, E2 γ to (15/2+); band member.
2077.66 *22*	(1/2+,3/2)	A		Jπ: gammas to 3/2+ and 5/2+; log *ft*=8.23 from 1/2+.
2123.2[a] *4*	(17/2+)	DEF		Jπ: ΔJ=2 γ to (13/2+); band member.
2214.4[g] *6*	(19/2−)	D F		Jπ: ΔJ=2 γ to (15/2−); ΔJ=1 γ to (17/2−).
2254.8? *3*		A		Jπ: γ to 3/2+ suggests 1/2 to 7/2+; possible ε feeding from 1/2+ gives 1/2,3/2.
2319.5[e] *5*	(21/2−)	DEF		Jπ: ΔJ=2 γ to (17/2−); ΔJ=1 γ to (19/2−).
2396.0[d] *6*	(23/2−)	DE	0.49 ps *+15−14*	Q(transition)=3.6 *+7−5*. Jπ: ΔJ=2, E2 γ to (19/2−); band member.
2500.6 *6*	(19/2+)	D		Jπ: ΔJ=2 γ to (15/2+).
2633.1[c] *5*	(21/2+)	DE	0.15 ps *+4−6*	Q(transition)=5.2 *+13−6*. Jπ: ΔJ=2, E2 γ to (17/2+); γ to (19/2+).
2667.1[&] *5*	(19/2+)	DE		Jπ: ΔJ=2 gammas to (15/2+); γ to (19/2+).
2676.5[#] *4*	(19/2+)	DE		Jπ: ΔJ=2 γ to (15/2+); γ to (19/2+).
2812.7[@] *5*	(21/2+)	DE		Jπ: ΔJ=2 γ to (17/2+); ΔJ=1, (M1+E2) γ to (19/2+).
2842.1[g] *6*	(23/2−)	D		Jπ: ΔJ=2 γ to (19/2−); γ to (21/2−).
2908.3[b] *5*	(23/2+)	DE	0.15 ps *+10−7*	Q(transition)=5.0 *+14−13*. Jπ: ΔJ=2, E2 γ to (19/2+).
2942.5[h] *6*	(21/2+)	D		Jπ: ΔJ=1 γ to (19/2+); band member.
2952.6[a] *6*	(21/2+)	DE		Jπ: ΔJ=2 γ to (17/2+); γ to (19/2+).
2981.2 *7*	(19/2+,21/2+)	D		Jπ: γ to (17/2+); γ from (23/2+).
3042.8[#] *6*	(23/2+)	DE		Jπ: ΔJ=1,(M1+E2) γ to (21/2+); γ to (19/2+).
3095.9[e] *6*	(25/2−)	DE		Jπ: ΔJ=2 γ to (21/2−); ΔJ=1 γ to(23/2−).
3157.3[h] *6*	(23/2+)	D		Jπ: ΔJ=2 γ to (19/2+); ΔJ=1,(M1+E2) γ to (21/2+).
3235.9[d] *6*	(27/2−)	DE	0.33 ps *10*	Q(transition)=3.5 *+7−5*. Jπ: ΔJ=2, E2 γ to (23/2+); band member.
3291.4 *9*	(25/2+)	D		Jπ: ΔJ=2 γ to (21/2+).
3296.8?[c] *9*	25/2+	DE	<0.18 ps	Q(transition)>8.6. Jπ: ΔJ=2, E2 γ to (21/2+); band member.
3406.4[@] *6*	(25/2+)	DE		Jπ: ΔJ=1,(M1+E2) γ to (23/2+); γ to (21/2+).
3419.0[h] *6*	25/2+	D		Jπ: ΔJ=1,(M1+E2) γ to (23/2+); band member.
3518.2[f] *7*	(25/2−)	D		Jπ: ΔJ=1 γ to (23/2−); γ to (25/2−).
3590.7[g] *6*	(27/2−)	D		Jπ: gammas to (23/2−) and (27/2−); band member.
3682.1[h] *6*	(27/2+)	D		Jπ: gammas to (23/2+) and (25/2+); band member.
3685.3[f] *7*	(27/2−)	D		Jπ: ΔJ=2 γ to (23/2−); ΔJ=1,(M1+E2) γ to (25/2−).
3730.0[b] *7*	(27/2+)	DE	<0.11 ps	Q(transition)>6.4. Jπ: ΔJ=2, E2 γ to (23/2+); band member.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Cs Levels (continued)

E(level)[†]	Jπ[‡]	XREF	T$_{1/2}$[§]	Comments
3733.3 *9*	(23/2 to 27/2+)	D		Jπ: γ to (23/2+).
3734.2[#] *6*	(27/2+)	DE		Jπ: ΔJ=1,(M1+E2) γ to (25/2+); γ to (23/2+); band member.
3810.3[a] *7*	(25/2+)	D		Jπ: ΔJ=2 γ to (21/2+); γ to (2/2+).
3919.9 *9*	(25/2)	D		Jπ: ΔJ=1 γ to (23/2+).
3924.5[e] *7*	(29/2−)	DE		Jπ: ΔJ=2 γ to (25/2−); ΔJ=1 γ to (27/2−).
3949.4[c] *11*	(29/2+)	DE		Jπ: ΔJ=2 γ to (25/2+); band member.
3993.6[h] *8*	(29/2+)	D		Jπ: gammas to (25/2+) and (27/2+).
4026.9[f] *9*	(29/2−)	D		Jπ: ΔJ=1,(M1+E2) γ to (27/2−); band member.
4114.7[d] *7*	(31/2−)	DE	0.139 ps *+49−20*	Q(transition)=4.7 *+6−7*. Jπ: ΔJ=2, E2 γ to (27/2−); band member.
4130.0[@] *7*	(29/2+)	DE		Jπ: ΔJ=1,(M1+E2) γ to (27/2+); γ to (25/2+).
4199.4 *10*	(29/2)	D		Jπ: ΔJ=1 γ to (27/2+).
4366.9[h] *8*	(31/2+)	D		Jπ: ΔJ=2 to (27/2+); γ to (29/2+).
4420.6[f] *8*	(31/2−)	D		Jπ: ΔJ=1,(M1+E2) γ to (29/2−); γ to (31/2−).
4437.1[b] *10*	(31/2+)	DE		Jπ: ΔJ=2 γ to (27/2+).
4445.3[g] *7*	(31/2−)	D		Jπ: γ to (27/2−); band member.
4599.0[#] *7*	(31/2+)	D		Jπ: ΔJ=1 γ to (29/2+); γ to (27/2+).
4764.4[e] *8*	(33/2−)	D		Jπ: ΔJ=1 γ to (31/2−).
4900.0[f] *11*	(33/2−)	D		Jπ: ΔJ=1 γ to (31/2−).
5024.4 *8*	(33/2+)	D		Jπ: gammas to (29/2+) and (31/2+).
5032.6[d] *8*	(35/2−)	DE	<0.40 ps	Q(transition)>2.5. Jπ: ΔJ=2, E2 γ to (31/2−) in band.
5067.2[@] *8*	(33/2+)	D		Jπ: gammas to (29/2+) and (31/2+); band member.
5212.5[h] *11*	(35/2+)	D		Jπ: γ to (31/2+); band member.
5282.4[b] *12*	(35/2+)	D		Jπ: ΔJ=2 γ to (31/2+); band member.
5402.1[f] *13*	(35/2−)	D		Jπ: ΔJ=1 γ to (33/2−); band member.
5547.2[#] *9*	(35/2+)	D		Jπ: gammas to (31/2+) and (33/2+); band member.
5566.7[a] *8*	(35/2+)	D		Jπ: gammas to (31/2+) and (33/2+); band member.
5692.3[e] *9*	(37/2−)	D		Jπ: gammas to (33/2−) and (35/2−); band member.
5989.6[d] *9*	(39/2−)	DE		Jπ: ΔJ=2 γ to (35/2−); band member.
6050.7 *10*	(35/2 to 39/2+)	D		Jπ: γ to (35/2+).
6200.4[h] *13*	(39/2+)	D		Jπ: γ to (35/2+); band member.
6271.4[b] *13*	(39/2+)	D		Jπ: γ to (35/2+); band member.
7000.8[d] *12*	(43/2−)	DE		Jπ: ΔJ=2 γ to (39/2−); band member.
7380.4[b] *14*	(43/2+)	D		Jπ: γ to (39/2+); band member.
8099.5[d] *14*	(47/2−)	D		Jπ: γ to (43/2−); band member.

[†] From least-squares fit to the adopted Eγ values, assuming 0.5 keV uncertainty when not given. Reduced χ^2=1.5 somewhat greater than critical χ^2=1.3.

[‡] From in-beam γ-ray studies, unless otherwise noted, based on M1+E2 and stretched quadrupole cascade–crossover relations observed. Band structures are based on the cranked-shell model calculation and systematics of neighboring nuclei. Most band assignments have been proposed by 2009Si08 and 2009Zh20 in ^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ). For levels populated in high-spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

[§] From DSAM (2010Wa01) in (^{11}B,xnγ), unless otherwise noted.

[#] (A): Possible 3-qp band,α=−1/2. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.

[@] (B): Possible 3-qp band,α=+1/2. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.

[&] (C): $\pi g_{7/2}$+γ vibration.

[a] (D): $\pi g_{7/2}$,α=+1/2. Favored signature partner, band crossing due to $h_{11/2}$ proton pair at $\hbar\omega$=0.41 MeV.

[b] (E): $\pi g_{7/2}$,α=−1/2. Unfavored signature partner, band crossing due to $h_{11/2}$ proton pair at $\hbar\omega$=0.37 MeV.

[c] (F): $\pi d_{5/2}$,α=+1/2. Favored signature partner, band crossing due to $h_{11/2}$ proton pair at $\hbar\omega$=0.37 MeV.

[d] (G): $\pi h_{11/2}$,α=−1/2. Favored signature partner, band crossing due to $h_{11/2}$ neutron pair at $\hbar\omega$=0.43 MeV.

[e] (H): $\pi h_{11/2}$,α=+1/2. Unfavored signature partner, band crossing due to $h_{11/2}$ neutron pair at $\hbar\omega$=0.41 MeV.

[f] (I): Possible magnetic-rotational band. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}{}^2$.

[g] (J): $\pi h_{11/2}$+γ vibration. The γ vibration refers to that of a triaxial core.

[h] (K): Possible 3-qp, ΔJ=1 band. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.

γ(^{129}Cs)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	δ[‡]	α[§]	Comments
6.5450	6.545 *1*	100	E2		432000	B(E2)(W.u.)=39 *4*. Mult.: from L subshell ratio.

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Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	δ[‡]	α[§]	Comments
135.59	129.14 *10*	100 *5*	M1+E2	0.20 *5*	0.449 *10*	α(K)=0.381 *7*; α(L)=0.054 *3*; α(M)=0.0112 *6*. α(N)=0.00236 *12*; α(O)=0.000322 *13*; α(P)=1.477×10^{-5} *21*. Mult.: from α(exp) ratio.
	135.61 *20*	13.9 *14*	M1(+E2)	<0.4	0.399 *19*	α(K)=0.336 *11*; α(L)=0.050 *7*; α(M)=0.0103 *15*. α(N)=0.0022 *3*; α(O)=0.00029 *4*; α(P)=1.290×10^{-5} *20*.
188.91	53.2 *3*	0.23 *2*	E2		18.6 *5*	B(E2)(W.u.)=29 *3*. α(K)=6.53 *12*; α(L)=9.5 *3*; α(M)=2.08 *7*. α(N)=0.419 *13*; α(O)=0.0474 *15*; α(P)=0.000174 *4*.
	182.3 *1*	100 *5*	M1+E2	0.25 *2*	0.1718 *25*	α(K)=0.1463 *21*; α(L)=0.0203 *4*; α(M)=0.00418 *8*. α(N)=0.000880 *16*; α(O)=0.0001210 *20*; α(P)=5.65×10^{-6} *8*. Mult.: from α(exp) and γ(θ). B(M1)(W.u.)=0.00124 *4*; B(E2)(W.u.)=1.55 *24*.
208.81	73.2 *3*	1.8 *2*	M1(+E2)	<0.3	2.35 *16*	α(K)=1.93 *6*; α(L)=0.33 *8*; α(M)=0.069 *17*. α(N)=0.014 *4*; α(O)=0.0019 *4*; α(P)=7.45×10^{-5} *14*.
	202.38 *10*	100 *5*	M1(+E2)	0.2 *2*	0.128 *4*	α(K)=0.1094 *23*; α(L)=0.0148 *14*; α(M)=0.0030 *3*. α(N)=0.00064 *6*; α(O)=8.8×10^{-5} *7*; α(P)=4.25×10^{-6} *7*. Mult.: from α(exp) and γ(θ).
220.78	85.1 *3*	1.7 *3*	[M1,E2]		2.4 *10*	α(K)=1.6 *4*; α(L)=0.6 *5*; α(M)=0.13 *10*. α(N)=0.027 *20*; α(O)=0.0032 *23*; α(P)=5.1×10^{-5} *3*. Iγ: From ε decay of 2.135–h activity. Other: 0.40 *4* in 2.23–h activity.
	214.30 *10*	100 *5*	M1(+E2)	0.5 *5*	0.113 *8*	α(K)=0.095 *4*; α(L)=0.014 *3*; α(M)=0.0029 *7*. α(N)=0.00061 *13*; α(O)=8.3×10^{-5} *14*; α(P)=3.59×10^{-6} *11*.
	220.83 *10*	65 *3*	M1(+E2)	<0.9	0.104 *5*	α(K)=0.0879 *23*; α(L)=0.0131 *19*; α(M)=0.0027 *4*. α(N)=0.00057 *8*; α(O)=7.7×10^{-5} *9*; α(P)=3.30×10^{-6} *9*.
426.47	238.0 *2*	12.9 *13*	M1		0.0819	α(K)=0.0704 *10*; α(L)=0.00919 *13*; α(M)=0.00188 *3*. α(N)=0.000398 *6*; α(O)=5.54×10^{-5} *8*; α(P)=2.75×10^{-6} *4*. Iγ: from 1991Hi12 in in–beam γ–ray work. Others: 5.3 *6* (2009Si08), 28 (1977Ch23) in in–beam γ–ray work seems discrepant. Values from the ε decay cannot be used since 420γ is doubly placed.
	420.0[#] *2*	100[#] *6*	(E2)		0.01548	α(K)=0.01295 *19*; α(L)=0.00201 *3*; α(M)=0.000417 *6*. α(N)=8.70×10^{-5} *13*; α(O)=1.157×10^{-5} *17*; α(P)=4.58×10^{-7} *7*.
551.59	416.1 *2*	61 *7*				
	551.5 *2*	100 *11*				
554.05	333.9 *3*	15.0 *14*	M1,E2		0.0323 *14*	α(K)=0.0273 *18*; α(L)=0.0040 *3*; α(M)=0.00083 *7*. α(N)=0.000174 *13*; α(O)=2.35×10^{-5} *10*; α(P)=1.00×10^{-6} *13*.

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Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[§]	Comments
554.05	554.0 2	100 10	(M1,E2)	0.0083 12	α(K)=0.0071 11; α(L)=0.00095 9; α(M)=0.000194 16. α(N)=4.1×10^{-5} 4; α(O)=5.6×10^{-6} 6; α(P)=2.7×10^{-7} 5.
555.10	334.0 3	23.0 24	M1,E2	0.0323 14	α(K)=0.0273 18; α(L)=0.0040 3; α(M)=0.00083 7. α(N)=0.000174 13; α(O)=2.35×10^{-5} 10; α(P)=1.00×10^{-6} 13.
	345.3 3	4.8 5			Eγ: poor fit, level-energy difference=346.3.
	366.1[@] 2	47 5	M1,E2	0.0250 17	α(K)=0.0211 18; α(L)=0.00305 12; α(M)=0.00063 3. α(N)=0.000132 5; α(O)=1.79×10^{-5} 3; α(P)=7.8×10^{-7} 11.
	420.0[#] 2	91[#] 10			
	549.0 2	100 11			
575.40	149.1 3	100 10	(E1)	0.0722	Iγ: branching ratios are from in-beam γ-ray data where this level is populated more intensely than in ε decay. Values from ε decay are in general agreement. α(K)=0.0620 10; α(L)=0.00810 13; α(M)=0.001647 25. α(N)=0.000344 6; α(O)=4.65×10^{-5} 7; α(P)=2.03×10^{-6} 3. B(E1)(W.u.)=5.8×10^{-8} 5.
	354.8[&]		[M4]	1.369	Eγ: γ reported only by 1983TaZI in ε decay with an upper limit of intensity. It is neither seen in any other decay study (1972Ta02, 1973Is04) nor in in-beam γ-ray data; thus it is considered as questionable by the evaluators. α(K)=1.045 15; α(L)=0.255 4; α(M)=0.0558 8. α(N)=0.01173 17; α(O)=0.001542 22; α(P)=5.80×10^{-5} 9.
	366.1[@][&] 2		[E3]	0.0787	Eγ: γ not reported in in-beam γ-ray data; B(E3)(W.u.)=400 50 is a factor of 4 larger than RUL, thus this transition is considered suspect. α(K)=0.0592 9; α(L)=0.01542 22; α(M)=0.00331 5. α(N)=0.000681 10; α(O)=8.49×10^{-5} 12; α(P)=2.09×10^{-6} 3.
	386.6 3	67 7	(M2)	0.0863	Iγ: 82 9 in ε decay. α(K)=0.0728 11; α(L)=0.01074 16; α(M)=0.00223 4. α(N)=0.000471 7; α(O)=6.52×10^{-5} 10; α(P)=3.12×10^{-6} 5. B(M2)(W.u.)=0.067 7.
	569.2 3	12.7 13	[E3]	0.01751	Iγ: ≈11 in ε decay. α(K)=0.01419 20; α(L)=0.00264 4; α(M)=0.000554 8. α(N)=0.0001153 17; α(O)=1.506×10^{-5} 22; α(P)=5.29×10^{-7} 8. B(E3)(W.u.)=5.9 9.
603.36	177.02 10	100 5	(M1)	0.182	α(K)=0.1565 22; α(L)=0.0206 3; α(M)=0.00422 6. α(N)=0.000892 13; α(O)=0.0001242 18; α(P)=6.14×10^{-6} 9.
	382.9 3	12.9 13			
	394.5 2	87 4			
	414.0 2	59 6			
	467.9 20	65 3			
	596.78 8	70.0 20	(M1,E2)	0.0068 10	α(K)=0.0059 9; α(L)=0.00078 8; α(M)=0.000160 16. α(N)=3.4×10^{-5} 4; α(O)=4.6×10^{-6} 6; α(P)=2.2×10^{-7} 4.
648.41	459.5 1	100	(E2)	0.01193	α(K)=0.01003 14; α(L)=0.001517 22; α(M)=0.000314 5. α(N)=6.55×10^{-5} 10; α(O)=8.77×10^{-6} 13; α(P)=3.58×10^{-7} 5.
690.32	263.9[#] 3	7.8[#] 10	(M1,E2)	0.0641 21	α(K)=0.0534 8; α(L)=0.0085 15; α(M)=0.0018 4. α(N)=0.00037 7; α(O)=4.9×10^{-5} 7; α(P)=1.93×10^{-6} 16. Iγ: from ^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ); doublet in ε decay with total intensity=18.9 10.
	481.4 1	100 5	(E2)	0.01046	α(K)=0.00881 13; α(L)=0.001315 19; α(M)=0.000272 4. α(N)=5.68×10^{-5} 8; α(O)=7.62×10^{-6} 11; α(P)=3.16×10^{-7} 5.
	501.4 1	72 3	(M1)	0.01203	α(K)=0.01037 15; α(L)=0.001322 19; α(M)=0.000270 4. α(N)=5.70×10^{-5} 8; α(O)=7.98×10^{-6} 12; α(P)=4.01×10^{-7} 6. Iγ: 10.4 10 in ^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) is discrepant.

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Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[§]	Comments
755.26	151.9 *3*	2.7 *3*	[M1+E2]	0.35 *8*	α(K)=0.28 *4*; α(L)=0.06 *3*; α(M)=0.012 *6*. α(N)=0.0026 *12*; α(O)=0.00033 *14*; α(P)=9.50×10^{-6} *21*.
	328.4 *3*	4.7 *5*	M1,E2	0.0339 *14*	α(K)=0.0286 *17*; α(L)=0.0042 *4*; α(M)=0.00088 *8*. α(N)=0.000183 *15*; α(O)=2.47×10^{-5} *12*; α(P)=1.05×10^{-6} *13*.
	534.4 *2*	28.4 *26*	(M1)	0.01028	α(K)=0.00886 *13*; α(L)=0.001127 *16*; α(M)=0.000230 *4*. α(N)=4.86×10^{-5} *7*; α(O)=6.80×10^{-6} *10*; α(P)=3.42×10^{-7} *5*.
	546.6 *1*	100 *5*	(M1)	0.00972	α(K)=0.00839 *12*; α(L)=0.001066 *15*; α(M)=0.000217 *3*. α(N)=4.60×10^{-5} *7*; α(O)=6.43×10^{-6} *9*; α(P)=3.24×10^{-7} *5*.
	566.21 *10*	66 *3*			
	619.8 *3*	6.5 *7*			
	748.5[a] *2*	<59[a]	(M1,E2)		
879.31	658.9 *3*	15.5 *16*			
	670.4 *3*	15.7 *16*			
	690.3 *2*	79 *8*			
	744.4 *3*	8.5 *10*			
	872.5 *2*	100 *9*	(M1,E2)		
969.23	542.9 *2*	61 *6*	(M1,E2)	0.0087 *12*	α(K)=0.0074 *11*; α(L)=0.00100 *9*; α(M)=0.000205 *16*. α(N)=4.3×10^{-5} *4*; α(O)=6.0×10^{-6} *6*; α(P)=2.8×10^{-7} *5*.
	748.5[a] *2*	<108[a]			
	759.9 *2*	20.8 *20*			
	780.4 *2*	100 *5*			
	833.5 *2*	41 *5*			
	962.6 *2*	44 *5*			
991.97	343.4 *3*	3.1 *4*			
	437.0 *3*	6.5 *7*			
	803.0 *1*	100 *5*	(M1,E2)		
1023.3	447.9 *4*	100	E2	0.01284	α(K)=0.01078 *16*; α(L)=0.001642 *24*; α(M)=0.000340 *5*. α(N)=7.10×10^{-5} *11*; α(O)=9.48×10^{-6} *14*; α(P)=3.84×10^{-7} *6*.
1032.9	384.9 *7*		(M1+E2)	0.0217 *17*	α(K)=0.0184 *18*; α(L)=0.00263 *6*; α(M)=0.000541 *16*. α(N)=0.000114 *3*; α(O)=1.54×10^{-5} *3*; α(P)=6.8×10^{-7} *10*.
	606.1 *4*		Q		
1150.4	575.3 *7*	100	D+Q		
1156.23	601.0 *3*	13.3 *13*			
	730.2 *3*				Iγ: weak transition.
	935.2 *2*	100 *11*			
	947.6[a] *3*	<21[a]			
1164.68	944.5 *3*	10.2 *10*			
	1164.4 *2*	100 *10*	(M1,E2)		
1231.7	628.0 *7*	100 *12*			
	805.5 *7*	60 *8*			
1255.68	263.9[#] *3*	13.0[#] *19*			
	286.2 *2*	29 *3*	(M1,E2)	0.0504 *8*	α(K)=0.0423 *12*; α(L)=0.0065 *9*; α(M)=0.00135 *21*. α(N)=0.00028 *4*; α(O)=3.8×10^{-5} *4*; α(P)=1.54×10^{-6} *15*.
	700.6 *2*	33 *4*			
	828.9 *3*	13.2 *13*			
	1034.8 *1*	100 *5*	(M1,E2)		
	1047.1 *1*	96 *5*			
1279.3	631.3 *4*	100	E2	0.00506	B(E2)(W.u.)=280 +*60*–*70*. α(K)=0.00430 *6*; α(L)=0.000602 *9*; α(M)=0.0001236 *18*. α(N)=2.60×10^{-5} *4*; α(O)=3.53×10^{-6} *5*; α(P)=1.571×10^{-7} *23*.
1339.8	648.9 *4*	100	Q		
	692.5[#] *7*	15.6[#]	D+Q		
1609.64	1389.3 *3*	25.8 *26*			
	1473.6 *3*	100 *10*			
1627.6	604.3 *4*	100	E2	0.00566	B(E2)(W.u.)=111 +*24*–*36*. α(K)=0.00481 *7*; α(L)=0.000679 *10*; α(M)=0.0001396 *20*. α(N)=2.93×10^{-5} *5*; α(O)=3.98×10^{-6} *6*; α(P)=1.751×10^{-7} *25*.

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Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[§]	Comments
1648.01	392.33 10	44.0 22	(M1)	0.0223	α(K)=0.0192 3; α(L)=0.00246 4; α(M)=0.000503 7. α(N)=0.0001064 15; α(O)=1.487×10^{-5} 21; α(P)=7.44×10^{-7} 11.
	491.8 3	1.80 18			
	656.2 2	7.6 8			
	678.8 1	27.6 14	(M1)	0.00574	α(K)=0.00496 7; α(L)=0.000626 9; α(M)=0.0001275 18. α(N)=2.70×10^{-5} 4; α(O)=3.78×10^{-6} 6; α(P)=1.91×10^{-7} 3.
	768.8 2	5.9 6	(M1)		
	892.6 1	42.4 22	(M1)		
	957.5 2	8.2 8			
	999.5 1	15.6 8			
	1044.7 1	27.6 14			
	1072.8 3	1.50 16			
	1221.7 2	12.8 6			
	1459.2 1	100 5			
	1641.1 3	2.10 20			
1648.56	1439.8 3	100 11			
	1512.9 3				
1681.60	426.2 2	37 4	(M1)	0.0181	α(K)=0.01556 22; α(L)=0.00199 3; α(M)=0.000407 6. α(N)=8.61×10^{-5} 12; α(O)=1.203×10^{-5} 17; α(P)=6.03×10^{-7} 9.
	525.3 3	24.5 25			
	689.2 2	100 10			
	712.1 2	69 7			
	927.0 3	30 3			
	991.3 2	39 4			
	1077.7 3	33 3			
	1126.7 2	62 7			
	1473.3 3	17.3 17			
	1492.4 3	11.7 12			
	1675.1 3	6.9 7			
1691.6	541.5 7				
	668.0 4	100 6	D+Q		
1694.18	1140.3 3	63 6			
	1558.4 3	100 11			
1700.93	1693.8 3	93 9			
	1701.5 3	100 10			
1718.0	1142.5	100			
1793.0	514.0 7	2.1 4			
	759.8 4	100 8	Q		
1812.56	164.6 3	6.6 7			
	556.9 2	30 3			
	820.5 2	26 3			
	933.2 2	41 5			
	1122.3 2	47 3			
	1164.4 3	9.0 10			
	1209.1 2	61 3			
	1237.3 3	7.2 7			
	1385.7 3	5.3 5			
	1604.0 3	2.8 3			
	1623.7 1	100 6			
	1805.5 3	5.5 6			
1830.49	1276.6 3	18.2 18			
	1610.3 3	51 5			
	1694.3 3	12.3 12			
	1830.3 3	100 11			
1890.8	659.0 7	100 13	E2		
	1242.9 7	61 9	E2		
1922.83	1368.6 3	83 9			
	1787.5 3	33 13			
	1916.4 3	20 2			
	1922.6 3	100 11			
1941.02	947.6[a] 3	<58[a]			Eγ: poor fit, level-energy difference=948.7.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[§]	Comments
1941.02	1250.5 *2*	77 *8*			
	1292.8 *2*	100 *10*			
	1752.1 *3*	45 *4*			
1954.03	1400.3 *3*	1.9 *2*			
	1744.7 *3*	13.4 *14*			
	1818.8 *3*	12.5 *13*			
	1947.5 *3*	45 *5*			
	1953.8 *3*	100 *9*			
2019.12	1026.1[&] *3*	36 *4*			
	1370.4 *3*	100 *10*			
	1444.0 *3*	83 *9*			
	1830.2 *3*	4.3 *15*			
2047.4	768.3 *4*	100	E2		B(E2)(W.u.)=180 *+50–80*.
2077.66	1856.7 *3*	100 *9*			
	1869.0 *3*	100 *9*			
2123.2	783.1 *4*	100 *6*	Q		
	844.6 *7*				
2214.4	496 *1*				
	522.8[#] *7*	100[#] *8*	D+Q		
	587 *1*				
	1191.5 *7*	66 *5*	Q		
2254.8?	2034.0[&] *3*				
2319.5	627.8 *4*	93 *5*	Q		Iγ: from ^{122}Sn(^{11}B,4nγ). Other: 16 2 in ^{116}Cd(^{18}O,4npG) is in severe disagreement.
	692.1 *4*	100 *6*	D+Q		
2396.0	768.2 *4*	100	E2		B(E2)(W.u.)=110 *40*.
2500.6	1222.3 *7*	100	Q		
2633.1	586.8 *7*	2.2 *3*			
	839.7 *4*	100 *8*	E2		B(E2)(W.u.)=230 *+100–70*.
2667.1	166.0 *7*	10.0 *17*			
	775.9 *7*	100 *13*	Q		
	1388.4 *7*	61 *9*	Q		
2676.5	177.5 *7*	12.4 *22*			
	786.5 *7*	100 *19*	Q		
	1396.0				
2812.7	136.5 *7*	12.5 *12*	(M1+E2)	0.50 *13*	α(K)=0.39 *7*; α(L)=0.09 *5*; α(M)=0.019 *11*. α(N)=0.0039 *21*; α(O)=0.00049 *23*; α(P)=1.30×10^{-5} *5*. Iγ: from ^{122}Sn(^{11}B,4nγ). Other: 24 3 in ^{116}Cd(^{18}O,4npγ) is in severe disagreement.
	145.3 *7*	49 *6*	(M1+E2)	0.41 *10*	α(K)=0.32 *5*; α(L)=0.07 *4*; α(M)=0.015 *8*. α(N)=0.0030 *15*; α(O)=0.00038 *17*; α(P)=1.08×10^{-5} *4*.
	1020.5 *7*	100 *9*	Q		
2842.1	446				
	522.8[#] *7*	75[#] *7*			
	628.0 *7*	39 *5*			
	1214.3 *7*	100 *7*	Q		
2908.3	860.6 *4*	100	E2		B(E2)(W.u.)=210 *+100–140*.
2942.5	265.5 *7*	84 *16*			
	895.3 *7*	100 *19*	D+Q		
2952.6	829.3 *7*	100 *10*	Q		
	905.5 *7*	11.8 *20*			
2981.2	858				
3042.8	230.3 *7*	100	(M1+E2)	0.096 *8*	
	366.5 *7*	7.8 *13*			
3095.9	699.9 *7*	75 *7*	D+Q		Iγ: from ^{122}Sn(^{11}B,4nγ). Other: 44 4 in ^{116}Cd(^{18}O,4npG) is in disagreement.
	776.5 *4*	100 *8*	Q		
3157.3	205.5 *7*	33 *4*	(M1+E2)	0.137 *16*	α(K)=0.112 *8*; α(L)=0.020 *6*; α(M)=0.0041 *14*. α(N)=0.0009 *3*; α(O)=0.00011 *3*; α(P)=3.95×10^{-6} *16*.
	214.5 *7*	18.2 *21*	(M1+E2)	0.120 *12*	α(K)=0.098 *6*; α(L)=0.017 *5*; α(M)=0.0035 *11*. α(N)=0.00074 *21*; α(O)=9.6×10^{-5} *23*; α(P)=3.49×10^{-6} *16*.
	1109.4 *7*	100 *12*	Q		
3235.9	840.1 *4*	100	E2		B(E2)(W.u.)=110 *40*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[§]	Comments
3291.4	658.3 *7*	100	Q		
3296.8?	663.7 *7*	100	E2		B(E2)(W.u.)>630 factor of ≈2 higher than RUL.
3406.4	363.6 *7*	100 *14*	(M1+E2)	0.0254 *17*	α(K)=0.0215 *18*; α(L)=0.00311 *13*; α(M)=0.00064 *3*. α(N)=0.000135 *6*; α(O)=1.82×10^{-5} *4*; α(P)=8.0×10^{-7} *11*.
	594.5 *7*	4.5 *9*			
3419.0	262.1 *7*	100 *27*	(M1+E2)	0.0654 *23*	α(K)=0.0545 *9*; α(L)=0.0087 *16*; α(M)=0.0018 *4*. α(N)=0.00038 *7*; α(O)=5.0×10^{-5} *7*; α(P)=1.97×10^{-6} *16*.
	375.5 *7*	38 *8*			
3518.2	422.5				
	1122.0 *7*	100 *9*	D+Q		
3590.7	354.5				
	748.5				
	1194.5				
3682.1	262.8 *7*	83 *20*			
	524.5 *7*	47 *8*			
	774.5 *7*	100 *17*			
3685.3	167.1 *7*	30 *4*	(M1+E2)	0.26 *5*	α(K)=0.21 *3*; α(L)=0.041 *18*; α(M)=0.009 *4*. α(N)=0.0018 *8*; α(O)=0.00023 *9*; α(P)=7.20×10^{-6} *14*.
	449.5 *7*	87 *8*	D+Q		
	589.5 *7*	70 *5*	D+Q		
	840.0[&] *7*				
	1289.1 *7*	100 *6*	Q		
3730.0	821.5 *7*	100	E2		B(E2)(W.u.)>350.
3733.3	690.5 *7*	100			
3734.2	327.9 *7*	88 *16*	(M1+E2)	0.0341 *14*	α(K)=0.0287 *18*; α(L)=0.0043 *4*; α(M)=0.00088 *8*. α(N)=0.000184 *15*; α(O)=2.48×10^{-5} *12*; α(P)=1.06×10^{-6} *13*.
	692.5[#] *7*	100[#] *16*			
	825				
3810.3	857.2 *7*	100 *18*	Q		
	902.5 *7*	22 *4*			
3919.9	1011.6 *7*	100	D		
3924.5	688.2 *7*	100 *9*	D+Q		
	828.7 *7*	70 *8*	Q		
3949.4	652.6 *7*	100	Q		
3993.6	311.7 *7*	100 *18*			
	574.5 *7*	15.0 *25*			
4026.9	341.3 *7*	100	(M1+E2)	0.0304 *15*	α(K)=0.0257 *18*; α(L)=0.00377 *24*; α(M)=0.00078 *6*. α(N)=0.000163 *11*; α(O)=2.20×10^{-5} *8*; α(P)=9.5×10^{-7} *12*.
4114.7	879.0 *4*	100	E2		B(E2)(W.u.)=200 *+30−70*.
4130.0	395.7 *7*	100 *19*	(M1+E2)	0.0201 *17*	α(K)=0.0171 *17*; α(L)=0.00243 *4*; α(M)=0.000499 *11*. α(N)=0.0001048 *17*; α(O)=1.43×10^{-5} *4*; α(P)=6.3×10^{-7} *10*.
	400.0				
	724.3 *7*	39 *6*			
4199.4	469.4 *7*	100	D		
4366.9	373.5 *7*	68 *8*			
	684.6 *7*	100 *16*	Q		
4420.6	306.0				
	393.5 *7*	100 *11*	(M1+E2)	0.0204 *17*	α(K)=0.0173 *18*; α(L)=0.00246 *5*; α(M)=0.000507 *11*. α(N)=0.0001065 *19*; α(O)=1.45×10^{-5} *4*; α(P)=6.4×10^{-7} *10*.
4437.1	707.1 *7*	100	Q		
4445.3	854				
	1210				
4599.0	468.5[#] *9*	100[#] *21*	D+Q		
	864.5 *7*	53 *11*			
4764.4	650.6 *7*	100 *12*	D+Q		
	839.6 *7*	56 *7*			
4900.0	479.4 *7*	100	D+Q		
5024.4	425				
	895.5 *7*	100 *18*			
5032.6	917.7 *4*	100	E2		B(E2)(W.u.)>56.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Cs) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]
5067.2	468.5[#] *7*	100[#] *30*	
	936.5 *7*	100 *20*	
5212.5	845.6 *7*	100	
5282.4	845.3 *7*	100	Q
5402.1	502.1 *7*	100	D+Q
5547.2	479.7 *7*	100 *18*	
	948.5 *7*	45 *9*	
5566.7	542.5		
	967.5		
5692.3	659.2 *7*	100	
	928.5 *7*		
5989.6	957.0 *4*	100	Q
6050.7	484		
6200.4	987.9 *7*	100	
6271.4	989.0		
7000.8	1011.2 *7*	100	Q
7380.4	1109.0		
8099.5	1098.7 *7*	100	

[†] From (^{11}B,xnγ) for γ rays from high–spin states, and from ^{129}Ba ε decay for γ rays from low–spin states, unless otherwise noted.

[‡] From (HI,xnγ) based on γ(θ) for γ rays from high–spin states, and from ^{129}Ba ε decay for γ rays from low–spin states, unless otherwise noted.

[§] Value overlaps M1 and E2 for M1+E2 or M1,E2 transitions.

[#] Multiply placed; intensity suitably divided.

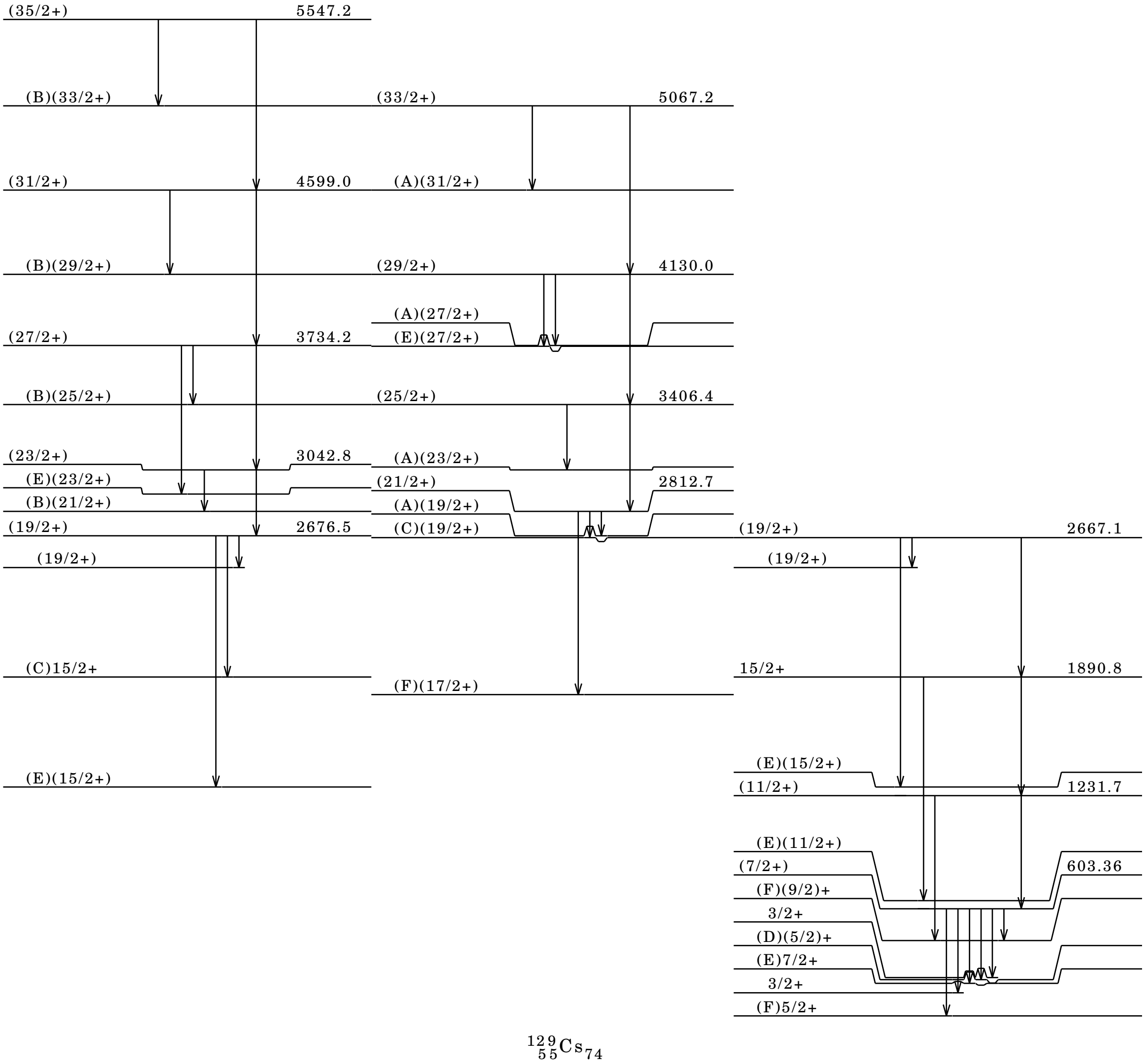
[@] Multiply placed.

[&] Placement of transition in the level scheme is uncertain.

[a] Multiply placed; undivided intensity given.

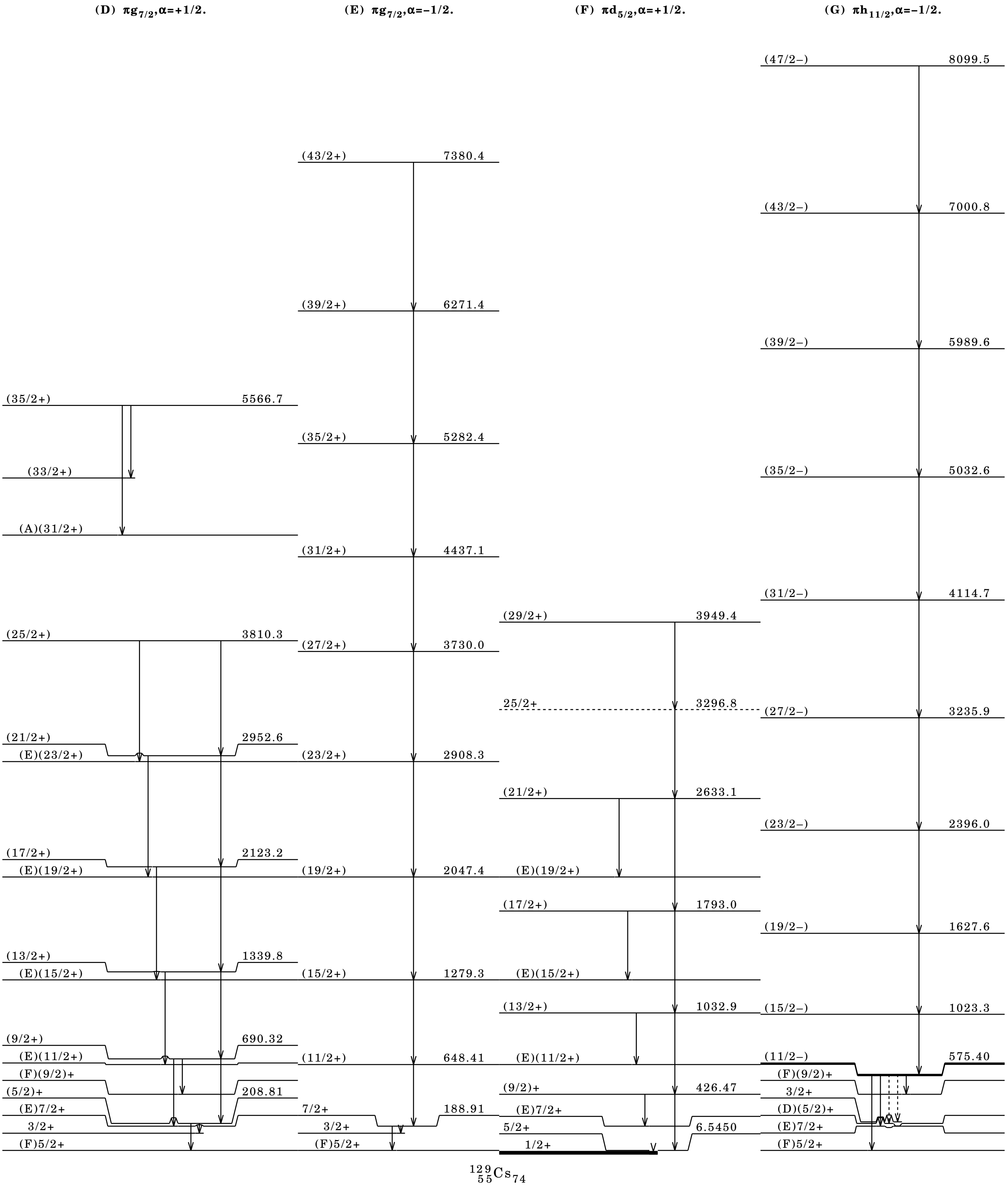
Adopted Levels, Gammas (continued)

(A) Possible 3-qp band,α=−1/2. **(B) Possible 3-qp band,α=+1/2.** **(C) $\pi g_{7/2}$+γ vibration.**



$^{129}_{55}$Cs$_{74}$

Adopted Levels, Gammas (continued)



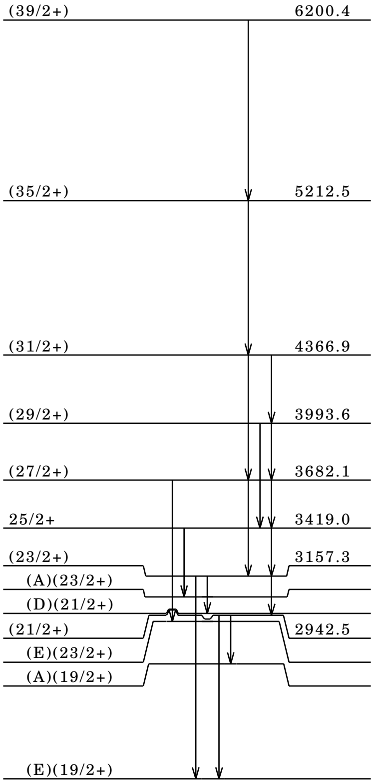
Adopted Levels, Gammas (continued)

(H) $\pi h_{11/2},\alpha=+1/2$. **(I) Possible magnetic–rotational band.** **(J) $\pi h_{11/2}+\gamma$ vibration.**

$^{129}_{55}Cs_{74}$

Adopted Levels, Gammas (continued)

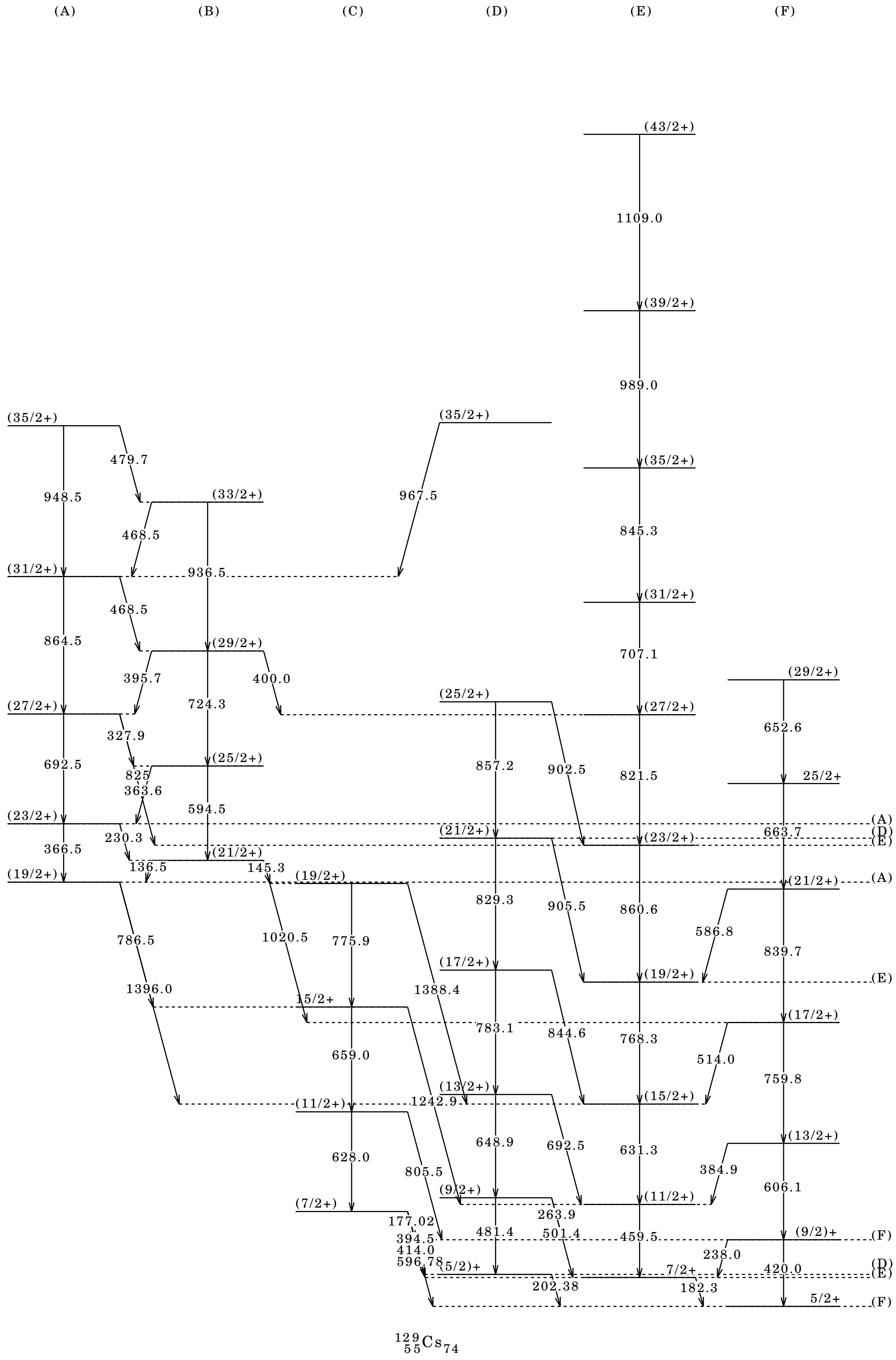
(K) Possible 3-qp, ΔJ=1 band.



$^{129}_{55}Cs_{74}$

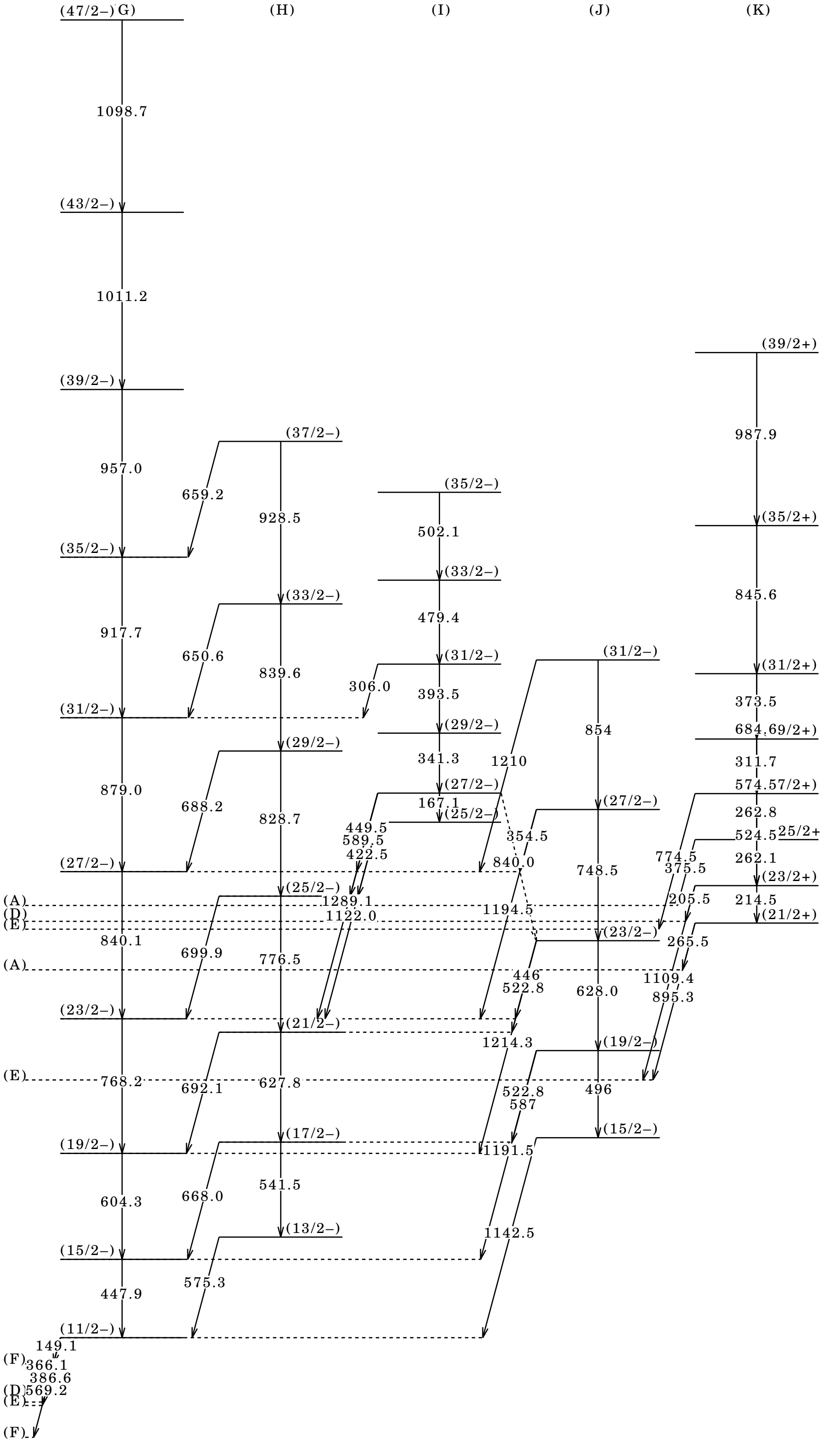
Adopted Levels, Gammas (continued)

Bands for ^{129}Cs



Adopted Levels, Gammas (continued)

Bands for ^{129}Cs

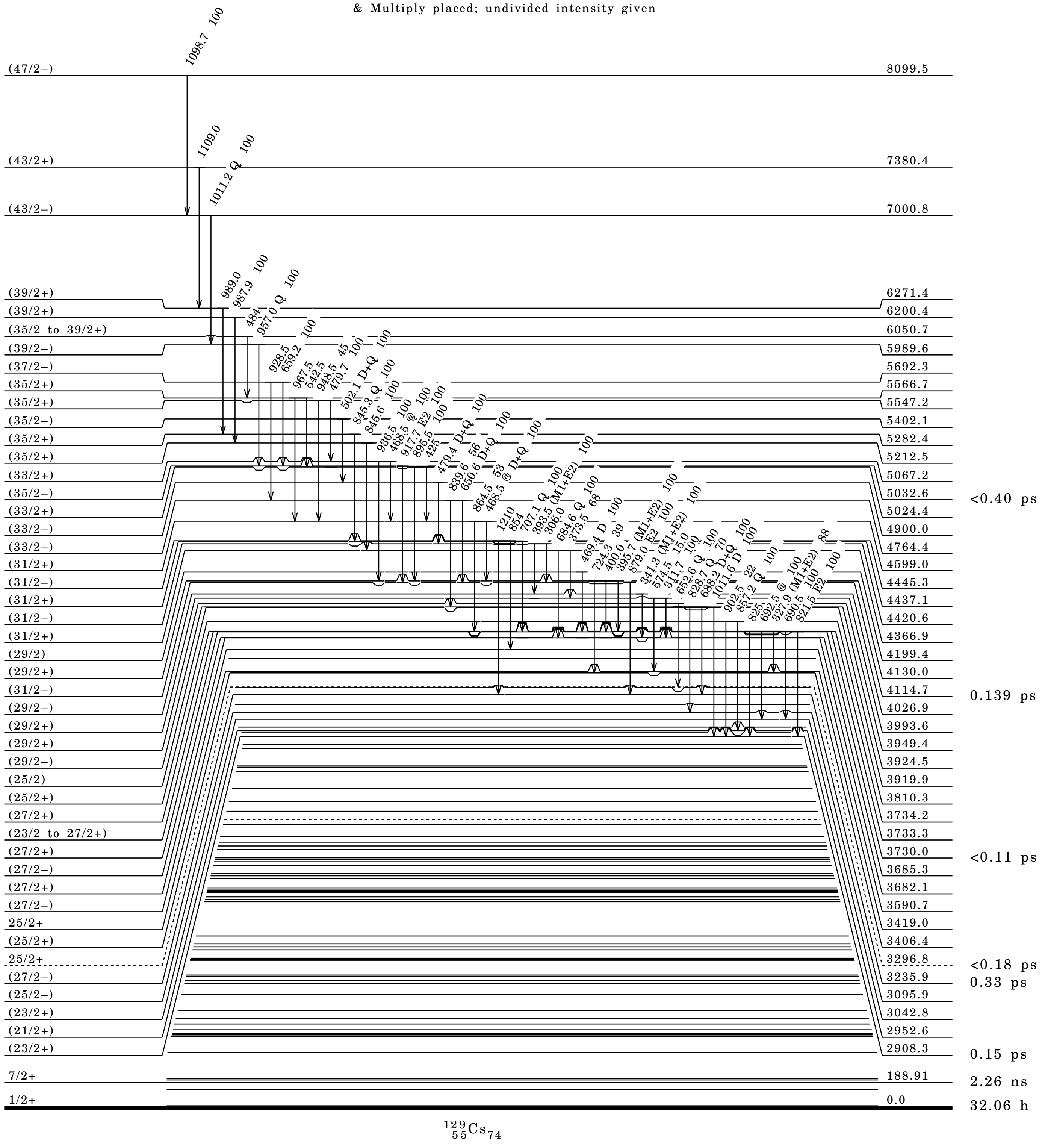


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given



From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

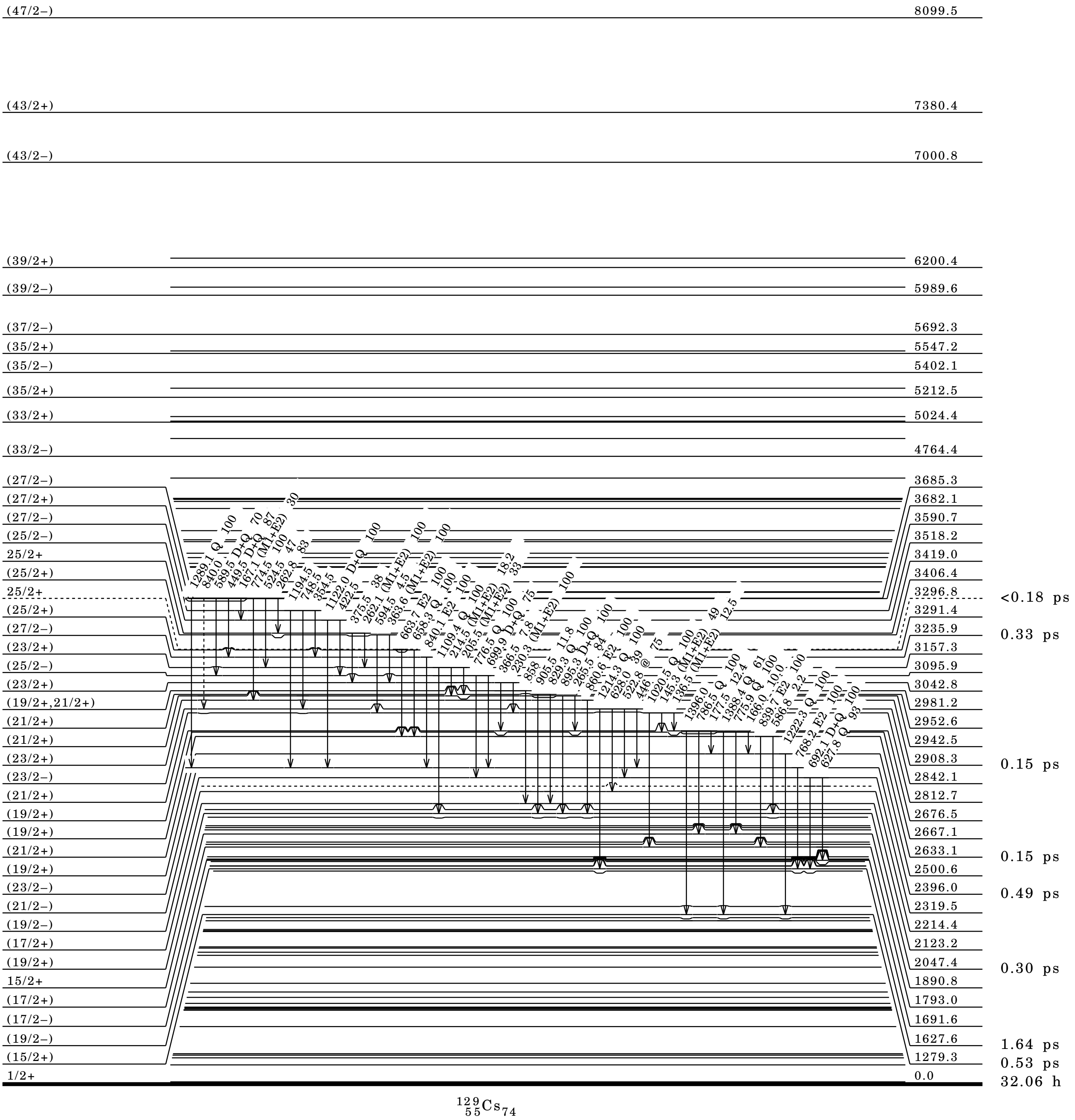
Level Scheme (continued)

Intensities: relative photon branching from each level

@ Multiply placed; intensity suitably divided

* Multiply placed

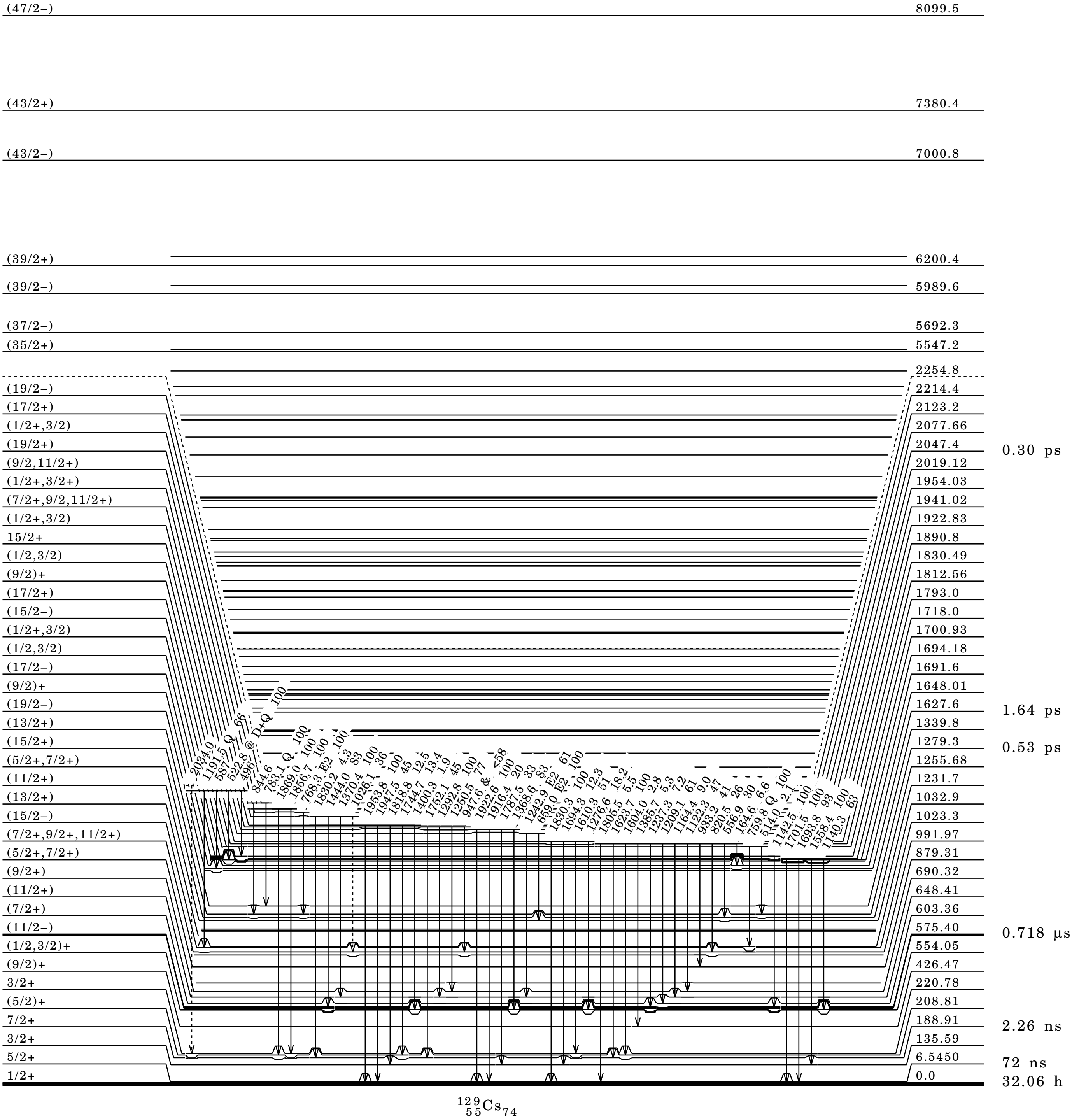
& Multiply placed; undivided intensity given



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given

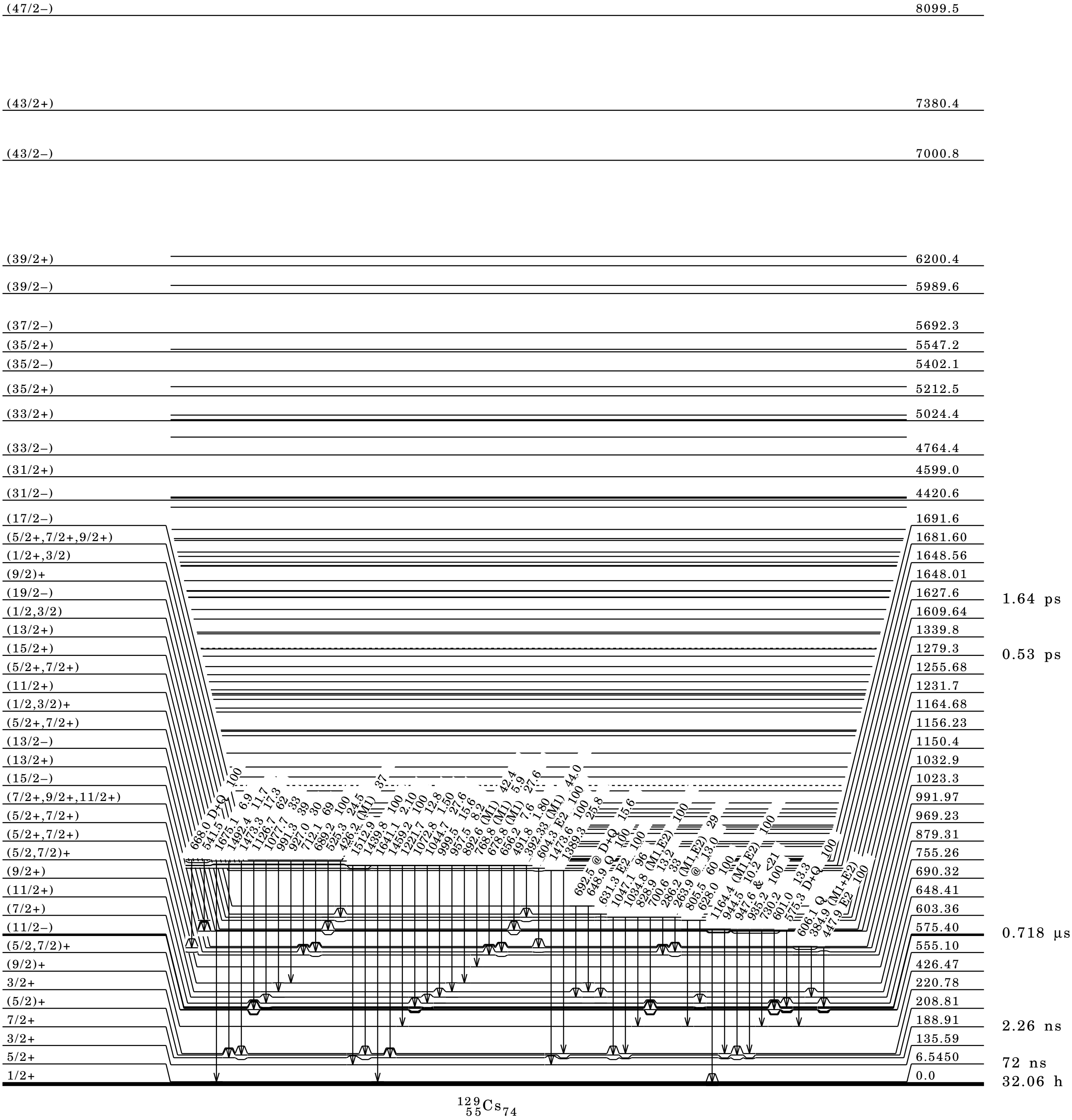


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given

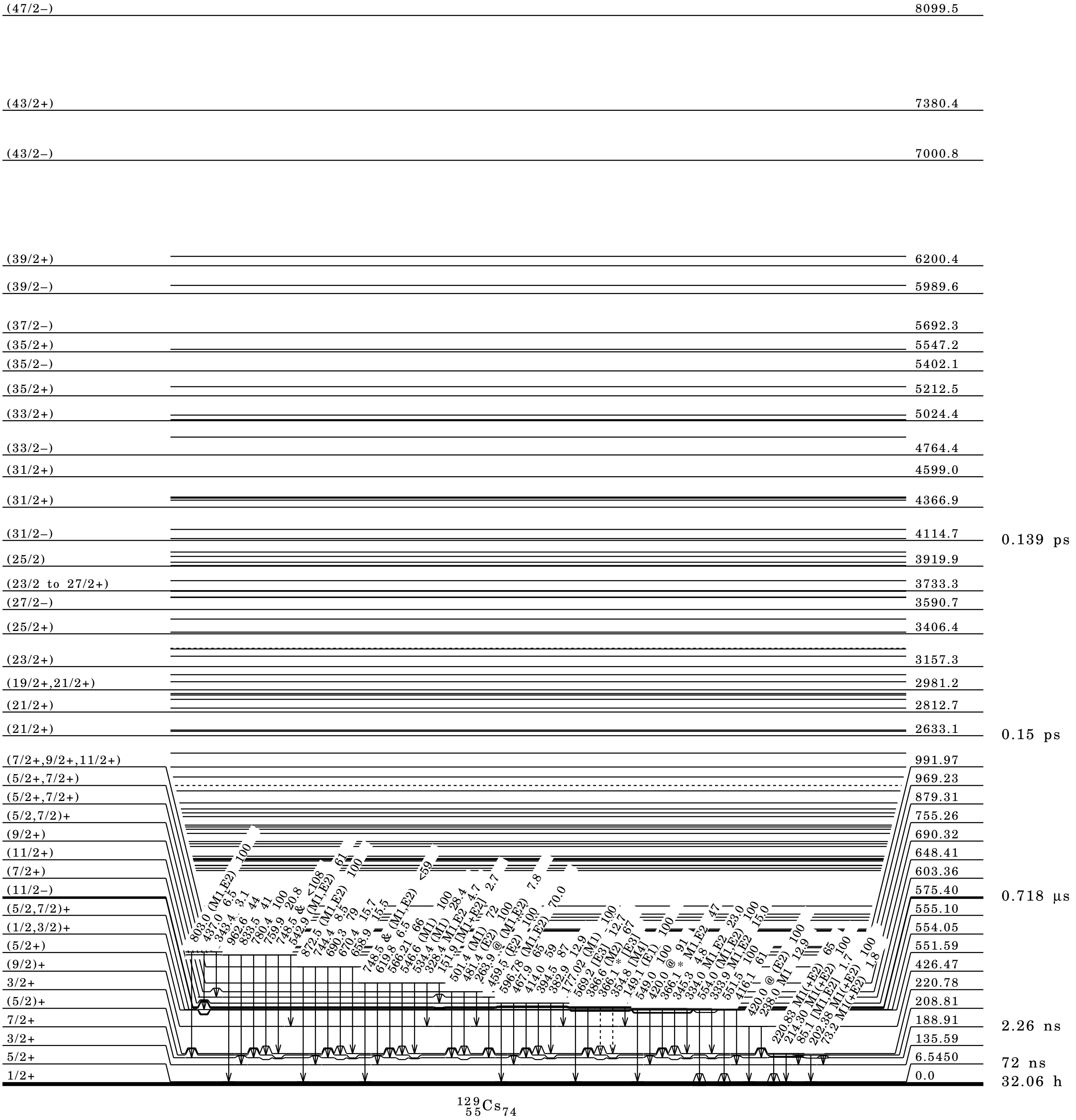


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

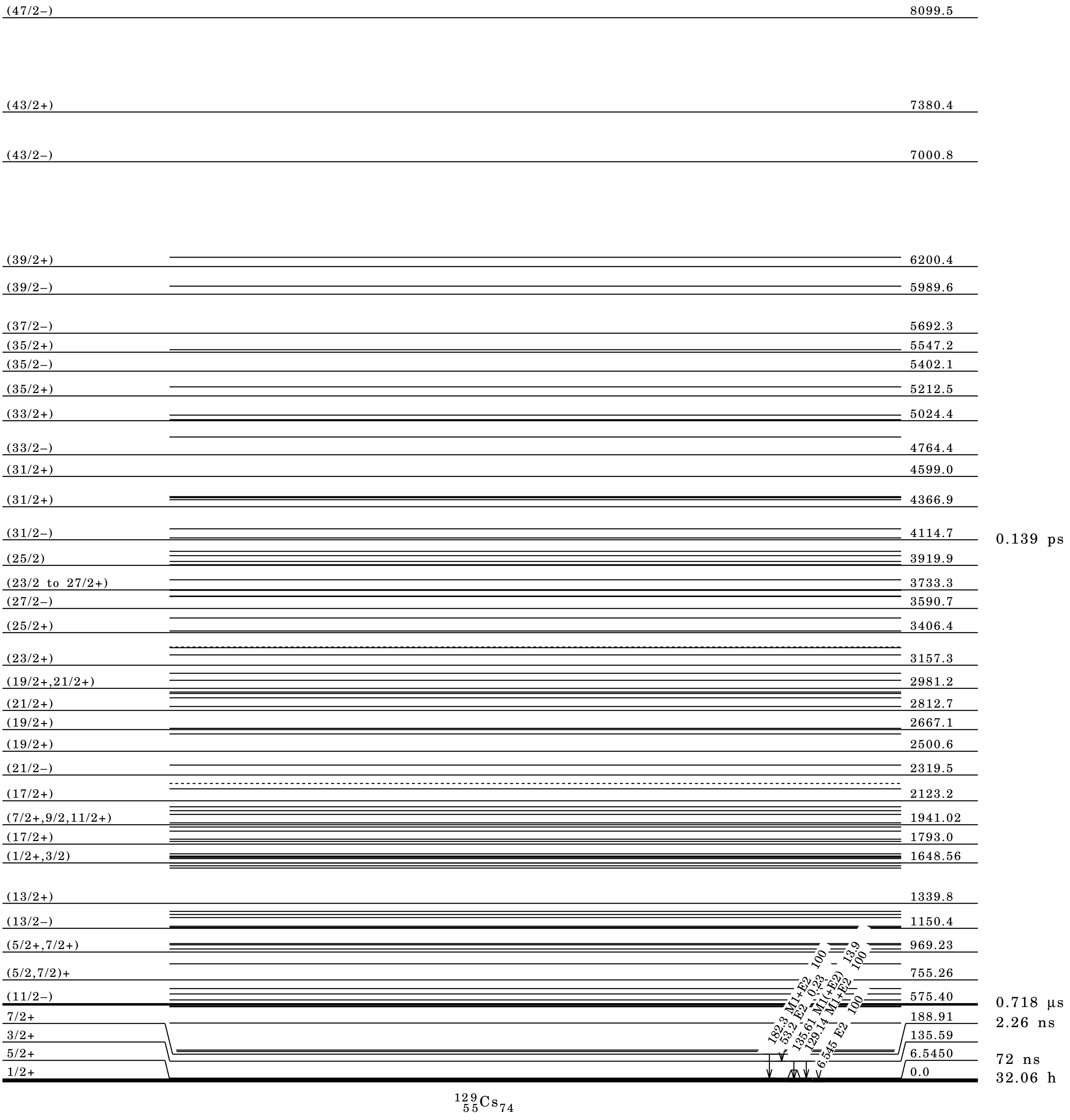
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intentities: relative photon branching from each level
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given



From NNDC(BNL)
program ENSDAT

^{129}Ba ε Decay (2.23 h) 1983TaZI,1973Is04,1972Ta02

Parent ^{129}Ba: E=0.0; Jπ=1/2+; $T_{1/2}$=2.23 h *11*; Q(g.s.)=2436 *11*; %ε+%β^+ decay=100.

^{129}Ba–Q(ε): From 2012Wa38.

^{129}Ba–J,$T_{1/2}$: From ^{129}Ba Adopted Levels.

The decay schemes of the g.s. and isomer of ^{129}Cs seem complex, especially for the isomer decay. First level scheme was proposed in 1970Is02, later expanded by 1972Ta02 and 1973Is04. First attempt to tentatively separate the decay schemes was made in 1972–NDS (1972Ho55). Based on detailed γγ coincidences with two Ge detectors and producing the source in different reactions producing different composition of low–spin and high–spin activities, 1983TaZI present evidence for two separate decay schemes, which are adopted here, although labeled as tentative by 1983TaZI. For the isomer decay, the gamma–ray energies and the decay scheme are almost identical to those given in 1973Is04. There is good agreement of gamma–ray energies between 1973Is04 (and 1983TaZI) and 1972Ta02, but a large number of differences exist in the placement of transitions and levels. The evaluators prefer to adopt level schemes from 1983TaZI and 1973Is04 due to better γγ coincidence data with two Ge(Li) detectors. However, in the opinion of the evaluators, none of the studies cited above can be considered as well established, since many γ–ray remain either unplaced or unconfirmed. Further experiments are recommended to improve knowledge of these decay schemes using state–of–the–art detector systems and better source production methods to avoid large number of impurities present in previous studies.

1983TaZI: ^{129}Ba source formed in three reactions: ^{120}Sn(^{12}C,3n)^{129}Ba, ^{121}Sb(^{12}C,4n)^{129}La followed by ε decay of ^{129}La to ^{129}Ba g.s. and isomer, ^{130}Ba(γ,n). The other two reactions also form both the g.s. and isomer of ^{129}Ba, albeit in different proportions, thus facilitating separation of gamma rays and their intensities into separate decay schemes. Measured Eγ, Iγ, γγ–coin using two Ge detectors. 1983TaZI is a short note in an annual laboratory report. In July 2011, the evaluators, on communication with T. Tamura (first author of 1983TaZI), were informed that there was no further report or follow–up of this work. work reported in 1983TaZI. Note that many features of the data presented in this short report are common with those in 1973Is04.

1973Is04 (also 1971Is02,1970Is04): mixed (g.s. and isomer) source from ^{133}Cs(p,5n); measured Eγ, Iγ, γγ coin with two Ge detectors, ce, ceγ(t) with π√2 air–core β–ray magnetic spectrometer. In 1971Is02, lifetime of 188–keV level was measured by (ce–L)(γ)(t) method. In 1970Is04, a first detailed decay scheme of ^{129}Ba was proposed with with 15 excited states and 49 γ rays. In 1973Is04, a total of 176 γ rays were reported with 107 γ rays placed in a composite level scheme from both activities, thus no ε,β^+ feedings and log *ft* values were deduced. Half–lives of the two activities were measured.

1972Ta02: mixed source from ^{130}Ba(γ,n) with dominant activity from ^{129}Ba g.s. decay in contrast to other studies where dominant activity in the source material was from the decay of ^{129}Ba isomer. Measured Eγ, Iγ, γγ coin using Ge and NaI(Tl) detector. A total of 118 γ rays reported with 100 placed in a proposed decay scheme of ^{129}Ba. Conversion coefficients were deduced by using γ–ray data from this work and ce data from 1961Ar05. Since a composite decay scheme was proposed for g.s. and isomer decay of ^{129}Ba, no ε,β^+ feedings and log *ft* values were deduced. Several levels and many placements differ from those in 1983TaZI and 1973Is04. Half–lives of the two activities were measured. Low–spin activity composition in the source material was about four times higher than in the source material used in 1973Is04.

1961Ar05: mixed source. Measured positron spectra, ce data. A total of about 62 transition energies were deduced up to 1624 keV from K–, L– and subshell lines. Another 45 lines in the ce–energy region of 49–1143 keV with half–life of ≈2 h were unassigned. Deduced intensities of three positron branches. Half–lives of most of the observed transitions were measured. No level scheme was proposed, however strong β^+ branch feeding the g.s. of ^{129}Cs was indicated. Half–lives of the two activities were measured.

Others:

1976Be11: measured lifetime of 6.5–keV level by γ(ce)(t).

1966Li05: measured half–lives of the two activities from γ rays.

1963Ya05: measured half–life of the composite source.

1959He45: measured Eγ, βγ coin, half–life, eight γ rays reported with a proposed 1450–182 γ cascade.

1950Th08, 1950Fi11: identification and production of ^{129}Ba isotope in proton bombardment of ^{133}Cs.

^{129}Cs Levels

In a composite level scheme for g.s. and isomer decay, 1970Is04 (earlier paper from authors of 1973Is04) reported 15 levels at 129,1, 182.3, 202.3, 214.3, 419.8, 595.9, 641.3, 683.8, 748.6, 962.6, 985.3, 1248.7, 1640.8, 1674.5, 1805.2. In their later paper 1971Is02, first excited state was indicates at 6.5 keV. Thus all level energies in in 1970Is04 should be increased upwards by 6.5 keV. A total of 49 transitions were placed amongst these levels.

In a composite level scheme for g.s. and isomer decay, 1972Ta02 report 31 levels at 6.48, 135.6, 188.8, 208.8, 220.8, 426.8, 554.4, 603.6, 648.4, 690.5, 755.3, 969.6, 992.4, 1165.0, 1208.4, 1256.1, 1299.4, 1450.8, 1459.1, 1487.3, 1648.2, 1681.5, 1682.7, 1812.5, 1830.5, 1922.8, 1954.0, 2076.0, 2143.8, 2178.8, 2422.2. Nine of these at 1208.4, 1299.4, 1450.8, 1459.1, 1487.3, 1682.7, 2143.8, 2178.8 and 2422.3 have been omitted here since these are not confirmed in 1983TaZI and 1973Si04. The gamma rays from these levels have either not been confirmed or placed elsewhere in the level schemes based on γγ coin data with two Ge detectors in 1983TaZI and 1973Is04.

In a composite level scheme for g.s. and isomer decay, 1973Is04 report 24 levels at 6.54, 135.5, 188.9, 209.1, 220.8, 426.5, 551.6, 554.9, 575.4, 603.4, 648.4, 690.3, 755.2, 879.1, 969.2, 991.9, 1156.2, 1255.6, 1647.9, 1681.4, 1812.5, 1940.4, 1953.8, 2018.9. All The level scheme for the isomer decay is essentially the same as in 1983TaZI.

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^{129}Ba ε Decay (2.23 h) 1983TaZI,1973Is04,1972Ta02 (continued)

^{129}Cs Levels (continued)

1983TaZI report 16 levels populated in the decay of g.s. of ^{129}Ba and 23 levels from the decay of isomer in ^{129}Ba; five low–lying levels amongst these are populated in the decay of both the activities. A 2308.6 level reported in 1983TaZI is discarded due to poor fit of of the two γ rays 2105.8 and 2086.2 from this level. Their level scheme for isomer decay is almost identical to that given in 1973Is04.

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0	1/2+	32.06 h *6*	$T_{1/2}$: from Adopted Levels.
6.5450 *10*	5/2+	72 ns *6*	$T_{1/2}$: from (129.1–214.3 keV γ)(6.54 ce(M)+ce(N))(t) (1976Be11).
135.69 *8*	3/2+		
208.87 *10*	(5/2)+		
220.74 *7*	3/2+		
554.09 *13*	(1/2,3/2)+		Level from 1983TaZI and 1972Ta02; not in 1973Is04.
1164.66 *17*	(1/2,3/2)+		Level from 1983TaZI and 1972Ta02; not in 1973Is04.
1609.67 *22*	(1/2,3/2)		Level from 1983TaZI; not in 1972Ta02 and 1973Is04.
1648.64 *22*	(1/2+,3/2)		
1694.25 *23*	(1/2,3/2)		Level from 1983TaZI; not in 1972Ta02 and 1973Is04.
1700.93 *22*	(1/2+,3/2)		Level from 1983TaZI; not in 1972Ta02 and 1973Is04.
1830.52 *16*	(1/2,3/2)		Level from 1983TaZI and 1972Ta02; not in 1973Is04.
1922.87 *16*	(1/2+,3/2)		Level from 1983TaZI and 1972Ta02; not in 1973Is04.
1954.03 *14*	(1/2+,3/2+)		
2077.67 *22*	(1/2+,3/2)		Level from 1983TaZI and 1972Ta02, but different γ rays are assigned in 1972Ta02 from this level. Level not in 1973Is04.
2254.8 *3*			Level from 1983TaZI; not in 1972Ta02 and 1973Is04.

[†] From least–squares fit to Eγ data.

[‡] From Adopted Levels.

β$^+$,ε Data

Total measured positron intensity=6% (1961Ar05).

Eε	E(level)	Iβ$^+$[§]	Iε[†][§]	Log *ft*[‡]	I(ε+β$^+$)[†][§]	Comments
(181[#] *11*)	2254.8					
(358 *11*)	2077.67		0.0022 *2*	8.23 *6*		εK=0.8313 *9*; εL=0.1316 *7*; εM+=0.03712 *22*.
(482 *11*)	1954.03		1.11 *7*	5.80 *4*		εK=0.8382 *5*; εL=0.1264 *4*; εM+=0.03543 *11*.
(513 *11*)	1922.87		0.16 *1*	6.70 *4*		εK=0.8393 *4*; εL=0.1255 *3*; εM+=0.03514 *10*.
(605 *11*)	1830.52		1.18 *8*	5.99 *4*		εK=0.8420 *3*; εL=0.12350 *21*; εM+=0.03448 *7*.
(735 *11*)	1700.93		0.17 *1*	7.01 *4*		εK=0.8446 *2*; εL=0.12157 *14*; εM+=0.03385 *5*.
(742 *11*)	1694.25		0.046 *4*	7.58 *5*		εK=0.8447 *2*; εL=0.12149 *14*; εM+=0.03383 *5*.
(787 *11*)	1648.64		0.047 *5*	7.63 *6*		εK=0.8454 *2*; εL=0.1210 *2*; εM+=0.03366 *4*.
(826 *11*)	1609.67		0.25 *2*	6.95 *5*		εK=0.8459 *2*; εL=0.1206 *1*; εM+=0.03354 *4*.
(1271 *11*)	1164.66		1.21 *11*	6.65 *5*	1.21 *11*	εK=0.8491; εL=0.11786 *6*; εM+=0.03265 *2*.
(1882 *11*)	554.09	0.15 *2*	3.0 *3*	6.59 *5*	3.2 *3*	av Eβ=390.0 *49*; εK=0.8110 *18*; εL=0.1108 *3*; εM+=0.03062 *8*. Eε: 975 *60* (β$^+$ end–point energy), relative β$^+$ intensity=60 (measured in 1961Ar05).
(2215 *11*)	220.74	3.14 *15*	20.4 *8*	5.91 *3*	23.5 *9*	av Eβ=536.8 *49*; εK=0.738 *3*; εL=0.1004 *5*; εM+=0.02772 *12*. Eε: 1243 *35* (β$^+$ end–point energy), relative β$^+$ intensity=240 (measured in 1961Ar05).
(2227[#] *11*)	208.87	<0.04	<0.20	>8.0	<0.24	av Eβ=542.0 *49*; εK=0.735 *3*; εL=0.0999 *5*; εM+=0.02759 *12*.
(2300 *11*)	135.69	1.4 *1*	7.4 *4*	6.39 *4*	8.8 *5*	av Eβ=574.5 *49*; εK=0.714 *4*; εL=0.0969 *5*; εM+=0.02677 *13*.
(2436 *11*)	0.0	13 *1*	47 *1*	5.63 *3*	60 *1*	av Eβ=634.9 *50*; εK=0.671 *4*; εL=0.0910 *5*; εM+=0.02512 *14*. Eε: 1425 *15* (β$^+$ end–point energy), relative β$^+$ intensity=780 (measured in 1961Ar05). I(ε+β$^+$): from intensity balance. 1983TaZI give 69 *6*.

[†] From γ–ray intensity balance. Weak feedings (<2% or so) are considered as tentative since there still remain many unplaced γ rays.

[‡] For weak (<2% or so) ε feedings, values are considered as approximate.

Footnotes continued on next page

^{129}Ba ε Decay (2.23 h) 1983TaZI,1973Is04,1972Ta02 (continued)

β^{+},ε Data (continued)

§ Absolute intensity per 100 decays.
\# Existence of this branch is questionable.

γ(^{129}Cs)

All the unplaced γ rays are listed with the decay of the isomer.
Iγ normalization: Absolute intensities per 100 decays of ^{129}Ba are given by 1983TaZI.

Eγ‡	E(level)	Iγ§&	Mult.#	δ	α†	I(γ+ce)&	Comments
6.545 *1*	6.5450		E2		3.98×10^{5} *6*	23.6 *9*	α(L)=3.15E5 5; α(M)=6.82×10^{4} *10*; α(N)=1.355E4 19; α(O)=1498 *21*; α(P)=0.373 *6*. Eγ: from ce(L2), ce(L3) measurements (1973Is04) relative to the ce(K) line of 182.32 *5* γ. Other: 6.48 *15* from differences of pairs γ–ray transitions feeding g.s. and 6.54–keV isomer (1972Ta02). I(γ+ce): from total Iγ+ce feeding this level from higher levels, no direct ε or β feeding is expected due to Jπ difference. Mult.: L3/L2=1.79 *28*.
85.1 *3*	220.74	0.054 *5*	[M1,E2]		2.4 *10*		α(K)=1.6 *4*; α(L)=0.6 *5*; α(M)=0.13 *10*. α(N)=0.027 *20*; α(O)=0.0032 *23*; α(P)=5.1×10^{-5} *3*.
129.14 *10*	135.69	5.51 *28*	M1+E2	0.20 *5*	0.449 *10*		α(K)=0.381 *7*; α(L)=0.054 *3*; α(M)=0.0112 *6*. α(N)=0.00236 *12*; α(O)=0.000322 *13*; α(P)=1.477×10^{-5} *21*. Mult.: L1:L2:L3::100.0 *26*:13.4 *13*:5.4 *11*. Other: K/ΣL>5.6 (1961Ar05) gives δ(E2/M1)<0.5.
135.61 *20*	135.69	1.00 *10*	M1(+E2)	<0.4	0.399 *19*		α(K)=0.336 *11*; α(L)=0.050 *7*; α(M)=0.0103 *15*. α(N)=0.0022 *3*; α(O)=0.00029 *4*; α(P)=1.290×10^{-5} *20*. Mult.,δ: from K/ΣL>6.1 (1961Ar05).
202.3 *1*	208.87	0.30 *3*	M1(+E2)	0.2 *2*	0.128 *4*		α(K)=0.1095 *23*; α(L)=0.0148 *14*; α(M)=0.0030 *3*. α(N)=0.00064 *6*; α(O)=8.9×10^{-5} *7*; α(P)=4.25×10^{-6} 7. Eγ: uncertainty based on γ intensity in isomer decay. Mult.: L1:L2:L3::100.0 *44*:7.0 *19*:4.5 *16*.
214.30 *10*	220.74	13.4 *7*	M1(+E2)	0.5 *5*	0.113 *8*		α(K)=0.095 *4*; α(L)=0.014 *3*; α(M)=0.0029 *7*. α(N)=0.00061 *13*; α(O)=8.3×10^{-5} *14*; α(P)=3.59×10^{-6} *11*. Mult.: α(K)exp=0.097 *3*. Other: K/ΣL=6.9 (1961Ar05) gives δ(E2/M1)<0.75.

Continued on next page (footnotes at end of table)

^{129}Ba ε Decay (2.23 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§&]	Mult.[#]	δ	α[†]	Comments
220.83 *10*	220.74	8.5 *4*	M1(+E2)	<0.9	0.104 *5*	α(K)=0.0879 *23*; α(L)=0.0131 *19*; α(M)=0.0027 *4*. α(N)=0.00057 *8*; α(O)=7.7×10^{-5} *9*; α(P)=3.30×10^{-6} *9*. Mult.,δ: from EKC AND K/ΣL=6.7 (1961Ar05).
333.9 *3*	554.09	0.44 *4*	M1,E2		0.0323 *14*	α(K)=0.0273 *18*; α(L)=0.0040 *3*; α(M)=0.00083 *7*. α(N)=0.000174 *13*; α(O)=2.35×10^{-5} *10*; α(P)=1.00×10^{-6} *13*. Mult.: from α(K)exp=0.035 (1961Ar05).
554.0 *2*	554.09	2.94 *29*	(M1,E2)		0.0083 *12*	α(K)=0.0071 *11*; α(L)=0.00095 *9*; α(M)=0.000194 *16*. α(N)=4.1×10^{-5} *4*; α(O)=5.6×10^{-6} *6*; α(P)=2.7×10^{-7} *5*. Mult.: from α(K)exp=0.016 (1961Ar05).
944.5 *3*	1164.66	0.112 *11*				
1140.3 *3*	1694.25	0.0176 *18*				
1164.4 *2*	1164.66	1.10 *11*	(M1,E2)			Mult.: from α(K)exp=0.0024 (1961Ar05).
1276.6 *3*	1830.52	0.118 *12*				
1368.6 *3*	1922.87	0.055 *6*				
1389.3 *3*	1609.67	0.051 *5*				
1400.1 *3*	1954.03	0.0121 *12*				
1439.8 *3*	1648.64	0.047 *5*				
1473.6 *3*	1609.67	0.198 *20*				
1512.9 *3*	1648.64					
1558.4 *3*	1694.25	0.028 *3*				
1610.3 *3*	1830.52	0.33 *3*				
1693.8 *3*	1700.93	0.080 *8*				
1694.3 *3*	1830.52	0.080 *8*				
1701.5 *3*	1700.93	0.086 *9*				
1744.7 *3*	1954.03	0.086 *9*				
1787.5 *3*	1922.87	0.022 *2*				
1818.8 *3*	1954.03	0.080 *8*				
1830.3 *3*	1830.52	0.65 *7*				
1856.7 *3*	2077.67	0.0011 *1*				
1869.0 *3*	2077.67	0.0011 *1*				
1916.4 *3*	1922.87	0.0132 *13*				
1922.6 *3*	1922.87	0.066 *7*				
1947.5 *3*	1954.03	0.29 *3*				
1953.8 *3*	1954.03	0.64 *6*				
2034.0 *3*	2254.8					
[x]2086.2[@]						
[x]2105.8[@]						

[†] Overlaps M1 and E2 values for M1+E2, or M1,E2 transitions.

[‡] From unweighted average of values from 1972Ta02 and 1973Is04 (or 1983TaZI). Uncertainties are provided only by 1972Ta02. In 1983TaZI, most energies are the same as in 1973Is04. Based on comparison of values in three studies, evaluators assign the uncertainties as follows: Δ(Eγ)=0.10 keV for Iγ≥3%, 0.20 keV for Iγ=0.5–3%, and 0.3 keV or Iγ<0.5%. Document records in the ENSDF database provide compiled Eγ values from 1973Is04, 1972Ta02, and 1961Ar05.

[§] From 1983TaZI unless otherwise noted. Uncertainties are not given by 1983TaZI. The evaluators assign the uncertainties as follows: Δ(Iγ)=5% for Iγ≥5%, 10% for Iγ<5% Document records in the ENSDF database provide compiled Iγ, Ice(K), K/L ratios from 1973Is04, 1972Ta02, and 1961Ar05.

[#] From 1973Is04 unless otherwise noted. Values α(K)exp, K/L and L-subshell ratios are from private communication to 1996Te01 from 1973Is04. Other multipolarities are deduced by evaluators of current evaluation using Iγ values from 1973Is04 and Ice(K) and/or K/L ratios from 1961Ar05. For γ rays above 350 keV or so, such assignments are tentative since the agreement between deduced α(K)exp values and theoretical values from BrIcc code is poor.

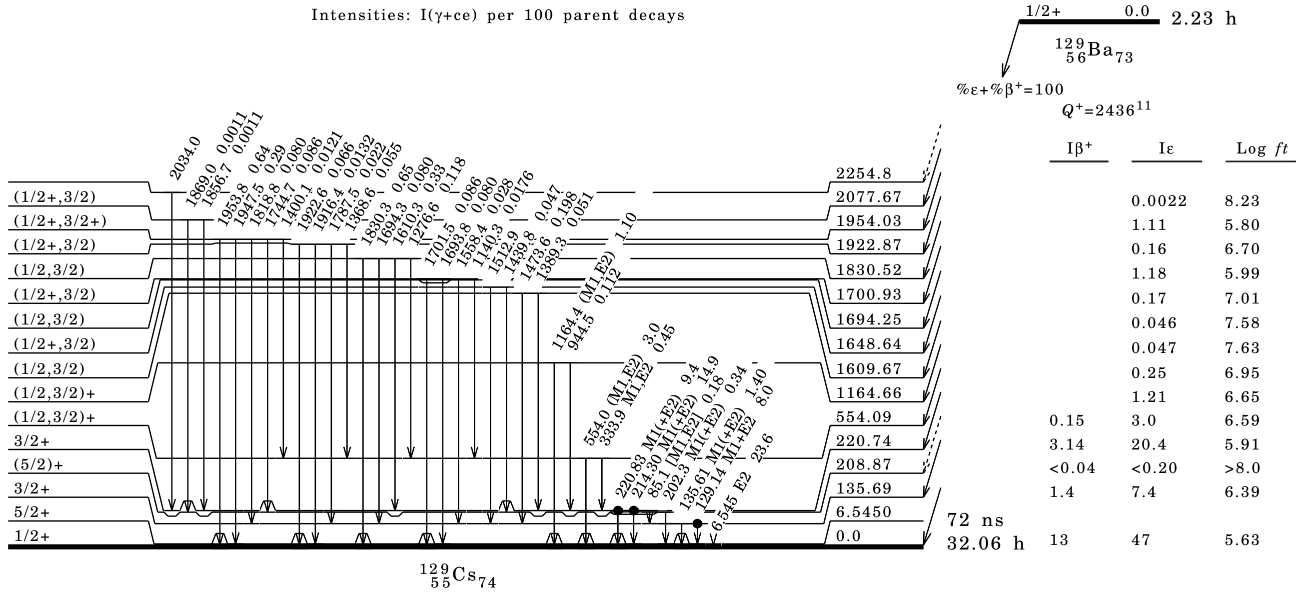
[@] γ from 1983TaZI only. 2105.8γ and 2086.2γ placed from a 2308.6 level, but the energy fit is poor, thus the evaluators have kept these as unplaced. None of the two γ rays was reported in 1973Is04 and 1972Ta02.

[&] Absolute intensity per 100 decays.

[x] γ ray not placed in level scheme.

^{129}Ba ε Decay (2.23 h) 1983TaZI,1973Is04,1972Ta02 (continued)

Decay Scheme



^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02

Parent ^{129}Ba: E=8.42 *6*; Jπ=7/2+; $T_{1/2}$=2.135 h *10*; Q(g.s.)=2436 *11*; %ε+%β⁺ decay≈100.

^{129}Ba–Q(ε): From 2012Wa38.

^{129}Ba–E,J,$T_{1/2}$: From ^{129}Ba Adopted Levels.

^{129}Ba–%ε+%β⁺ decay: %β⁻≈100 assumed; %IT is unknown.

The decay schemes of the g.s. and isomer of ^{129}Cs seem complex, especially for the isomer decay. First level scheme was proposed in 1970Is02, later expanded by 1972Ta02 and 1973Is04. First attempt to tentatively separate the decay schemes was made in 1972–NDS (1972Ho55). Based on detailed γγ coincidences with two Ge detectors and producing the source in different reactions producing different composition of low–spin and high–spin activities, 1983TaZI present evidence for two separate decay schemes, which are adopted here, although labeled as tentative by 1983TaZI. For the isomer decay, the gamma–ray energies and the decay scheme are almost identical to those given in 1973Is04. There is good agreement of gamma–ray energies between 1973Is04 (and 1983TaZI) and 1972Ta02, but a large number of differences exist in the placement of transitions and levels. The evaluators prefer to adopt level schemes from 1983TaZI and 1973Is04 due to better γγ coincidence data with two Ge(Li) detectors. However, in the opinion of the evaluators, none of the studies cited above can be considered as well established, since many γ–ray remain either unplaced or unconfirmed. Further experiments are recommended to improve knowledge of these decay schemes using state–of–the–art detector systems and better source production methods to avoid large number of impurities present in previous studies.

1983TaZI: ^{129}Ba source formed in three reactions: ^{120}Sn(^{12}C,3n)^{129}Ba, ^{121}Sb(^{12}C,4n)^{129}La followed by ε decay of ^{129}La to ^{129}Ba g.s. and isomer, ^{130}Ba(γ,n). The other two reactions also form both the g.s. and isomer of ^{129}Ba, albeit in different proportions, thus facilitating separation of gamma rays and their intensities into separate decay schemes. Measured Eγ, Iγ, γγ–coin using two Ge detectors. 1983TaZI is a short note in an annual laboratory report. In July 2011, the evaluators, on communication with T. Tamura (first author of 1983TaZI), were informed that there was no further report or follow–up of this work. work reported in 1983TaZI. Note that many features of the data presented in this short report are common with those in 1973Is04.

1973Is04 (also 1971Is02,1970Is04): mixed (g.s. and isomer) source from ^{133}Cs(p,5n); measured Eγ, Iγ, γγ coin with two Ge detectors, ce, ceγ(t) with π√2 air–core β–ray magnetic spectrometer. In 1971Is02, lifetime of 188–keV level was measured by (ce–L)(γ)(t) method. In 1970Is04, a first detailed decay scheme of ^{129}Ba was proposed with with 15 excited states and 49 γ rays. In 1973Is04, a total of 176 γ rays were reported with 107 γ rays placed in a composite level scheme from both activities, thus no ε,β⁺ feedings and log *ft* values were deduced. Half–lives of the two activities were measured.

Continued on next page (footnotes at end of table)

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

1972Ta02: mixed source from ^{130}Ba(γ,n) with dominant activity from ^{129}Ba g.s. decay in contrast to other studies where dominant activity in the source material was from the decay of ^{129}Ba isomer. Measured Eγ, Iγ, γγ coin using Ge and NaI(Tl) detector. A total of 118 γ rays reported with 100 placed in a proposed decay scheme of ^{129}Ba. Conversion coefficients were deduced by using γ–ray data from this work and ce data from 1961Ar05. Since a composite decay scheme was proposed for g.s. and isomer decay of ^{129}Ba, no ε,β^+ feedings and log *ft* values were deduced. Several levels and many placements differ from those in 1983TaZI and 1973Is04. Half–lives of the two activities were measured. Low–spin activity composition in the source material was about four times higher than in the source material used in 1973Is04.

1961Ar05: mixed source. Measured positron spectra, ce data. A total of about 62 transition energies were deduced up to 1624 keV from K–, L– and subshell lines. Another 45 lines in the ce–energy region of 49–1143 keV with half–life of ≈2 h were unassigned. Deduced intensities of three positron branches. Half–lives of most of the observed transitions were measured. No level scheme was proposed, however strong β^+ branch feeding the g.s. of ^{129}Cs was indicated. Half–lives of the two activities were measured.

Others:

1976Be11: measured lifetime of 6.5–keV level by γ(ce)(t).

1966Li05: measured half–lives of the two activities from γ rays.

1963Ya05: measured half–life of the composite source.

1959He45: measured Eγ, βγ coin, half–life, eight γ rays reported with a proposed 1450–182 γ cascade.

1950Th08, 1950Fi11: identification and production of ^{129}Ba isotope in proton bombardment of ^{133}Cs.

^{129}Cs Levels

1959He45, based on γγ coincidences proposed a cascade of 182–1450 cascade, establishing levels at 182 and 1632 keV. These are now defined at 189 and 1648 keV, respectively.

In a composite level scheme for g.s. and isomer decay, 1970Is04 (earlier paper from authors of 1973Is04) reported 15 levels at 129,1, 182.3, 202.3, 214.3, 419.8, 595.9, 641.3, 683.8, 748.6, 962.6, 985.3, 1248.7, 1640.8, 1674.5, 1805.2. In their later paper 1971Is02, first excited state was indicates at 6.5 keV. Thus all level energies in in 1970Is04 should be increased upwards by 6.5 keV. A total of 49 transitions were placed amongst these levels.

In a composite level scheme for g.s. and isomer decay, 1972Ta02 report 31 levels at 6.48, 135.6, 188.8, 208.8, 220.8, 426.8, 554.4, 603.6, 648.4, 690.5, 755.3, 969.6, 992.4, 1165.0, 1208.4, 1256.1, 1299.4, 1450.8, 1459.1, 1487.3, 1648.2, 1681.5, 1682.7, 1812.5, 1830.5, 1922.8, 1954.0, 2076.0, 2143.8, 2178.8, 2422.2. Nine of these at 1208.4, 1299.4, 1450.8, 1459.1, 1487.3, 1682.7, 2143.8, 2178.8 and 2422.3 have been omitted here since these are not confirmed in 1983TaZI and 1973Si04. The gamma rays from these levels have either not been confirmed or placed elsewhere in the level schemes based on γγ coin data with two Ge detectors in 1983TaZI and 1973Is04.

In a composite level scheme for g.s. and isomer decay, 1973Is04 report 24 levels at 6.54, 135.5, 188.9, 209.1, 220.8, 426.5, 551.6, 554.9, 575.4, 603.4, 648.4, 690.3, 755.2, 879.1, 969.2, 991.9, 1156.2, 1255.6, 1647.9, 1681.4, 1812.5, 1940.4, 1953.8, 2018.9. All The level scheme for the isomer decay is essentially the same as in 1983TaZI.

1983TaZI report 16 levels populated in the decay of g.s. of ^{129}Ba and 23 levels from the decay of isomer in ^{129}Ba; five low–lying levels amongst these are populated in the decay of both the activities.

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	1/2+	32.06 h *6*	$T_{1/2}$: from Adopted Levels.
6.5450 *10*	5/2+	72 ns *6*	$T_{1/2}$: from (129.1–214.3 keV γ)(6.54 ce(M)+ce(N))(t) (1976Be11).
135.56 *7*	3/2+		
188.92 *6*	7/2+	2.26 ns *6*	$T_{1/2}$: from γ(ce)(t) (1973Is04).
208.82 *6*	(5/2)+		
220.85 *6*	3/2+		
426.49 *8*	(9/2)+		
551.58 *15*	(5/2+)		Level from 1983TaZI and 1973Is04; not in 1972Ta02.
555.13 *9*	(5/2,7/2)+		
575.44 *14*	(11/2−)	0.718 μs *21*	Level from 1983TaZI and 1973Is04, not in 1972TA02. $T_{1/2}$: from Adopted Levels.
603.40 *7*	(7/2+)		
648.46 *8*	(11/2+)		
690.33 *8*	(9/2+)		
755.28 *7*	(5/2,7/2)+		
879.33 *10*	(5/2+,7/2+)		Level from 1983TaZI and 1973IS04, not in 1972Ta02.
969.25 *7*	(5/2+,7/2+)		
992.09 *9*	(7/2+,9/2+,11/2+)		
1156.27 *12*	(5/2+,7/2+)		Level from 1983TaZI and 1973Is04; not in 1972Ta02.
1255.71 *7*	(5/2+,7/2+)		
1648.04 *6*	(9/2)+		
1681.63 *9*	(5/2+,7/2+,9/2+)		
1812.59 *8*	(9/2)+		
1941.05 *13*	(7/2+,9/2,11/2+)		Level from 1983TaZI and 1973Is04; not in 1972Ta02.
2019.15 *19*	(9/2,11/2+)		Level from 1983TaZI and 1973Is04; not in 1972Ta02.

Footnotes continued on next page

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

^{129}Cs Levels (continued)

† From least–squares fit to Eγ data. The 947.6 doublet γ from 1941 level was omitted in the fitting procedure.
‡ From Adopted Levels.

β$^+$,ε Data

No log *ft* values are deduced since direct ε+β$^+$ feeding to 6.5–keV level is unknown, as well as possible %IT decay is unknown.

Eε	E(level)	Iε†	I(ε+β$^+$)†	Comments
(425 *11*)	2019.15	0.52 *4*		
(503 *11*)	1941.05	1.5 *1*		
(632 *11*)	1812.59	15.0 *4*		Most likely an allowed ε transition.
(763 *11*)	1681.63	7.2 *3*		
(796 *11*)	1648.04	59.5 *13*		Most probably an allowed ε transition.
(1288 *11*)	1156.27		1.7 *2*	
(1475 *11*)	969.25		1.9 *5*	
(1565 *11*)	879.33		1.7 *4*	
(1689 *11*)	755.28		3.6 *6*	
(1754 *11*)	690.33		2.2 *4*	
(1796‡ *11*)	648.46		1.8 *4*	
(1841 *11*)	603.40		3.4 *5*	
(1889 *11*)	555.13		2.3 *4*	
(1893 *11*)	551.58		3.0 *3*	
(2018‡ *11*)	426.49		<2	

† Only the apparent feedings are given from intensity balance. For some levels there is non–physical negative feeding: −1.3 *6* for 135.56 level, −3.7 *4* for 220.85 level, −1.0 *3* for 992.09 level, and −1.8 *6* for 1255.7 level, implying thereby that level scheme is not known fully.
‡ Existence of this branch is questionable.

γ(^{129}Cs)

Iγ normalization: 1983TaZI give Iγ=40 as the absolute intensity of 182.3–keV γ ray, assuming the isomer decays 100% by ε decay, and no ε feeding to 6.5–keV level. Both these assumption may not be valid, thus no normalization is carried out here, only apparent ε+β$^+$ feedings are given from intensity balances.

Eγ‡	E(level)	Iγ§	Mult.#	δ	α†	I(γ+ce)	Comments
6.545 *1*	6.5450		E2		3.98×10^5 *6*	232 *7*	α(L)=3.15E5 5; α(M)=6.82×10^4 *10*; α(N)=1.355E4 19; α(O)=1498 *21*; α(P)=0.373 *6*. Eγ: from ce(L2), ce(L3) (1973Is04) measurements relative to the ce(K) line of 182.32 *5* γ. I(γ+ce): from total Iγ+ce feeding the 6.5–keV level, assuming no direct ε+β$^+$ feeding. Mult.: L3/L2=1.79 *28*.
53.2 *3*	188.92	0.23 *2*	E2		18.6 *5*		α(K)=6.53 *12*; α(L)=9.5 *3*; α(M)=2.08 *7*. α(N)=0.419 *13*; α(O)=0.0474 *15*; α(P)=0.000174 *4*. Mult.: L1:L2:L3=14.9 *29*:81.9 *42*:100 *5*. Also E2 from K/ΣL=0.5 (1961Ar05).
73.2 *3*	208.82	0.59 *6*	M1(+E2)	<0.3	2.35 *16*		α(K)=1.93 *6*; α(L)=0.33 *8*; α(M)=0.069 *17*. α(N)=0.014 *4*; α(O)=0.0019 *4*; α(P)=7.45×10^{-5} *14*. Mult.,δ: from EKC=2.1, K/ΣL=5.5 (1961Ar05).
^{x}75.2		0.20 *2*					

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^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ‡	E(level)	Iγ§	Mult.#	δ	α†	Comments
85.1 *3*	220.85	0.15 *2*	[M1,E2]		2.4 *10*	α(K)=1.6 *4*; α(L)=0.6 *5*; α(M)=0.13 *10*. α(N)=0.027 *20*; α(O)=0.0032 *23*; α(P)=5.1×10^{-5} *3*.
^{x}88.6		≤0.1				
^{x}118.3		≤0.1				
^{x}119.7		≤0.1				
129.14 *10*	135.56	11.8 *6*	M1+E2	0.20 *5*	0.449 *10*	α(K)=0.381 *7*; α(L)=0.054 *3*; α(M)=0.0112 *6*. α(N)=0.00236 *12*; α(O)=0.000322 *13*; α(P)=1.477×10^{-5} *21*. Mult.: L1:L2:L3=100.0 *26*:13.4 *13*:5.4 *11*. Other: K/ΣL>5.6 (1961Ar05) gives δ(E2/M1)<0.5.
135.61 *20*	135.56	1.64 *16*	M1(+E2)	<0.4	0.399 *19*	α(K)=0.336 *11*; α(L)=0.050 *7*; α(M)=0.0103 *15*. α(N)=0.0022 *3*; α(O)=0.00029 *4*; α(P)=1.290×10^{-5} *20*. Mult.,δ: α(K)exp=0.39, K/ΣL>6.1 (1961Ar05).
^{x}140.1		≤0.1				
^{x}142.8		≤0.1				
^{x}145.5		≤0.1				
149.1 *3*	575.44	1.03 *10*	(E1)		0.0722	α(K)=0.0620 *10*; α(L)=0.00810 *13*; α(M)=0.001647 *25*. α(N)=0.000344 *6*; α(O)=4.65×10^{-5} *7*; α(P)=2.03×10^{-6} *3*. Mult.: from Adopted Gammas.
151.9 *3*	755.28	0.31 *3*	[M1+E2]		0.35 *8*	α(K)=0.28 *4*; α(L)=0.06 *3*; α(M)=0.012 *6*. α(N)=0.0026 *12*; α(O)=0.00033 *14*; α(P)=9.50×10^{-6} *21*.
^{x}155.2		≤0.1				
^{x}159.9		≤0.1				
164.6 *3*	1812.59	0.73 *7*				
177.02 *10*	603.40	7.5 *4*	(M1)		0.182	α(K)=0.1565 *22*; α(L)=0.0206 *3*; α(M)=0.00422 *6*. α(N)=0.000892 *13*; α(O)=0.0001242 *18*; α(P)=6.14×10^{-6} *9*. Mult.: α(K)exp=0.126, K/ΣL=7.0 (1961Ar05).
182.3 *1*	188.92	100 *5*	M1+E2	0.25 *2*	0.1718 *25*	α(K)=0.1463 *21*; α(L)=0.0203 *4*; α(M)=0.00418 *8*. α(N)=0.000880 *16*; α(O)=0.0001210 *20*; α(P)=5.65×10^{-6} *8*. Eγ: from ce data in 1973Is04. Mult.: L1:L2:L3=100.0 *9*:9.79 *42*:5.41 *39*. Other: K/ΣL=7.0 (1961Ar05) gives δ(E2/M1)<0.5. δ: 0.32 *5* if penetration effect is included (1973Is04).
^{x}193.7		≤0.15				
202.38 *10*	208.82	33.7 *17*	M1(+E2)	0.2 *2*	0.128 *4*	α(K)=0.1094 *23*; α(L)=0.0148 *14*; α(M)=0.0030 *3*. α(N)=0.00064 *6*; α(O)=8.8×10^{-5} *7*; α(P)=4.25×10^{-6} *7*. Mult.: L1:L2:L3=100.0 *44*:7.0 *19*:4.5 *16*. Other: K/ΣL=6.9 (1961Ar05) gives δ(E2/M1)<0.7.
214.30 *10*	220.85	8.7 *4*	M1(+E2)	0.5 *5*	0.113 *8*	α(K)=0.095 *4*; α(L)=0.014 *3*; α(M)=0.0029 *7*. α(N)=0.00061 *13*; α(O)=8.3×10^{-5} *14*; α(P)=3.59×10^{-6} *11*. Mult.: α(K)exp=0.097 *3*. Other: K/ΣL=6.9 (1961Ar05) gives δ(E2/M1)<0.75.

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^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[#]	δ	α[†]	Comments
220.83 *10*	220.85	5.7 *3*	M1(+E2)	<0.9	0.104 *5*	α(K)=0.0879 *23*; α(L)=0.0131 *19*; α(M)=0.0027 *4*. α(N)=0.00057 *8*; α(O)=7.7×10^{-5} *9*; α(P)=3.30×10^{-6} *9*. Mult.,δ: from EKC=0.073, K/ΣL=6.7 (1961Ar05).
^{x}225.2		≤0.15				
^{x}228.0		≤0.15				
^{x}230.4		0.35 *4*				
238.0 *2*	426.49	2.9 *3*	M1		0.0819	α(K)=0.0704 *10*; α(L)=0.00919 *13*; α(M)=0.00188 *3*. α(N)=0.000398 *6*; α(O)=5.54×10^{-5} *8*; α(P)=2.75×10^{-6} *4*. Mult.: K/ΣL=9, α(K)exp=0.098 (1961Ar05); and γ(θ) in in–beam γ ray studies.
^{x}243.5		≤0.15				
^{x}252.7		≤0.15				
263.9[&] *3*	690.33	1.20[&] *12*	(M1,E2)		0.0641 *21*	α(K)=0.0534 *8*; α(L)=0.0085 *15*; α(M)=0.0018 *4*. α(N)=0.00037 *7*; α(O)=4.9×10^{-5} *7*; α(P)=1.93×10^{-6} *16*. Iγ: total intensity of 1.80 *9* based on branching ratios in Adopted Gammas. δ: α(K)exp=0.062 (1961Ar05).
	1255.71	1.05[&] *15*				
^{x}284.0		0.24 *3*				
286.2 *2*	1255.71	2.32 *23*	(M1,E2)		0.0504 *8*	α(K)=0.0423 *12*; α(L)=0.0065 *9*; α(M)=0.00135 *21*. α(N)=0.00028 *4*; α(O)=3.8×10^{-5} *4*; α(P)=1.54×10^{-6} *15*. Mult.: α(K)exp=0.027 (1961Ar05).
^{x}293.0		0.29 *3*	(M1,E2)		0.0471	α(K)=0.0395 *13*; α(L)=0.0060 *8*; α(M)=0.00125 *18*. α(N)=0.00026 *4*; α(O)=3.5×10^{-5} *4*; α(P)=1.44×10^{-6} *15*.
^{x}297.9		0.29 *3*				
^{x}307.2		≤0.15				
^{x}324.1		0.51 *5*				
328.4 *3*	755.28	0.54 *5*	M1,E2		0.0339 *14*	α(K)=0.0286 *17*; α(L)=0.0042 *4*; α(M)=0.00088 *8*. α(N)=0.000183 *15*; α(O)=2.47×10^{-5} *12*; α(P)=1.05×10^{-6} *13*. Mult.: α(K)exp=0.027 (1961Ar05).
334.0 *3*	555.13	1.06 *11*	M1,E2		0.0323 *14*	α(K)=0.0273 *18*; α(L)=0.0040 *3*; α(M)=0.00083 *7*. α(N)=0.000174 *13*; α(O)=2.35×10^{-5} *10*; α(P)=1.00×10^{-6} *13*. Mult.: α(K)exp=0.035 (1961Ar05).
^{x}337.8		1.28 *13*	(M1,E2)		0.0313 *15*	α(K)=0.0264 *18*; α(L)=0.0039 *3*; α(M)=0.00080 *7*. α(N)=0.000168 *12*; α(O)=2.27×10^{-5} *9*; α(P)=9.7×10^{-7} *13*.
343.4 *3*	992.09	0.26 *3*				
345.3 *3*	555.13	0.22 *2*				Eγ: poor fit, level–energy difference=346.3.
354.8[b]	575.44		[M4]		1.369	α(K)=1.045 *15*; α(L)=0.255 *4*; α(M)=0.0558 *8*. α(N)=0.01173 *17*; α(O)=0.001542 *22*; α(P)=5.80×10^{-5} *9*. Iγ: 1983TaZI report ≤2.7. γ not seen in 1972Ta02 and 1961Ar05. RI≤0.15 in 1973Is04. Based on decay data and in–beam γ–ray studies, the evaluators consider this γ ray either non–existent or very weak.

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^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[#]	α[†]	Comments
^{x}356.4		≤0.15			
366.1[a] *2*	555.13	2.15 *22*	M1,E2	0.0250 *17*	α(K)=0.0211 *18*; α(L)=0.00305 *12*; α(M)=0.00063 *3*. α(N)=0.000132 *5*; α(O)=1.79×10^{-5} *3*; α(P)=7.8×10^{-7} *11*. Iγ: 1.65 from 366 level and 0.50 from 575 level added. Mult.: α(K)exp=0.026 (1961Ar05).
	575.44		[E3]	0.0787	α(K)=0.0592 *9*; α(L)=0.01542 *22*; α(M)=0.00331 *5*. α(N)=0.000681 *10*; α(O)=8.49×10^{-5} *12*; α(P)=2.09×10^{-6} *3*. Eγ,Iγ: this γ is not reported in any of the three in–beam γ–ray studies, even though the 575, (11/2–) isomer is very strongly populated in these studies. It is possible that a small component of 366γ belongs in this location.
^{x}376.3		0.75 *8*			
382.9 *3*	603.40	0.97 *10*			
^{x}384.5		0.30 *3*			
386.7 *3*	575.44	0.85 *9*	(M2)	0.0862	α(K)=0.0727 *11*; α(L)=0.01073 *16*; α(M)=0.00223 *4*. α(N)=0.000471 *7*; α(O)=6.51×10^{-5} *10*; α(P)=3.12×10^{-6} *5*. Mult.: α(K)exp=0.116 (1961Ar05).
392.33 *10*	1648.04	22.2 *11*	(M1)	0.0223	α(K)=0.0192 *3*; α(L)=0.00246 *4*; α(M)=0.000503 *7*. α(N)=0.0001064 *15*; α(O)=1.487×10^{-5} *21*; α(P)=7.44×10^{-7} *11*. Mult.: α(K)exp=0.024, K/ΣL=8.0 (1961Ar05).
394.5 *2*	603.40	6.5 *3*			
^{x}407.6		0.70 *7*			
414.0 *2*	603.40	4.4 *4*			
416.1 *2*	551.58	2.8 *3*			
420.0[&] *2*	426.49	22.5[&] *25*	(E2)	0.01548	α(K)=0.01295 *19*; α(L)=0.00201 *3*; α(M)=0.000417 *6*. α(N)=8.70×10^{-5} *13*; α(O)=1.157×10^{-5} *17*; α(P)=4.58×10^{-7} *7*. Iγ: total IG=26.7 13 divided based on branching ratios in Adopted Gammas. Mult.: α(K)exp=0.016, K/ΣL=6.4 (1961Ar05).
	555.13	4.2[&] *4*			
426.2 *2*	1681.63	1.55 *16*	(M1)	0.0181	α(K)=0.01556 *22*; α(L)=0.00199 *3*; α(M)=0.000407 *6*. α(N)=8.61×10^{-5} *12*; α(O)=1.203×10^{-5} *17*; α(P)=6.03×10^{-7} *9*. Mult.: α(K)exp=0.018 (1961Ar05).
^{x}432.3		0.26 *3*			
^{x}434.5		0.74 *7*	(M1,E2)	0.0156 *16*	α(K)=0.0133 *16*; α(L)=0.00185 *6*; α(M)=0.000381 *9*. α(N)=8.00×10^{-5} *23*; α(O)=1.09×10^{-5} *6*; α(P)=5.0×10^{-7} *8*.
437.0 *3*	992.09	0.55 *6*			
^{x}450.1		0.37 *4*			
459.5 *1*	648.46	15.7 *8*	(E2)	0.01193	α(K)=0.01003 *14*; α(L)=0.001517 *22*; α(M)=0.000314 *5*. α(N)=6.55×10^{-5} *10*; α(O)=8.77×10^{-6} *13*; α(P)=3.58×10^{-7} *5*. Mult.: α(K)exp=0.013 gives M1,E2 (1961Ar05).
467.9 *2*	603.40	4.9 *5*			
^{x}475.5		0.46 *5*			
481.4 *1*	690.33	9.5 *5*	(E2)	0.01046	α(K)=0.00881 *13*; α(L)=0.001315 *19*; α(M)=0.000272 *4*. α(N)=5.68×10^{-5} *8*; α(O)=7.62×10^{-6} *11*; α(P)=3.16×10^{-7} *5*. Mult.: α(K)exp=0.016, K/ΣL=6.3 (1961Ar05).
491.8 *3*	1648.04	0.88 *9*			
501.4 *1*	690.33	6.8 *3*	(M1)	0.01203	α(K)=0.01037 *15*; α(L)=0.001322 *19*; α(M)=0.000270 *4*. α(N)=5.70×10^{-5} *8*; α(O)=7.98×10^{-6} *12*; α(P)=4.01×10^{-7} *6*. Mult.: α(K)exp=0.013 (1961Ar05).
^{x}517.6		0.48 *5*			
^{x}519.6		0.53 *5*			
525.3 *3*	1681.63	1.03 *10*			
^{x}528.5		0.86 *9*			
534.4 *2*	755.28	3.3 *3*	(M1)	0.01028	α(K)=0.00886 *13*; α(L)=0.001127 *16*; α(M)=0.000230 *4*. α(N)=4.86×10^{-5} *7*; α(O)=6.80×10^{-6} *10*; α(P)=3.42×10^{-7} *5*. Mult.: α(K)exp=0.011 (1961Ar05).

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^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[#]	α[†]	Comments
542.9 *2*	969.25	3.9 *4*	(M1,E2)	0.0087 *12*	α(K)=0.0074 *11*; α(L)=0.00100 *9*; α(M)=0.000205 *16*. α(N)=4.3×10^{-5} *4*; α(O)=6.0×10^{-6} *6*; α(P)=2.8×10^{-7} *5*. Mult.: α(K)exp=0.013 (1961Ar05).
546.6 *1*	755.28	11.6 *6*	(M1)	0.00972	α(K)=0.00839 *12*; α(L)=0.001066 *15*; α(M)=0.000217 *3*. α(N)=4.60×10^{-5} *7*; α(O)=6.43×10^{-6} *9*; α(P)=3.24×10^{-7} *5*. Mult.: α(K)exp=0.014, K/ΣL=8 (1961Ar05).
549.0 *2*	555.13	4.6 *5*			
551.5 *2*	551.58	4.6 *5*			
556.9 *2*	1812.59	3.3 *3*			
566.21 *10*	755.28	7.6 *4*			
569.2 *3*	575.44	≈0.10	[E3]	0.01751	α(K)=0.01419 *20*; α(L)=0.00264 *4*; α(M)=0.000554 *8*. α(N)=0.0001153 *17*; α(O)=1.506×10^{-5} *22*; α(P)=5.29×10^{-7} *8*. Iγ: from branching in-beam γ-ray study (1977Ch23), where this γ is seen very weakly with only 7% branching ratio, consistent with its high multipolarity. In 1983TaZI, with Iγ=1.19, branching is 34%. In 1972Ta02 this γ was not placed. Main component of this γ ray must belong somewhere else.
^{x}577.9		≤0.15			
^{x}589.8		0.70 *7*			
596.78 *20*	603.40	5.3 *5*	(M1,E2)	0.0068 *10*	α(K)=0.0059 *9*; α(L)=0.00078 *8*; α(M)=0.000160 *16*. α(N)=3.4×10^{-5} *4*; α(O)=4.6×10^{-6} *6*; α(P)=2.2×10^{-7} *4*. Mult.: α(K)exp=0.0106, K/ΣL=6 (1961Ar05).
601.0 *3*	1156.27	0.60 *6*			
^{x}606.3		0.40 *4*			
^{x}610.0		0.06 *1*			
^{x}614.9		0.55 *6*			
619.8 *3*	755.28	0.75 *8*			
^{x}628.0		0.31 *3*			
^{x}631.3		0.38 *4*			
656.2 *2*	1648.04	3.8 *4*			
658.9 *3*	879.33	0.82 *8*			
^{x}660.7		0.31 *3*			
670.4 *3*	879.33	0.83 *8*			
^{x}670.8[@] *7*		0.68 *7*			
678.8 *1*	1648.04	13.8 *7*	(M1)	0.00574	α(K)=0.00496 *7*; α(L)=0.000626 *9*; α(M)=0.0001275 *18*. α(N)=2.70×10^{-5} *4*; α(O)=3.78×10^{-6} *6*; α(P)=1.91×10^{-7} *3*. Mult.: α(K)exp=0.0075, K/ΣL=6.5 (1961Ar05).
^{x}684.4 *7*		0.65 *7*			
^{x}685.7		0.76 *8*			
689.2 *2*	1681.63	4.2 *4*			
690.3 *2*	879.33	4.2 *4*			
^{x}698.8		0.29 *3*			
700.6 *2*	1255.71	2.7 *3*			
^{x}706.0		0.51 *5*			
712.1 *2*	1681.63	2.9 *3*			
^{x}713.5		0.31 *3*			
730.2 *3*	1156.27				
^{x}737.9		0.53 *5*			
744.4 *3*	879.33	0.45 *5*			
748.5[c] *2*	755.28	6.9[c] *3*	(M1,E2)		Eγ: placement from 1972Ta02 and 1973Is04; not given in level-scheme figure 1 of 1983TaZI. Mult.: α(K)exp=0.0064 (1961Ar05).
	969.25	6.9[c] *3*			
759.9 *2*	969.25	1.33 *13*			
^{x}761.7		0.20 *2*			
^{x}766.4		0.31 *3*			
768.8 *2*	1648.04	2.95 *30*	(M1)		Mult.: α(K)exp=0.0053 (1961Ar05).
^{x}776.4		0.32 *3*			
780.4 *2*	969.25	6.4 *3*			
^{x}783.1		1.33 *13*			
^{x}789.2		≤0.1			

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^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§]	Mult.[#]	Comments
^{x}792.1		≤0.1		
^{x}793.4		≤0.1		
803.2 *1*	992.09	8.5 *4*	(M1,E2)	Mult.: α(K)exp=0.0051 (1961Ar05).
^{x}805.2		0.61 *6*		
^{x}816.3		0.59 *6*		
^{x}818.4		0.64 *6*		
820.5 *2*	1812.59	2.8 *3*		
^{x}822.7		0.33 *3*		
^{x}826.6		0.11 *1*		
828.9 *3*	1255.71	1.07 *11*		
833.5 *2*	969.25	2.6 *3*		
^{x}869.1		0.51 *5*		
872.5 *2*	879.33	5.3 *5*	(M1,E2)	Mult.: α(K)exp=0.0041 (1961Ar05).
^{x}883.2		0.56 *6*		
892.6 *1*	1648.04	21.2 *11*	(M1)	Mult.: α(K)exp=0.0032, K/ΣL=6.4 (1961Ar05).
^{x}911.1		0.30 *3*		
^{x}923.8[@] *4*		0.45 *5*		
927.0 *3*	1681.63	1.26 *13*		
933.2 *2*	1812.59	4.5 *5*		
935.2 *2*	1156.27	4.5 *5*		
947.6[c] *3*	1156.27	0.96[c] *10*		
	1941.05	0.96[c] *10*		Eγ: poor fit, level–energy difference=948.7.
^{x}955.4		0.93 *9*		
957.5 *2*	1648.04	4.1 *4*		
962.6 *2*	969.25	2.8 *3*		
^{x}970.7[@] *7*		0.28 *3*		
991.3 *2*	1681.63	1.62 *16*		
999.5 *1*	1648.04	7.8 *4*		
^{x}1019.3[@] *4*		0.45 *5*		
1026.1[b] *3*	2019.15	0.25 *3*		Eγ: γ reported only in 1973Is05.
1034.8 *1*	1255.71	8.1 *4*	(M1,E2)	Mult.: α(K)exp=0.0024, K/ΣL=7.4 (1961Ar05).
1044.7 *1*	1648.04	13.8 *7*		
1047.1 *1*	1255.71	7.8 *4*		Eγ: from 1973Is04; large uncertainty of 0.6 keV in 1972Ta02.
^{x}1051.2		0.40 *4*		
1072.8 *3*	1648.04	0.75 *8*		
1077.7 *3*	1681.63	1.40 *14*		
^{x}1080.7[@] *5*		0.37 *4*		
^{x}1112.0[@] *5*		0.48 *5*		
^{x}1115.5		0.95 *10*		
1122.3 *2*	1812.59	5.2 *3*		
1126.7 *2*	1681.63	2.6 *3*		
1164.4 *3*	1812.59	0.99 *10*		
^{x}1180.2		1.00 *10*		
^{x}1181.8[@] *5*		0.56 *6*		
1209.1 *2*	1812.59	6.7 *3*		
1221.7 *2*	1648.04	6.4 *3*		Mult.: α(K)exp=0.0016 (1961Ar05).
1237.3 *3*	1812.59	0.79 *8*		
1250.5 *2*	1941.05	1.27 *13*		
^{x}1255.6[@] *4*		0.56 *6*		
^{x}1266.4[@] *4*		0.31 *3*		
^{x}1286.0		0.77 *8*		
1292.8 *2*	1941.05	1.66 *17*		
^{x}1295.4[@] *4*		0.40 *4*		
^{x}1302.9		0.55 *6*		
1370.4 *3*	2019.15	0.69 *7*		
1385.7 *3*	1812.59	0.58 *6*		
^{x}1421.6[@] *4*		0.28 *3*		
^{x}1429.6[@] *6*		0.13 *2*		
1444.0 *3*	2019.15	0.57 *6*		
1459.2 *1*	1648.04	50.0 *25*		Mult.: from α(K)exp=4×10^{-4} *1* (in figure 7 of 1973Is04) suggests E1, but (M1,E2) from α(K)exp=0.0013 and K/ΣL=6.3 (1961Ar05).
1473.3 *3*	1681.63	0.73 *7*		
1492.4 *3*	1681.63	0.49 *5*		

Continued on next page (footnotes at end of table)

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

γ(^{129}Cs) (continued)

Eγ[‡]	E(level)	Iγ[§]
[x]1553.2		0.22 *2*
1604.0 *3*	1812.59	0.31 *3*
1623.7 *1*	1812.59	11.0 *6*
1641.1 *3*	1648.04	1.04 *10*
1675.1 *3*	1681.63	0.29 *3*
1752.1 *3*	1941.05	0.74 *7*
1805.5 *3*	1812.59	0.60 *6*
[x]1810.1[@] *4*		0.20 *2*
1830.2 *3*	2019.15	0.03 *1*
[x]1890.7		≤0.15
[x]1934.9[@] *5*		0.14 *2*
[x]1969.6[@] *3*		0.17 *2*
[x]2069.7[@] *3*		0.28 *3*
[x]2287.1[@] *10*		0.08 *1*

[†] Overlaps M1 and E2 values for M1+E2, or M1,E2 transitions.

[‡] From unweighted average of values from 1972Ta02 and 1973Is04 (or 1983TaZI). Uncertainties are provided only by 1972Ta02. In 1983TaZI, most energies are the same as in 1973Is04. Based on comparison of values in three studies, evaluators assign the uncertainties as follows: Δ(Eγ)=0.10 keV for Iγ≥3%, 0.20 keV for Iγ=0.5–3%, and 0.3 keV or Iγ<0.5%. Document records in the ENSDF database provide compiled Eγ values from 1973Is04, 1972Ta02, and 1961Ar05. Unplaced γ rays are from 1973Is04 unless otherwise stated.

[§] Values are from 1983TaZI relative to 100 for 182.3γ, i.e. each value in 1983TaZI is multiplied by a factor of 2.5. 1983TaZI quoted absolute intensities but lack of knowledge about direct ε feeding to 6.5–keV, 5/2+ level does not allow normalization of the decay scheme. Uncertainties are not given by 1983TaZI. The evaluators assign the uncertainties as follows: Δ(Iγ)=5% for Iγ≥5, 10% for Iγ<5. There is in general poor agreement of intensities listed by 1983TaZI, 1973Is04 and 1972Ta02; with factor of 2 difference in many cases. Values are adopted here from 1983TaZI, since they probably used more efficient Ge detectors resulting in better statistics. Document records in the ENSDF database provide compiled Iγ data from 1973Is04 and 1972Ta02, and Ice(K), K/L ratios from 1961Ar05.

[#] From 1973Is04 unless otherwise noted. Values α(K)exp, K/L and L–subshell ratios are from private communication to evaluator of 1996Te01 from 1973Is04. Other multipolarities are deduced by evaluators of current evaluation using Iγ values from 1973Is04 and Ice(K) and/or K/L ratios from 1961Ar05. For γ rays above 400 keV or so, such assignments are tentative since the agreement between deduced α(K)exp values and theoretical values from BrIcc code is poor.

[@] This γ from 1972Ta02 only.

[&] Multiply placed; intensity suitably divided.

[a] Multiply placed.

[b] Placement of transition in the level scheme is uncertain.

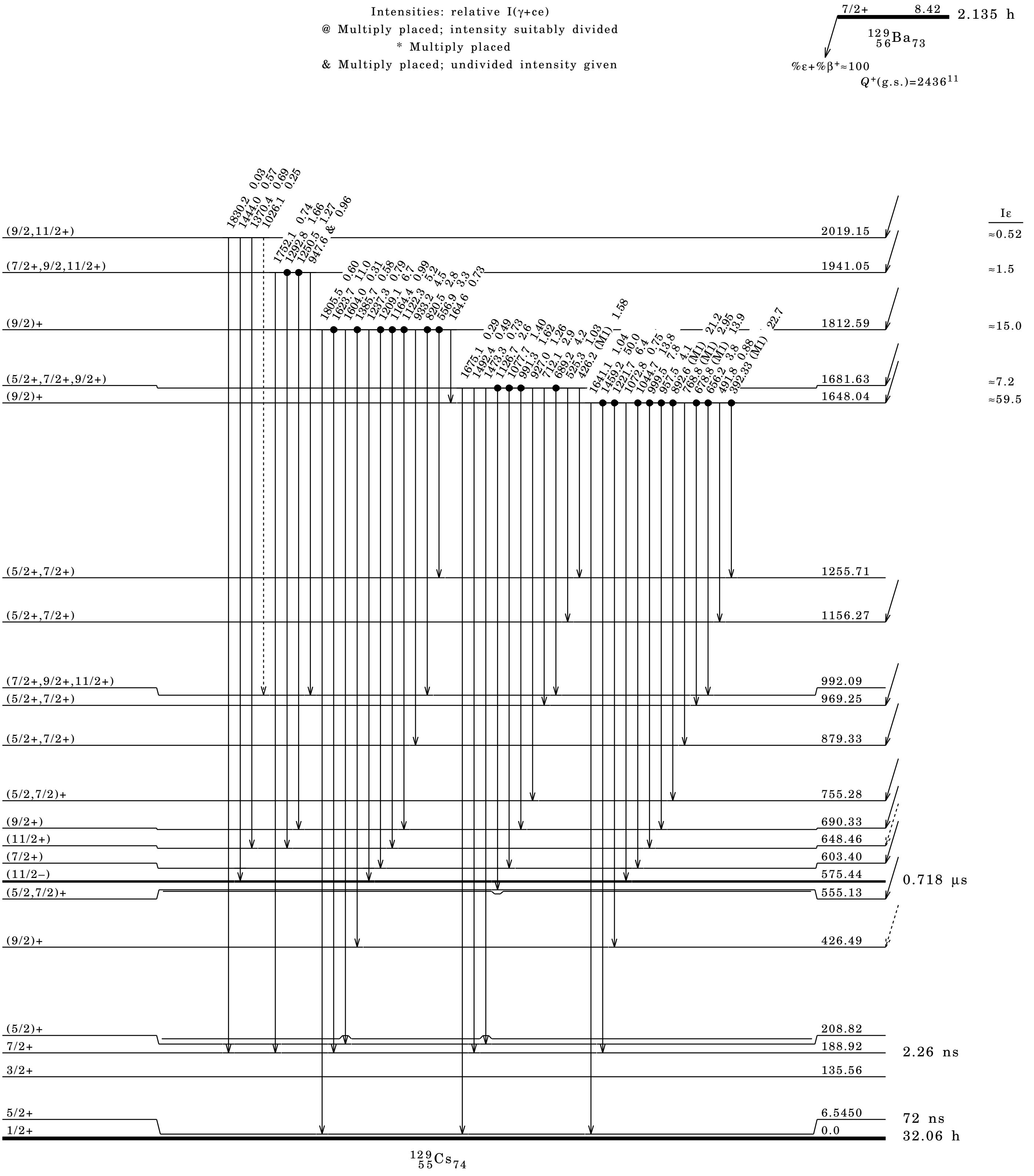
[c] Multiply placed; undivided intensity given.

[x] γ ray not placed in level scheme.

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

Decay Scheme

Intensities: relative I(γ+ce)
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given

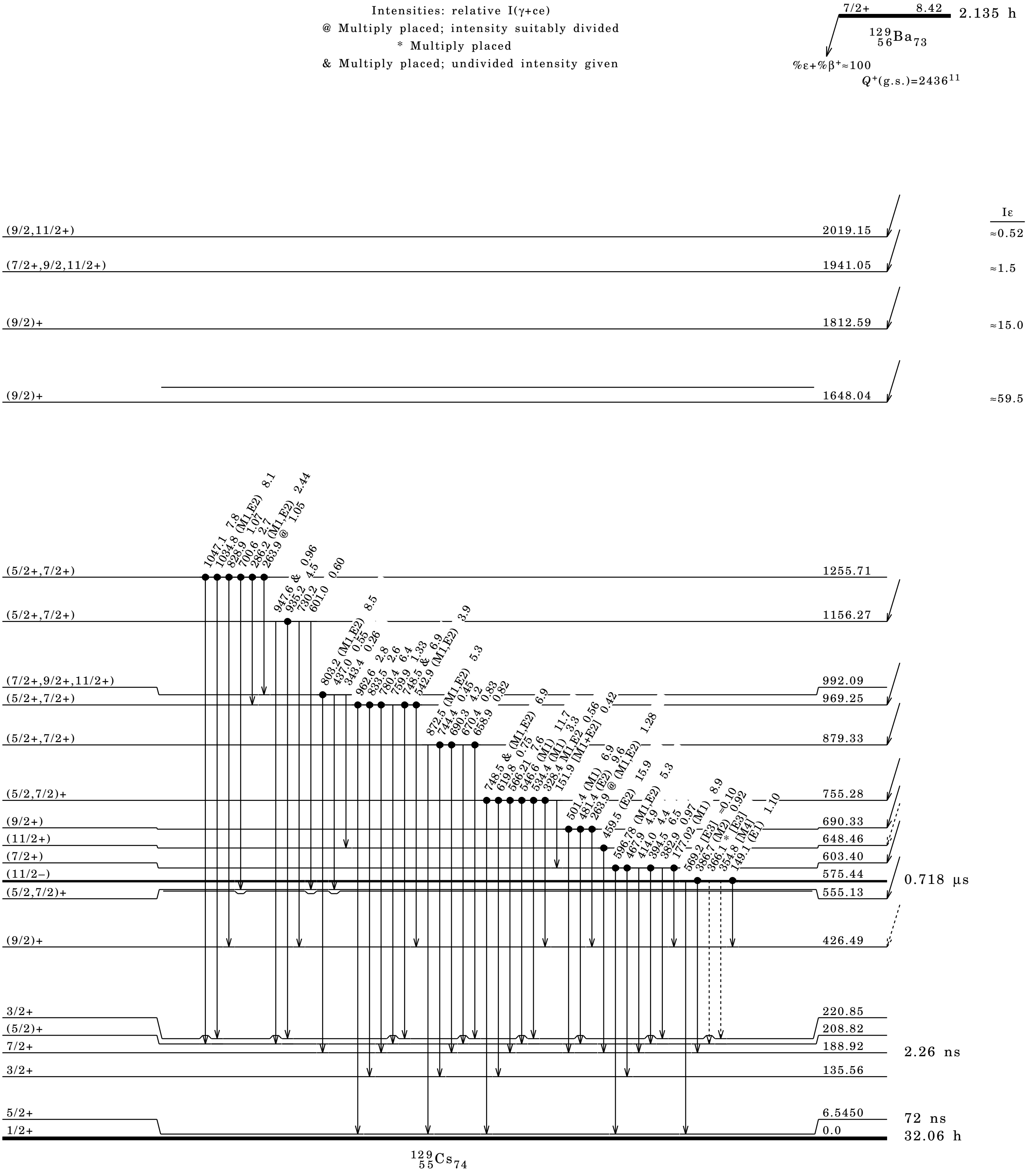


From NNDC(BNL)
program ENSDAT

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

Decay Scheme (continued)

Intensities: relative I(γ+ce)
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given

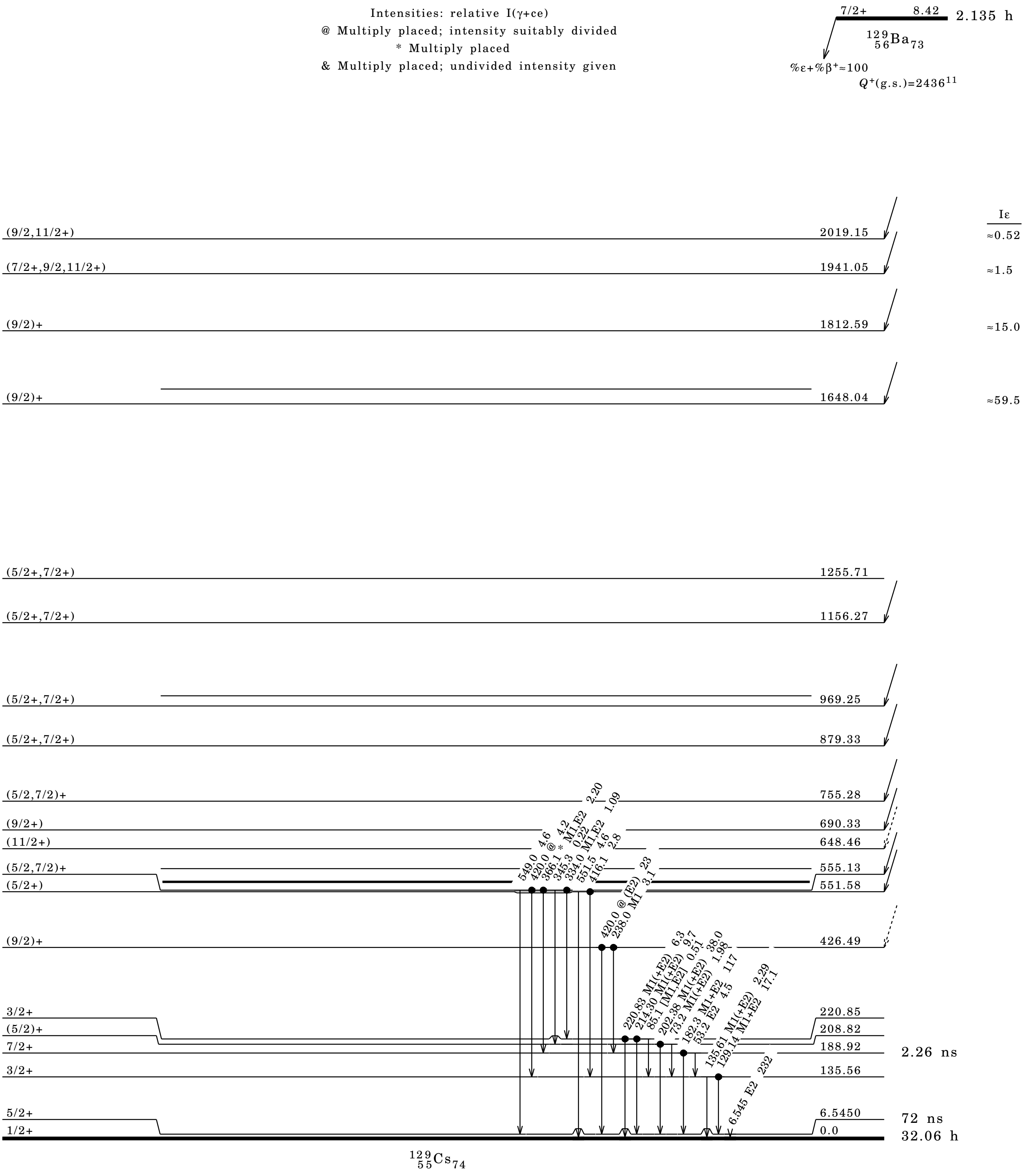


From NNDC(BNL)
program ENSDAT

^{129}Ba ε Decay (2.135 h) 1983TaZI,1973Is04,1972Ta02 (continued)

Decay Scheme (continued)

Intensities: relative I(γ+ce)
@ Multiply placed; intensity suitably divided
* Multiply placed
& Multiply placed; undivided intensity given



From NNDC(BNL)
program ENSDAT

^{129}Cs IT Decay (0.718 μs) 1978Da29

Parent ^{129}Cs: E=575.45 *5*; Jπ=(11/2−); T$_{1/2}$=0.718 μs *21*; %IT decay=100.
1978Da29: measured Eγ, Iγ, half–life, g factor.

^{129}Cs Levels

E(level)[†]	Jπ[†]	T$_{1/2}$[†]	Comments
0.0	1/2+	32.06 h *6*	%ε+%β^{+}=100.
6.57 *4*	5/2+	72 ns *6*	
135.58 *4*	3/2+		
188.94 *5*	7/2+	2.26 ns *6*	
209.08? *5*	(5/2)+		
220.75? *4*	3/2+		
426.49 *5*	(9/2+)		
575.45 *5*	(11/2−)	0.718 μs *21*	%IT=100. μ=+6.55 *10* (1978De29). μ: TDPAD method (1978De29). T$_{1/2}$: from γγ(t); weighted average of 0.734 μs *23* (1978De29), and 0.69 μs *3* (1977Ch23). Other: 0.73 μs *7* (1979Ga01, same group as 1978De29).

[†] From Adopted Levels unless otherwise stated.

γ(^{129}Cs)

Iγ normalization: Summed transition intensity=100 for γ rays from 575–keV isomer.

Eγ[†]	E(level)	Iγ[‡§]	Mult.[†]	δ[†]	α	I(γ+ce)[§]	Comments
6.55 *5*	6.57		E2		432000	189 *10*	
53.2 *1*	188.94	0.15 *2*	E2		18.6		α(K)=6.53 *10*; α(L)=9.52 *16*; α(M)=2.08 *4*. α(N)=0.419 *7*; α(O)=0.0474 *8*; α(P)=0.000174 *3*.
73.2[#] *1*	209.08?		[M1,E2]		4.0 *18*		α(K)=2.5 *6*; α(L)=1.2 *10*; α(M)=0.26 *21*. α(N)=0.05 *5*; α(O)=0.006 *5*; α(P)=7.7×10^{-5} *3*.
85.1[#] *1*	220.75?		[M1,E2]		2.4 *10*		α(K)=1.6 *4*; α(L)=0.6 *5*; α(M)=0.13 *10*. α(N)=0.027 *20*; α(O)=0.0032 *23*; α(P)=5.05×10^{-5} *25*.
129.14 *9*	135.58	1.7 *2*	M1+E2	0.20 *5*	0.449 *9*		α(K)=0.381 *7*; α(L)=0.054 *3*; α(M)=0.0112 *6*. α(N)=0.00236 *12*; α(O)=0.000322 *13*; α(P)=1.477×10^{-5} *21*.
135.61 *9*	135.58	0.24 *4*	[M1,E2]		0.51 *13*		α(K)=0.39 *7*; α(L)=0.09 *5*; α(M)=0.019 *11*. α(N)=0.0040 *21*; α(O)=0.00050 *24*; α(P)=1.32×10^{-5} *5*.
149.05 *8*	575.45	100 *5*	(E1)		0.0722		α(K)=0.0621 *9*; α(L)=0.00811 *12*; α(M)=0.001649 *24*. α(N)=0.000344 *5*; α(O)=4.65×10^{-5} *7*; α(P)=2.03×10^{-6} *3*.
182.32 *5*	188.94	68 *8*	M1+E2	0.25 *2*	0.1718 *25*		α(K)=0.1463 *21*; α(L)=0.0203 *4*; α(M)=0.00417 *8*. α(N)=0.000879 *16*; α(O)=0.0001209 *20*; α(P)=5.65×10^{-6} *8*.
202.38[#] *7*	209.08?		M1(+E2)	0.2 *2*	0.128 *4*		α(K)=0.1094 *23*; α(L)=0.0148 *14*; α(M)=0.0030 *3*. α(N)=0.00064 *6*; α(O)=8.8×10^{-5} *7*; α(P)=4.25×10^{-6} *7*.
214.30[#] *7*	220.75?		M1(+E2)	0.5 *5*	0.113 *8*		α(K)=0.095 *4*; α(L)=0.014 *3*; α(M)=0.0029 *7*. α(N)=0.00061 *13*; α(O)=8.3×10^{-5} *14*; α(P)=3.59×10^{-6} *11*.
220.83[#] *7*	220.75?		[M1,E2]		0.110 *10*		α(K)=0.090 *5*; α(L)=0.015 *5*; α(M)=0.0032 *9*. α(N)=0.00067 *18*; α(O)=8.7×10^{-5} *20*; α(P)=3.21×10^{-6} *16*.

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^{129}Cs IT Decay (0.718 μs) 1978Da29 (continued)

γ(^{129}Cs) (continued)

Eγ[†]	E(level)	Iγ[‡][§]	Mult.[†]	α	Comments
237.65 *9*	426.49	12.1 *12*	(M1)	0.0822	
354.8[#]	575.45		[M4]	1.369	Eγ: γ reported only by 1983TaZI in ε decay with an upper limit of intensity. It is neither seen in any other decay study (1972Ta02, 1973Is04) nor in in–beam γ–ray data; thus it is considered as questionable by the evaluators. α(K)=1.045 *15*; α(L)=0.255 *4*; α(M)=0.0558 *8*. α(N)=0.01173 *17*; α(O)=0.001542 *22*; α(P)=5.80×10^{-5} *9*.
365.86[#] *8*	575.45		[E3]	0.0789	Eγ: γ not reported in in–beam γ–ray data; B(E3)(W.u.)=400 *50* is a factor of 4 larger than RUL, thus this transition is considered suspect. α(K)=0.0594 *9*; α(L)=0.01547 *22*; α(M)=0.00332 *5*. α(N)=0.000683 *10*; α(O)=8.52×10^{-5} *12*; α(P)=2.10×10^{-6} *3*.
386.7 *1*	575.45	64 *5*	[M2]	0.0862	α(K)=0.0727 *11*; α(L)=0.01073 *15*; α(M)=0.00223 *4*. α(N)=0.000471 *7*; α(O)=6.51×10^{-5} *10*; α(P)=3.12×10^{-6} *5*.
419.83 *7*	426.49	94 *7*			
569.3 *1*	575.45	12.7 *18*	[E3]	0.01750	

[†] From Adopted dataset for ^{129}Cs.

[‡] Branching ratios of γ rays from 575–keV isomer taken from Adopted dataset. Based on these values, intensities for γ rays from lower levels are deduced.

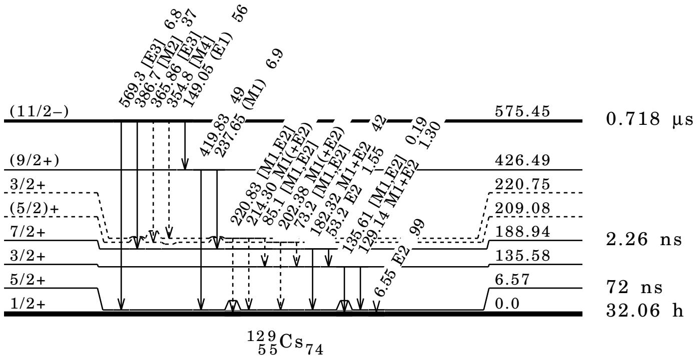
[§] For absolute intensity per 100 decays, multiply by 0.526 *20*.

[#] Placement of transition in the level scheme is uncertain.

^{129}Cs IT Decay (0.718 μs) 1978Da29 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays
%IT=100



^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01

2009Si08: ^{122}Sn(^{11}B,4nγ) E=60 MeV, enriched thick target, 12 Compton–suppressed HPGe detectors plus 14 BGO multiplicity filter; measured Eγ, Iγ, γγ, γγ(θ)(DCO); deduced levels, J, π, bands.
2009Zh20: ^{122}Sn(^{11}B,4nγ) E=55,60 MeV, enriched thick target, 14 Compton–suppressed HPGe detectors; measured Eγ, Iγ, γγ, γγ(θ)(DCO); deduced levels, J, π, bands. Gamma–ray intensities and DCO ratios are not listed in the paper.
2010Wa01: ^{124}Sn(^{11}B,6nγ) E=65 MeV, 14 Compton–suppressed HPGe detectors; measured lifetimes by Doppler–shift attenuation method; deduced transition quadrupole moments.
The level scheme and the most data are from 2009Si08, except when stated otherwise.

^{129}Cs Levels

E(level)[†]	Jπ	$T_{1/2}$[§]	Comments
0.0	1/2+	32.06 h[#] *6*	
6.55[d] *5*	5/2+	72 ns[#] *6*	
188.8[c] *3*	7/2+	2.26 ns[#] *6*	
209.5[‡b] *4*	5/2+		
426.4[d] *3*	9/2+		
575.4[e] *3*	11/2−	0.718 μs *21*	%IT=100. $T_{1/2}$: from Adopted Levels.
604.0[a] *4*	7/2+		The γ–ray branching ratios differ significantly from those in Adopted dataset taken from ^{129}Ba ε decay.
647.7[c] *4*	11/2+		
690.6[b] *4*	9/2+		The γ–ray branching ratios differ significantly from those in Adopted dataset taken from ^{129}Ba ε decay.
1023.3[e] *5*	15/2−		
1032.7[d] *4*	13/2+		
1150.4[f] *6*	13/2−		
1231.8[a] *5*	11/2+		
1278.7[c] *4*	15/2+	0.53 ps *+12−11*	Q(transition)=6.0 *+8−6*.
1339.7[b] *5*	13/2+		
1627.6[e] *6*	19/2−	1.64 ps *+53−35*	Q(transition)=3.6 *+5−4*.
1691.6[f] *6*	17/2−		
1718.2[‡h] *8*	(15/2−)		E(level),Jπ: assumed by the evaluators.
1792.7[d] *5*	17/2+		
1890.6[a] *5*	15/2+		
2046.9[c] *5*	19/2+	0.30 ps *+12−8*	Q(transition)=4.7 *+8−7*.
2122.9[b] *5*	17/2+		
2214.5[h] *6*	19/2−		
2319.4[f] *6*	21/2−		
2395.7[e] *6*	23/2−	0.49 ps *+15−14*	Q(transition)=3.6 *+7−5*.

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^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

^{129}Cs Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[§]	Comments
2500.3 *6*	19/2+		
2632.7[d] *6*	21/2+	0.15 ps *+4–6*	Q(transition)=5.2 *+13–6*.
2666.8[a] *6*	19/2+		
2676.7[@] *5*	19/2+		
2812.7[&] *6*	21/2+		
2842.6[h] *7*	23/2–		
2907.6[c] *6*	23/2+	0.15 ps *+10–7*	Q(transition)=5.0 *+14–13*.
2942.3[i] *6*	21/2+		
2952.2[b] *6*	21/2+		
2980.9[‡] *11*	(21/2+)		
3042.9[@] *6*	23/2+		
3095.7[f] *7*	25/2–		
3156.9[i] *6*	23/2+		
3235.7[e] *7*	27/2–	0.33 ps *10*	Q(transition)=3.5 *+7–5*.
3291.0 *9*	25/2+		
3296.4[d] *9*	25/2+	<0.18 ps	Q(transition)>8.6.
3406.9[&] *7*	25/2+		
3418.8[i] *7*	25/2+		
3517.9[g] *8*	25/2–		
3590.7[‡h] *8*	(27/2–)		
3681.7[i] *7*	27/2+		
3684.1? *7*	(27/2–)		This level was suggested only by 2009Si08. The depopulating two strong γ rays (589.1 and 1289.3) have the same energies within the experimental uncertainty as the corresponding γ rays from the next level and feed the same levels. The 840.0 keV γ is probably weak with no intensity given. The existence of the level is not discussed in 2009Si08. Evaluators do not see enough evidence for the existence of this level.
3685.1[g] *7*	27/2–		
3729.1[c] *9*	27/2+	<0.11 ps	Q(transition)>6.4.
3732.6 *8*	(27/2+)		
3734.9[@] *7*	27/2+		
3809.7[b] *7*	25/2+		
3919.2 *9*	(25/2+)		
3924.3[f] *8*	29/2–		
3949.0[d] *11*	29/2+		
3993.2[i] *8*	29/2+		
4026.6[g] *9*	29/2(–)		
4114.6[e] *8*	31/2–	0.139 ps *+49–28*	Q(transition)=4.7 *+6–7*.
4131.1[&] *8*	29/2+		
4198.5 *12*	29/2(+)		
4366.5[i] *8*	31/2+		
4420.2[g] *10*	31/2(–)		
4436.2[c] *12*	31/2+		
4445.2[‡h] *10*	(31/2)		
4599.7[@] *8*	31/2+		
4764.3[f] *9*	33/2–		
4899.6[g] *12*	33/2(–)		
5025.8 *9*	(33/2+)		In 2009Zh20 this level is proposed as the 33/2+ member of band B. In 2009Si08 it is the 5068.0 keV level. The configurations of these levels are not firmly determined, both can belong to band B. In this evaluation the suggestion of 2009Si08 is accepted tentatively.
5032.5[e] *9*	35/2–	<0.40 ps	Q(transition)>2.5.
5068.0[&] *9*	33/2+		
5212.1[i] *11*	(35/2+)		
5281.5[c] *13*	35/2+		
5401.7[g] *14*	35/2(–)		
5548.0[@] *10*	35/2+		
5567.8[‡] *11*	(35/2+)		In 2009Zh20 this level is proposed as the 35/2+ member of band A. In 2009Si08 it is the 5548.0 keV level. The configurations of these levels are not firmly determined, both can belong to band A. In this evaluation the suggestion of 2009Si08 is accepted tentatively.
5692.2[f] *9*	(37/2–)		
5989.5[e] *9*	39/2–		

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^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

^{129}Cs Levels (continued)

E(level)[†]	Jπ	Comments
6051.8[‡] *15*		In 2009Zh20 this level is proposed as the 37/2+ member of band β. In this evaluation the suggestion of 2009Si08 has been accepted tentatively for the highest–spin states of this band. See the comments in levels 5025.8 keV and 5567.8 keV.
6200.0[i] *13*	(39/2+)	
6270.5[‡c] *17*	(39/2+)	
7000.7[e] *12*	43/2−	
7379.5[‡c] *20*	(43/2+)	
8099.4[e] *14*	(47/2−)	

[†] From least–squares fit to Eγ data.
[‡] Level from 2009Zh20.
[§] From 2010Wa01 unless otherwise noted.
[#] From Adopted Levels.
[@] (A): Possible 3–qp band,α=−1/2. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.
[&] (B): Possible 3–qp band,α=+1/2. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.
[a] (C): $\pi g_{7/2}$+γ vibration.
[b] (D): $\pi g_{7/2}$,α=+1/2. Favored signature partner, band crossing due to $h_{11/2}$ proton pair at ħω=0.41 MeV.
[c] (E): $\pi g_{7/2}$,α=−1/2. Unfavored signature partner, band crossing due to $h_{11/2}$ proton pair at ħω=0.37 MeV.
[d] (F): $\pi d_{5/2}$,α=+1/2. Favored signature partner, band crossing due to $h_{11/2}$ proton pair at ħω=0.37 MeV.
[e] (G): $\pi h_{11/2}$,α=−1/2. Favored signature partner, band crossing due to $h_{11/2}$ neutron pair at ħω=0.43 MeV.
[f] (H): $\pi h_{11/2}$,α=+1/2. Unfavored signature partner, band crossing due to $h_{11/2}$ neutron pair at ħω=0.41 MeV.
[g] (I): Possible magnetic–rotational band. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}{}^2$.
[h] (J): $\pi h_{11/2}$+γ vibration. The γ vibration refers to that of a triaxial core.
[i] (K): Possible 3–qp, ΔJ=1 band. Possible configuration=$\pi h_{11/2}\otimes\nu h_{11/2}\otimes\ \nu(g_{7/2}/s_{1/2}/d_{3/2})$.

γ(^{129}Cs)

The DCO ratios were deduced from coincidence spectra with gates on transitions of known ΔJ=2 quadrupole multipolarity (2009Si08). Expected ratios are 1.0 for ΔJ=2, quadrupole and ≈0.6 for ΔJ=1, dipole transitions.

Eγ[†]	E(level)	Iγ[†]	Mult.	α	Comments
6.55 *5*	6.55				
136.5 *7*	2812.7	0.84 *8*	[M1+E2]	0.50 *13*	α(K)=0.39 *7*; α(L)=0.09 *5*; α(M)=0.019 *11*. α(N)=0.0039 *21*; α(O)=0.00049 *23*; α(P)=1.30×10^{-5} *5*.
145.3 *7*	2812.7	3.3 *4*	(M1+E2)	0.41 *10*	DCO=0.62 *12*. α(K)=0.32 *5*; α(L)=0.07 *4*; α(M)=0.015 *8*. α(N)=0.0030 *15*; α(O)=0.00038 *17*; α(P)=1.08×10^{-5} *4*.
149.1 *4*	575.4	65 *6*	(E1)	0.0722 *12*	DCO=0.64 *5*. α(K)=0.0620 *10*; α(L)=0.00810 *13*; α(M)=0.00165 *3*. α(N)=0.000344 *6*; α(O)=4.65×10^{-5} *8*; α(P)=2.03×10^{-6} *4*.
166.0 *7*	2666.8	0.23 *4*			
167.1 *7*	3685.1	2.9 *4*	(M1+E2)	0.26 *5*	DCO=0.58 *12*. α(K)=0.21 *3*; α(L)=0.041 *18*; α(M)=0.009 *4*. α(N)=0.0018 *8*; α(O)=0.00023 *9*; α(P)=7.20×10^{-6} *14*.
177.5 *7*	2676.7	0.11 *2*			
182.3 *4*	188.8	109 *8*	(M1+E2)	0.20 *3*	DCO=0.62 *5*. α(K)=0.160 *17*; α(L)=0.030 *12*; α(M)=0.0063 *25*. α(N)=0.0013 *5*; α(O)=0.00017 *6*; α(P)=5.59×10^{-6} *12*.
202.8 *7*	209.5	5.1 *5*	(M1+E2)	0.142 *17*	DCO=0.54 *8*. α(K)=0.116 *9*; α(L)=0.021 *7*; α(M)=0.0043 *15*. α(N)=0.0009 *3*; α(O)=0.00012 *4*; α(P)=4.10×10^{-6} *15*. DCO value contradicts 5/2+ to 5/2+ assignment (evaluators).
205.5 *7*	3156.9	1.11 *14*	(M1+E2)	0.137 *16*	DCO=0.52 *11*. α(K)=0.112 *8*; α(L)=0.020 *6*; α(M)=0.0041 *14*. α(N)=0.0009 *3*; α(O)=0.00011 *3*; α(P)=3.95×10^{-6} *16*.
214.5 *7*	3156.9	0.62 *7*	(M1+E2)	0.120 *12*	DCO=0.52 *14*. α(K)=0.098 *6*; α(L)=0.017 *5*; α(M)=0.0035 *11*. α(N)=0.00074 *21*; α(O)=9.6×10^{-5} *23*; α(P)=3.49×10^{-6} *16*.
230.3 *7*	3042.9	3.2 *4*	(M1+E2)	0.096 *8*	DCO=0.54 *11*. α(K)=0.080 *4*; α(L)=0.013 *4*; α(M)=0.0028 *8*. α(N)=0.00058 *15*; α(O)=7.6×10^{-5} *16*; α(P)=2.85×10^{-6} *17*.

Continued on next page (footnotes at end of table)

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

γ(^{129}Cs) (continued)

Eγ†	E(level)	Iγ†	Mult.	α	Comments
237.6 *7*	426.4	4.7 *5*	(M1+E2)	0.088 *6*	DCO=0.52 *11*. α(K)=0.0727 *23*; α(L)=0.012 *3*; α(M)=0.0025 *6*. α(N)=0.00052 *12*; α(O)=6.9×10^{-5} *13*; α(P)=2.60×10^{-6} *17*.
262.1 *7*	3418.8	0.37 *10*	(M1+E2)	0.0654 *23*	DCO=0.54 *14*. α(K)=0.0545 *9*; α(L)=0.0087 *16*; α(M)=0.0018 *4*. α(N)=0.00038 *7*; α(O)=5.0×10^{-5} *7*; α(P)=1.97×10^{-6} *16*. DCO value for 262.1γ+262.8γ.
262.8 *7*	3681.7	0.83 *20*			
263.9 *7*	690.6	1.18 *15*			
265.5 *7*	2942.3	0.27 *5*			
306.0‡	4420.2				
311.7 *7*	3993.2	0.80 *14*			
327.9 *7*	3734.9	0.22 *4*	(M1+E2)	0.0341 *14*	DCO=0.54 *15*.
341.3 *7*	4026.6	5.6 *5*	(M1+E2)	0.0304 *15*	DCO=0.62 *10*.
354.5‡	3590.7				
363.6 *7*	3406.9	2.2 *3*	(M1+E2)	0.0254 *17*	DCO=0.59 *12*.
366.5 *7*	3042.9	0.25 *4*			
373.5 *7*	4366.5	0.65 *8*			
375.5 *7*	3418.8	0.14 *3*			
384.9 *7*	1032.7	3.9 *4*	D+Q		DCO=0.62 *10*.
386.4 *4*	575.4	45 *4*	[M2]	0.0864	DCO=0.62 *5*. α(K)=0.0729 *11*; α(L)=0.01076 *16*; α(M)=0.00223 *4*. α(N)=0.000472 *7*; α(O)=6.53×10^{-5} *10*; α(P)=3.12×10^{-6} *5*. The DCO value contradicts with the multipolarity assignment.
393.5 *7*	4420.2	3.8 *4*	(M1+E2)	0.0204 *17*	DCO=0.52 *14*.
394.6 *7*	604.0	0.81 *14*			
395.7 *7*	4131.1	0.31 *6*	(M1+E2)	0.0201 *17*	DCO=0.52 *14*.
400.0‡	4131.1				
415.3 *7*	604.0	0.35 *5*			
419.7 *4*	426.4	88 *5*			
422.5	3517.9				
425‡	5025.8				
446	2842.6				
447.9 *4*	1023.3	100 *4*			
449.5 *7*	3685.1	8.5 *8*	D+Q		DCO=0.82 *16*.
459.2 *4*	647.7	57 *3*			
468.5§ *7*	4599.7	0.19§ *4*	D+Q		DCO=0.58 *14*. DCO value for 468.5 doublet.
	5068.0	0.10§ *3*			
469.4 *7*	4198.5	1.33 *18*	D		DCO=0.62 *16*.
479.4 *7*	4899.6	3.7 *5*	D+Q		DCO=0.45 *14*.
479.7 *7*	5548.0	0.22 *4*			DCO=0.45 *14*.
481.0 *4*	690.6	15.2 *9*			
484‡	6051.8				
496 *1*	2214.5				
501.6 *7*	690.6	1.58 *16*			
502.1 *7*	5401.7	2.8 *4*	D+Q		DCO=0.65 *12*.
514.0 *7*	1792.7	0.39 *7*			
522.8§ *7*	2214.5	9.1§ *7*	D+Q		DCO=0.52 *8*. DCO value for 522.8 doublet.
	2842.6	4.2§ *4*			
524.5 *7*	3681.7	0.47 *8*			
541.5# *7*	1691.6				
542.5‡	5567.8				
569.2 *7*	575.4		[E3]	0.0175	
574.5 *7*	3993.2	0.12 *2*			
575.3 *7*	1150.4	4.1 *4*			
586.8 *7*	2632.7	0.38 *6*			
587 *1*	2214.5				
589.1# *7*	3684.1?	5.2 *5*	D+Q		DCO=0.47 *9*. DCO value for 589.1γ+589.5γ.
589.5 *7*	3685.1	1.7 *2*	D+Q		DCO=0.47 *9*. DCO value for 589.1γ+589.5γ.

Continued on next page (footnotes at end of table)

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

γ(^{129}Cs) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.	Comments
594.5 *7*	3406.9	0.10 *2*		
597.5 *7*	604.0	2.5 *3*		
604.3 *4*	1627.6	93 *5*	E2	DCO=1.05 *8*.
606.1 *4*	1032.7	28.9 *16*	Q	DCO=0.92 *10*.
627.8 *4*	2319.4	15.2 *8*	Q	DCO=0.98 *12*. DCO value for 627.8γ+628.0γ.
628.0[§] *7*	1231.8	2.5[§] *3*		
	2842.6	2.2[§] *3*		
631.3 *4*	1278.7	27.1 *16*	E2	DCO=1.12 *9*.
648.9 *4*	1339.7	14.1 *8*	Q	DCO=0.95 *9*.
650.6 *7*	4764.3	4.3 *5*	D+Q	DCO=0.68 *11*.
652.6 *7*	3949.0	2.9 *4*	Q	DCO=0.94 *17*.
658.3 *7*	3291.0	3.2 *4*	Q	DCO=0.92 *16*.
659.0 *7*	1890.6	2.3 *3*	Q	DCO=0.94 *17*.
659.2 *7*	5692.2	2.5 *3*		
663.7 *7*	3296.4	4.5 *5*	E2	DCO=0.92 *17*.
668.0 *4*	1691.6	12.8 *8*	D+Q	DCO=0.54 *5*.
684.6 *7*	4366.5	0.95 *15*	Q	DCO=0.92 *22*.
688.2 *7*	3924.3	8.0 *7*	D+Q	DCO=0.45 *8*.
690.5 *7*	3732.6	0.37 *6*		
692.1 *4*	2319.4	16.4 *10*	D+Q	DCO=0.46 *5*.
692.5[§] *7*	1339.7	2.2[§] *2*	D+Q	DCO=0.62 *14*.
	3734.9	0.25[§] *4*		DCO=0.62 *14*.
699.9 *7*	3095.7	9.8 *9*	D+Q	DCO=0.43 *7*.
707.1 *7*	4436.2	3.5 *4*	Q	DCO=0.92 *16*.
724.3 *7*	4131.1	0.12 *2*		
748.5[‡]	3590.7			
759.8 *4*	1792.7	18.2 *14*	Q	DCO=0.97 *9*.
768.2 *4*	2395.7	72 *5*	E2	DCO=1.12 *10*.
768.3 *4*	2046.9	20.3 *12*	E2	DCO=1.02 *12*.
774.5 *7*	3681.7	1.00 *17*		
775.9 *7*	2666.8	2.3 *3*	Q	DCO=0.96 *18*.
776.5 *4*	3095.7	13.1 *10*	Q	DCO=0.92 *14*.
783.1 *4*	2122.9	13.9 *9*	Q	DCO=0.96 *14*.
786.5 *7*	2676.7	0.89 *17*	Q	DCO=1.12 *19*.
805.5 *7*	1231.8	1.5 *2*		
821.5 *7*	3729.1	5.4 *6*	E2	DCO=0.92 *17*.
825.0[‡]	3734.9			
828.7 *7*	3924.3	5.6 *6*	Q	DCO=0.98 *16*.
829.3 *7*	2952.2	6.1 *6*	Q	DCO=0.92 *17*.
839.6 *7*	4764.3	2.4 *3*		
839.7 *4*	2632.7	17.6 *14*	E2	DCO=1.02 *15*. B(E2)(W.u.)=230 *+100–70*.
840.0[#] *7*	3684.1?			
840.1 *4*	3235.7	58 *3*	E2	DCO=0.98 *10*.
844.6[#] *7*	2122.9			Eγ: from figure 1 of 2009Si08, not listed in authors' table I.
845.3 *7*	5281.5	2.3 *3*	Q	DCO=0.92 *18*.
845.6 *7*	5212.1	0.82 *12*		
854[‡]	4445.2			
857.2 *7*	3809.7	1.7 *3*	Q	DCO=1.14 *24*.
858[‡]	2980.9			
860.6 *4*	2907.6	12.9 *10*	E2	DCO=0.94 *14*.
864.5 *7*	4599.7	0.10 *2*		
879.0 *4*	4114.6	29.9 *16*	E2	DCO=0.91 *9*.
895.3 *7*	2942.3	0.32 *6*	D+Q	DCO=0.58 *14*.
895.5 *7*	5025.8	0.17 *3*		
902.5 *7*	3809.7	0.38 *7*		
905.5 *7*	2952.2	0.72 *12*		
917.7 *4*	5032.5	14.5 *9*	E2	DCO=1.05 *12*.
928.5 *7*	5692.2			
936.5 *7*	5068.0	0.10 *2*		
948.5 *7*	5548.0	0.10 *2*		
957.0 *4*	5989.5	11.7 *8*	Q	DCO=0.94 *12*.

Continued on next page (footnotes at end of table)

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

γ(^{129}Cs) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.	Comments
967.5[‡]	5567.8			
987.9 *7*	6200.0	0.75 *12*		
989.0[‡]	6270.5			
1011.2 *7*	7000.7	5.2 *5*	Q	DCO=1.12 *16*.
1011.6 *7*	3919.2	4.2 *4*	D	DCO=0.52 *8*.
1020.5 *7*	2812.7	6.7 *6*	Q	DCO=0.98 *17*.
1098.7 *7*	8099.4	2.1 *2*		
1109.0[‡]	7379.5			
1109.4 *7*	3156.9	3.4 *4*	Q	DCO=0.98 *20*.
1122.0 *7*	3517.9	4.7 *4*	D+Q	DCO=0.62 *9*.
1142.5[‡]	1718.2			
1191.5 *7*	2214.5	6.0 *5*	Q	DCO=0.94 *18*.
1194.5[‡]	3590.7			
1210[‡]	4445.2			
1214.3 *7*	2842.6	5.6 *4*	Q	DCO=0.89 *16*.
1222.3 *7*	2500.3	1.4 *2*	Q	DCO=0.88 *24*.
1242.9 *7*	1890.6	1.4 *2*	Q	DCO=0.92 *20*.
1289.1 *7*	3685.1	5.5 *4*	Q	DCO=0.92 *17*. DCO value for 1289.1γ+1289.3γ.
1289.3[#] *7*	3684.1?	4.3 *4*	Q	DCO=0.92 *17*. DCO value for 1289.1γ+1289.3γ.
1388.4 *7*	2666.8	1.4 *2*	Q	DCO=1.12 *19*.
1396.0[‡]	2676.7			

[†] From 2009Si08 unless otherwise stated. Energy uncertainties are assigned as 0.4 keV for transitions with Iγ≥10 and 0.7 keV for transitions with Iγ<10, based on a general comment in 2009Si08.

[‡] γ reported by 2009Zh20.

[§] Multiply placed; intensity suitably divided.

[#] Placement of transition in the level scheme is uncertain.

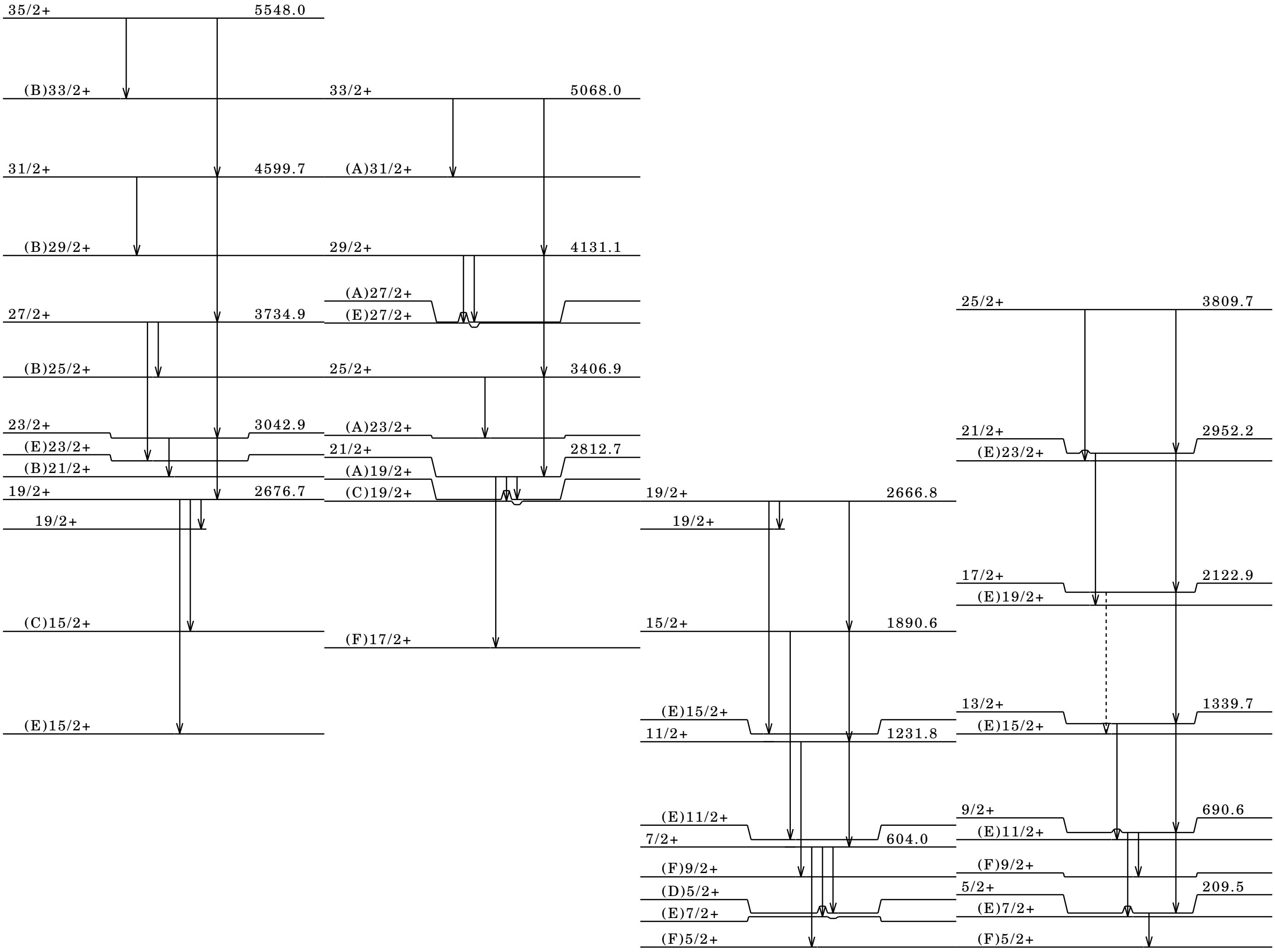
^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

(A) Possible 3-qp band,α=−1/2.

(B) Possible 3-qp band, α=+1/2.

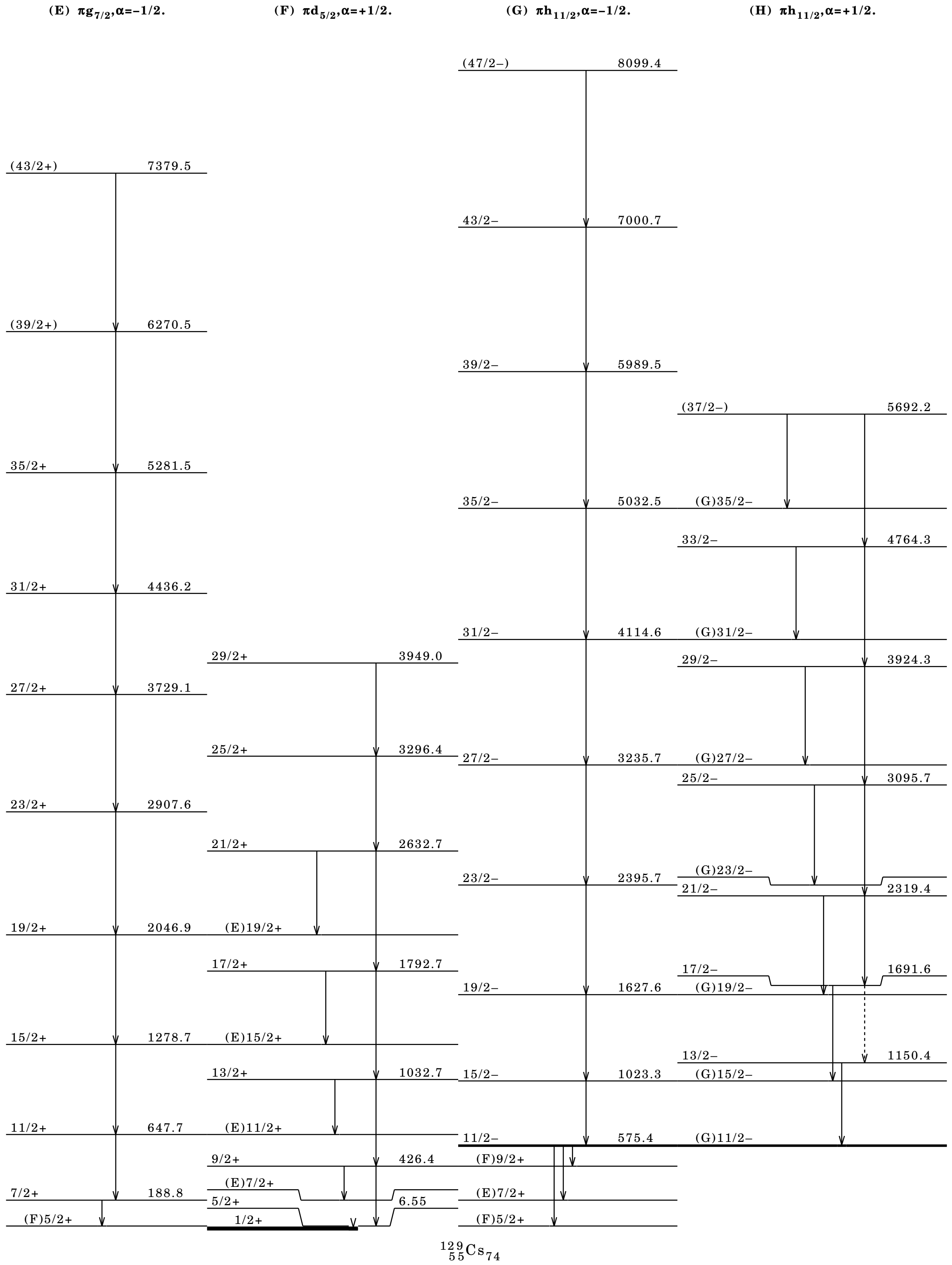
(C) πg$_{7/2}$+γ vibration.

(D) πg$_{7/2}$,α=+1/2.



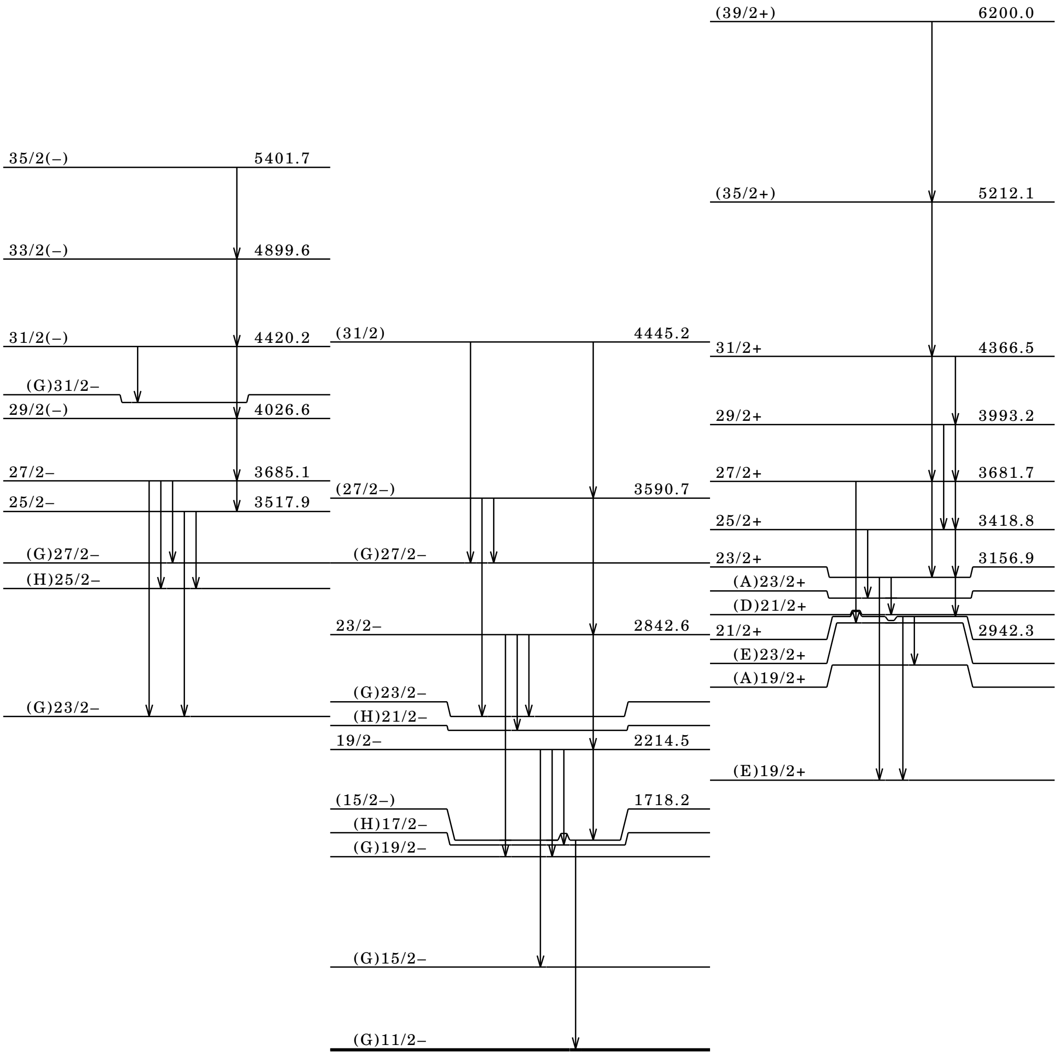
$^{129}_{55}$Cs$_{74}$

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)



^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

(I) Possible magnetic–rotational band. **(J) πh$_{11/2}$+γ vibration.** **(K) Possible 3–qp, ΔJ=1 band.**

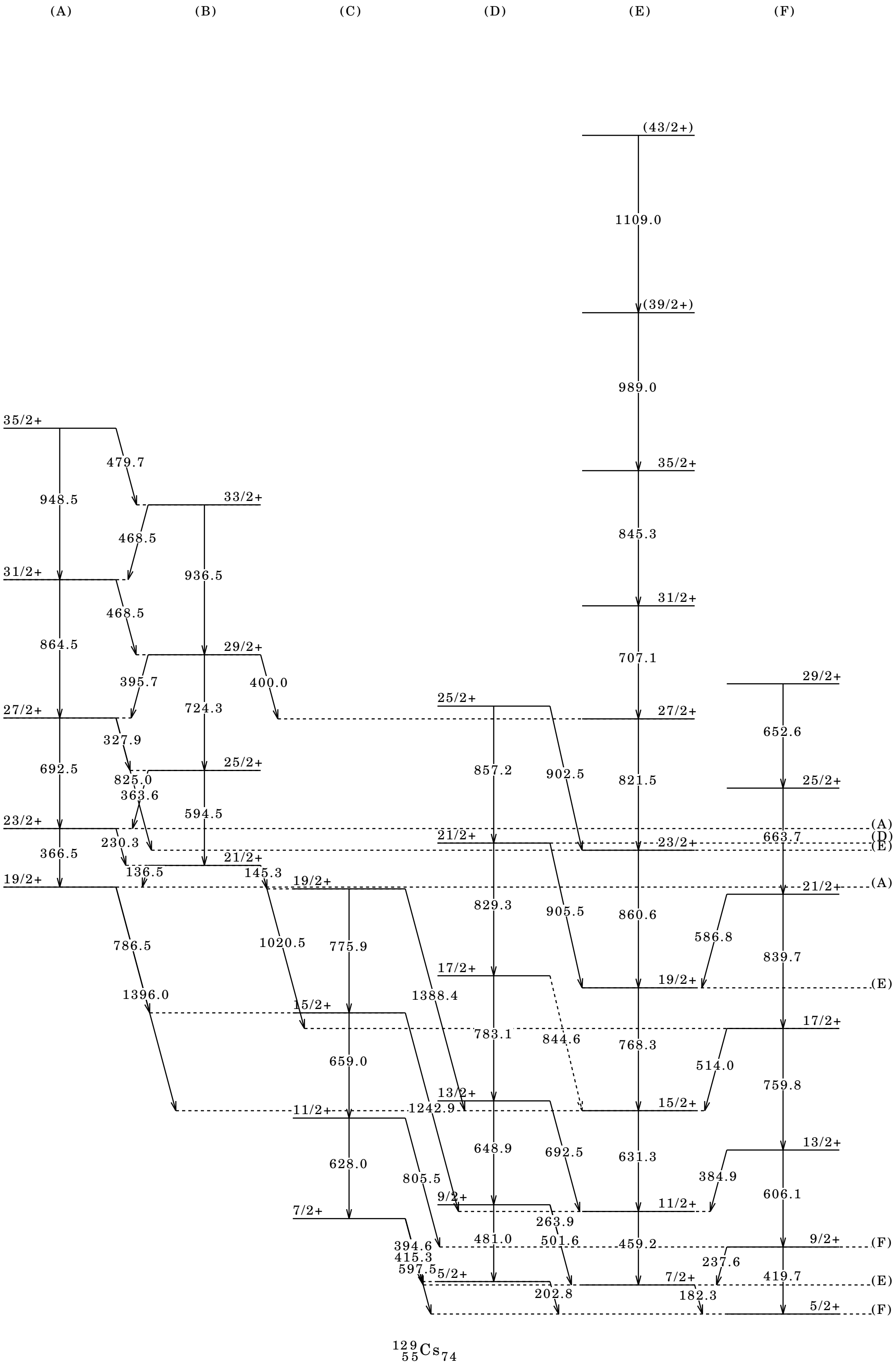


$^{129}_{55}$Cs$_{74}$

From NNDC(BNL)
program ENSDAT

$^{122}Sn(^{11}B,4n\gamma),^{124}Sn(^{11}B,6n\gamma)$ 2009Si08,2009Zh20,2010Wa01 (continued)

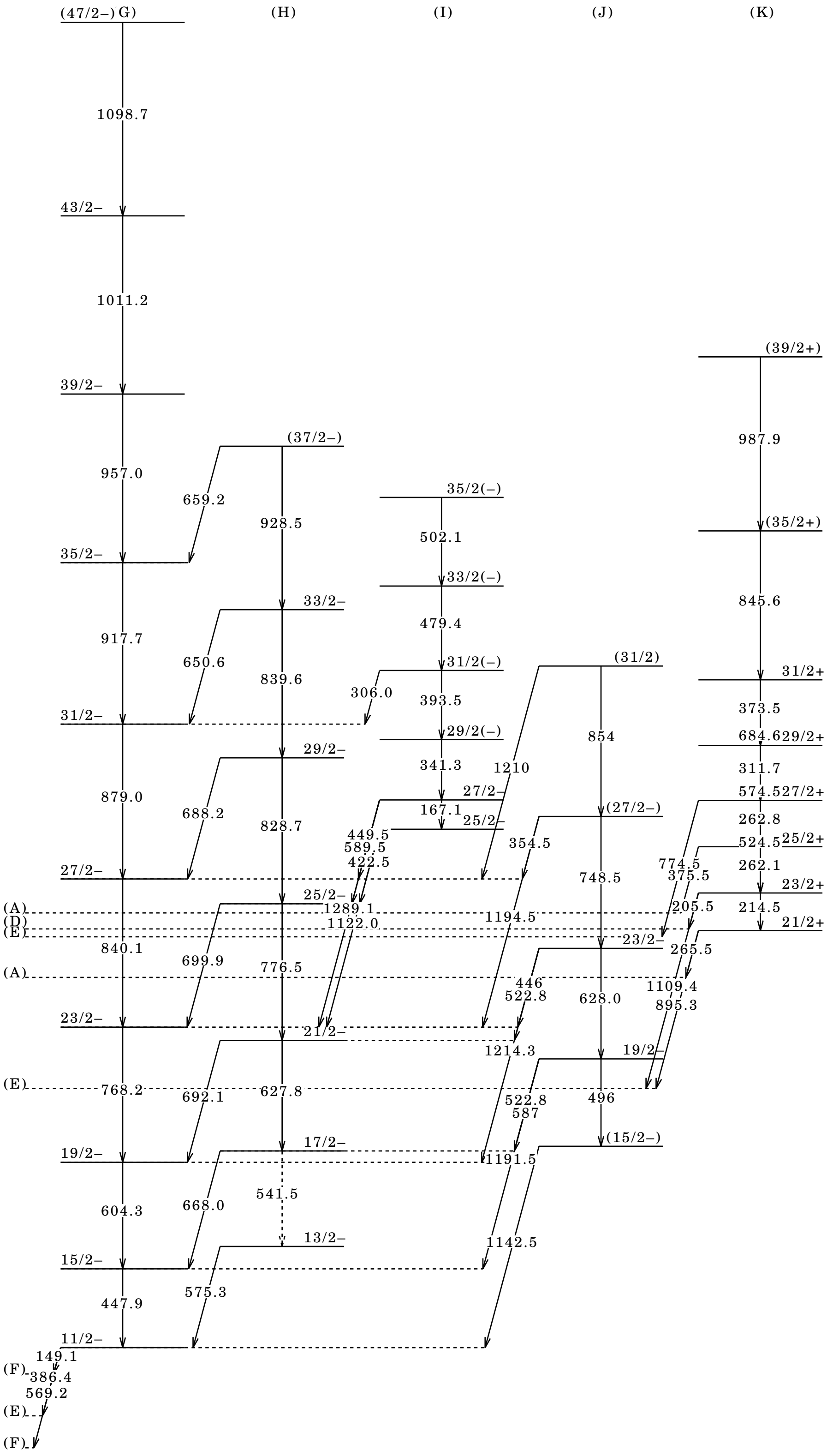
Bands for ^{129}Cs



$^{129}_{55}Cs_{74}$

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

Bands for ^{129}Cs



$^{129}_{55}$Cs$_{74}$

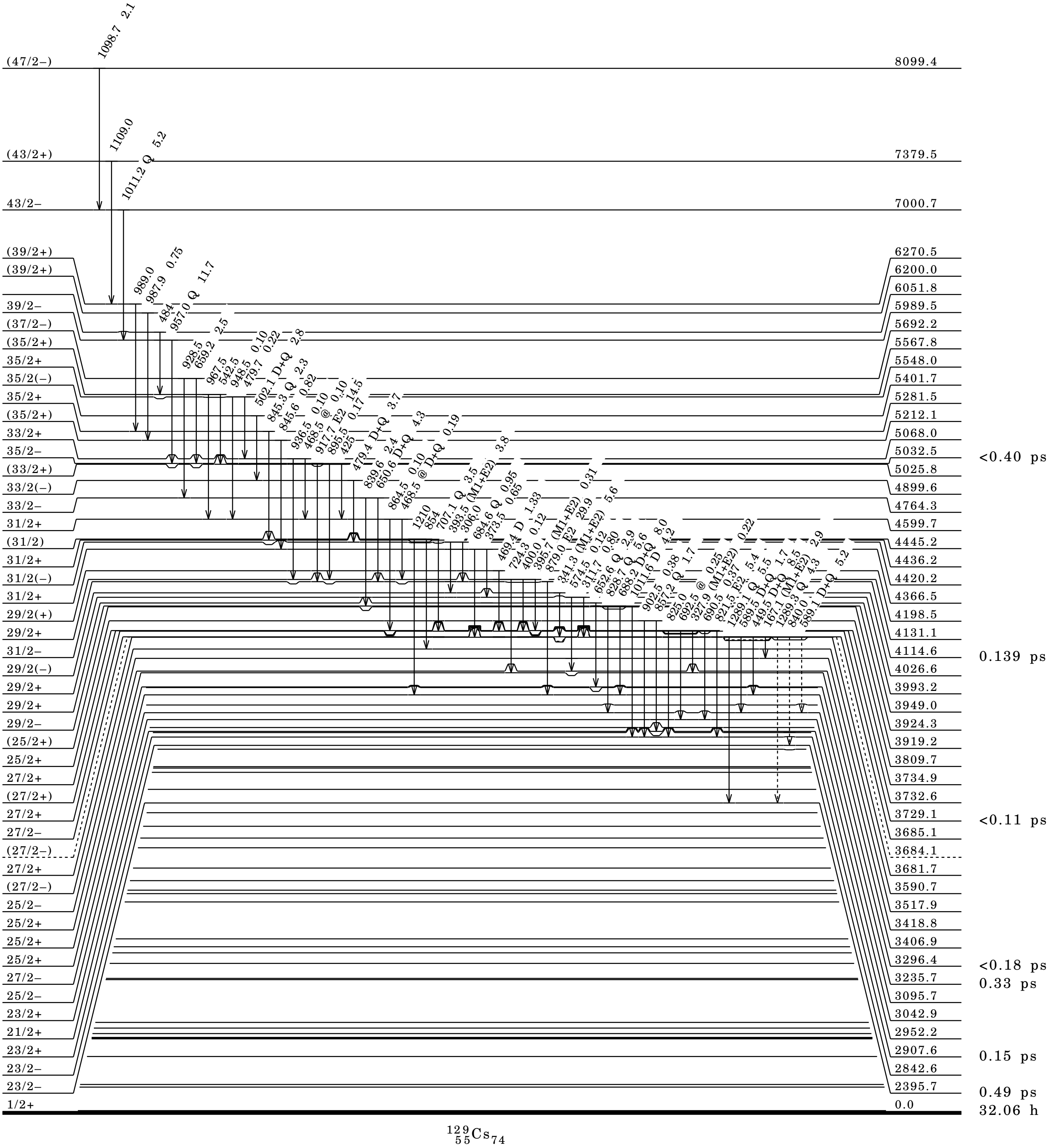
From NNDC(BNL)
program ENSDAT

$^{122}Sn(^{11}B,4n\gamma)$,$^{124}Sn(^{11}B,6n\gamma)$ 2009Si08,2009Zh20,2010Wa01 (continued)

Level Scheme

Intensities: relative Iγ

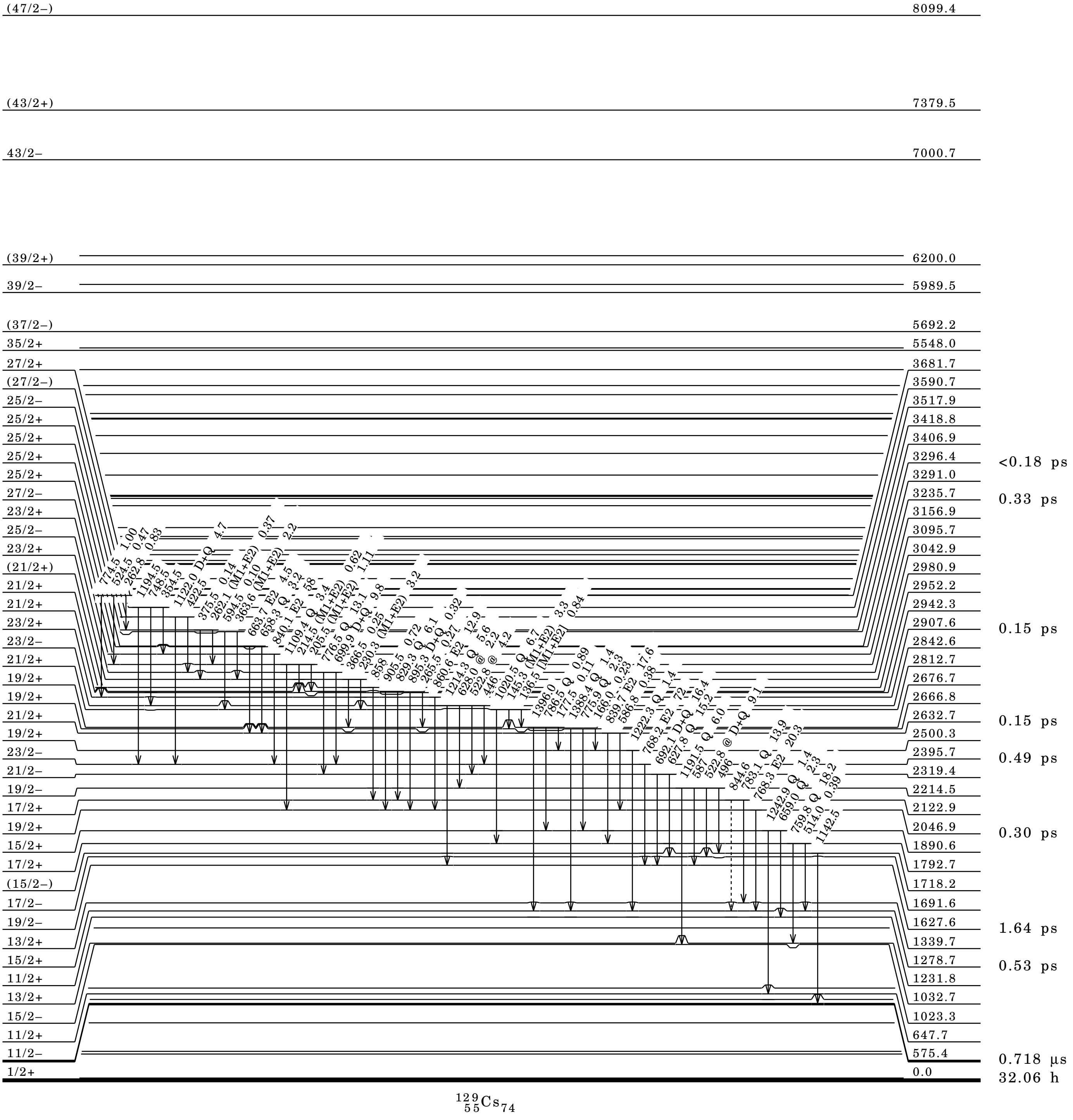
@ Multiply placed; intensity suitably divided



^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

Level Scheme (continued)

Intensities: relative Iγ
@ Multiply placed; intensity suitably divided



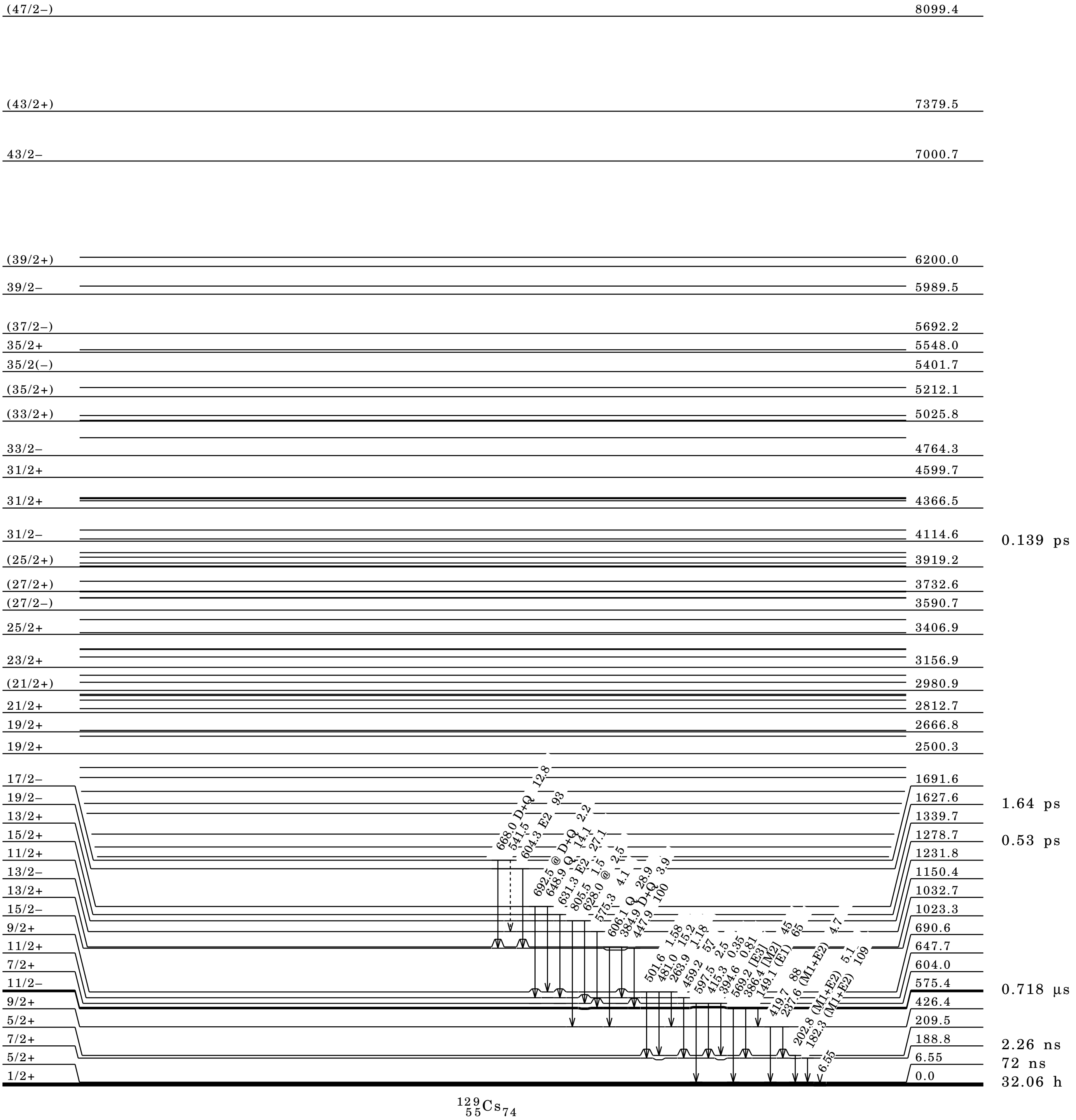
From NNDC(BNL)
program ENSDAT

^{122}Sn(^{11}B,4nγ),^{124}Sn(^{11}B,6nγ) 2009Si08,2009Zh20,2010Wa01 (continued)

Level Scheme (continued)

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided



$^{129}_{55}$Cs$_{74}$

From NNDC(BNL)
program ENSDAT

^{116}Cd(^{18}O,4npγ) 1991Hi12

1991Hi12: ^{116}Cd(^{18}O,4np) E=85 MeV, ^{122}Sn(^{11}B,4n) E=50 MeV; $\gamma\gamma$–coin, $\gamma(\theta)$.

^{129}Cs Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0	1/2+		
6.55[@] *5*	5/2+		
188.85[&] *24*	7/2+	2.26 ns *6*	
208.8[a] *3*	5/2+		
426.52[@] *24*	9/2+		
575.5[§] *3*	11/2−	0.718 μs *21*	%IT=100. $T_{1/2}$: from Adopted Levels.
603.3?[b] *8*	(7/2+)		
648.2[&] *4*	11/2+		
690.4[a] *4*	9/2+		
1023.9[§] *5*	15/2−		
1032.2[@] *4*	13/2+		
1150.1[#] *5*	13/2−		
1231.0[b] *7*	(11/2+)		
1279.4[&] *5*	15/2+		
1339.3[a] *5*	13/2+		
1627.5[§] *5*	19/2−		
1692.3[#] *5*	17/2−		
1792.0[@] *5*	17/2+		Large negative intensity balance at this level.
1890.1[b] *7*	15/2+		
2047.8[&] *6*	19/2+		
2122.4[a] *6*	17/2+		
2319.6[#] *6*	21/2−		
2396.0[§] *6*	23/2−		
2631.8[@] *6*	21/2+		
2667.0[b] *7*	19/2+		
2676.3[c] *8*	(19/2+)		
2812.3[c] *7*	(21/2+)		
2908.0[&] *7*	23/2+		
2951.3[a] *7*	21/2+		
3042.4[c] *8*	(23/2+)		
3095.7[#] *6*	25/2−		
3235.9[§] *10*	27/2−		
3295.8[@] *12*			
3406.3[c] *8*	(25/2+)		
3728.8[&] *7*	27/2+		
3801.9?[c] *9*	(27/2+)		E(level): this level is at 3734 keV in Adopted Levels due to reversed ordering of 327.7–395.6 γ cascade.
3923.8?[#] *10*			
3948.8?[@] *16*			
4114.8[§] *11*	31/2−		
4129.6?[c] *9*	(29/2+)		
4435.8[&] *13*			
5032.5[§] *11*	35/2−		
5989.5[§] *15*	(39/2−)		
7000.5[§] *18*	(43/2−)		

[†] From least–squares fit to Eγ data, assuming 0.3 keV uncertainty when Eγ stated to nearest keV, 1 keV otherwise.

[‡] As assigned in 1991Hi12.

[§] (A): Band based on 11/2−,α=−1/2.

[#] (B): Band based on 11/2−,α=+1/2.

[@] (C): Band based on 5/2+, 6 keV, α=+1/2.

[&] (D): Band based on 7/2+, 189,α=−1/2.

[a] (E): Band based on 5/2+, 209, α=+1/2.

[b] (F): Band based on 7/2+, 603, α=+1/2.

[c] (G): Band based on (19/2+).

^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)

γ(^{129}Cs)

When only A_2 is given, A_4 is set to zero.

Eγ	E(level)	Iγ	Mult.†	α	Comments
6.55 *5*	6.55				Eγ: from Adopted Gammas.
136.1	2812.3	2.4 *3*	(M1+E2)	0.50 *13*	α(K)=0.39 *7*; α(L)=0.09 *5*; α(M)=0.019 *11*. α(N)=0.0039 *21*; α(O)=0.00049 *23*; α(P)=1.30×10^{-5} *5*. A_2=−0.08 *8*.
145.2	2812.3	5.1 *5*	(M1+E2)	0.41 *10*	α(K)=0.32 *5*; α(L)=0.07 *4*; α(M)=0.015 *8*. α(N)=0.0030 *15*; α(O)=0.00038 *17*; α(P)=1.08×10^{-5} *4*. A_2=−0.24 *6*.
149.0	575.5	73 *7*			A_2=+0.04 *4*.
182.3	188.85	104 *11*			
202.2	208.8	7.2 *7*	(M1+E2)		α(K)=0.116 *9*; α(L)=0.021 *7*; α(M)=0.0043 *15*. α(N)=0.0009 *3*; α(O)=0.00012 *4*; α(P)=4.10×10^{-6} *15*. A_2=+0.41 *11*; A_4=+0.11 *10*.
230.1	3042.4	15.3 *15*	(M1+E2)	0.096 *8*	α(K)=0.080 *4*; α(L)=0.013 *4*; α(M)=0.0028 *8*. α(N)=0.00058 *15*; α(O)=7.6×10^{-5} *16*; α(P)=2.85×10^{-6} *17*. A_2=−0.22 *10*; A_4=+0.17 *9*.
237.6	426.52	11.7 *12*	D		A_2=−0.18 *5*.
327.7	4129.6?	1.3 *1*	(M1+E2)		A_2=−0.63 *16*.
363.9	3406.3	11.5 *12*	(M1+E2)	0.0254 *17*	A_2=−0.59 *5*.
385 *1*	1032.2				
386.6	575.5	42 *4*	[M2]	0.0864	α(K)=0.0729 *11*; α(L)=0.01076 *16*; α(M)=0.00223 *4*. α(N)=0.000472 *7*; α(O)=6.53×10^{-5} *10*; α(P)=3.12×10^{-6} *5*. A_2=+0.11 *9*; A_4=+0.12 *8*. Sign of A_4 is inconsistent with ΔJ=2, quadrupole transition.
395.6	3801.9?	3.7 *4*	(M1+E2)		A_2=−0.50 *8*.
420.0	426.52	91 *9*			A_2=+0.11 *10*; A_4=+0.02 *8*.
448.4	1023.9	100	(E2)		A_2=+0.32 *10*; A_4=−0.05 *8*.
459.4	648.2	50 *5*	(E2)		A_2=+0.27 *10*; A_4=−0.04 *8*.
481 *1*	690.4				
501.6	690.4	5.8 *6*	(M1+E2)		A_2=−0.41 *14*; A_4=+0.04 *13*.
574.6	1150.1	10.6 *11*	D+Q		A_2=−0.76 *12*; A_4=+0.05 *11*.
597 *1*	603.3?				
604.1	1627.5	76 *8*	(Q)		A_2=+0.26 *10*; A_4=−0.06 *8*.
605.6	1032.2	27 *3*	(Q)		A_2=+0.27 *10*; A_4=+0.01 *8*.
626.8	2319.6	4.0 *4*			
628 *1*	1231.0				
631.1	1279.4	40 *4*	(Q)		A_2=+0.29 *10*; A_4=−0.05 *8*.
648.9	1339.3	7.4 *7*	(Q)		A_2=+0.23 *6*.
653 *1*	3948.8?				
660 *1*	1890.1				
664 *1*	3295.8				
668.0	1692.3	13.9 *14*	D+Q		A_2=−0.66 *11*; A_4=+0.08 *10*.
688 *1*	3923.8?				
692.5	2319.6	25.2 *25*	D+Q		A_2=−0.39 *10*; A_4=+0.23 *10*.
699.7	3095.7	5.6 *6*	D+Q		A_2=−0.65 *18*; A_4=+0.27 *17*.
707 *1*	4435.8				
759.7	1792.0	15.2 *15*	(Q)		A_2=+0.34 *11*; A_4=−0.05 *9*.
768.4‡	2047.8	69‡ *7*	(Q)		A_2=+0.35 *10*; A_4=−0.03 *8*.
	2396.0	69‡ *7*	(Q)		
776.1	3095.7	12.6 *13*	(Q)		A_2=+0.35 *11*; A_4=+0.03 *10*.
777 *1*	2667.0				
783.1	2122.4	5.2 *5*	(Q)		A_2=+0.30 *15*; A_4=−0.04 *13*.
787 *1*	2676.3				
805 *1*	1231.0				
820.8	3728.8	4.2 *4*	(Q)		A_2=+0.27 *18*; A_4=−0.06 *16*.
828 *1*	3923.8?				
828.9	2951.3	4.9 *5*	(Q)		A_2=+0.37 *14*; A_4=−0.03 *13*.
839.8	2631.8	32 *3*	(Q)		A_2=+0.30 *10*; A_4=−0.08 *9*.
840 *1*	3235.9	32 *3*	(Q)		A_2=+0.30 *10*; A_4=−0.08 *9*.
860.2	2908.0	12.8 *13*	(Q)		A_2=+0.37 *12*; A_4=−0.05 *10*.
878.9	4114.8	11.1 *11*	(Q)		A_2=+0.32 *12*; A_4=0.00 *10*.
917.7	5032.5	4.0 *4*	(Q)		A_2=+0.19 *7*.
957 *1*	5989.5	<2			

Continued on next page (footnotes at end of table)

^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)

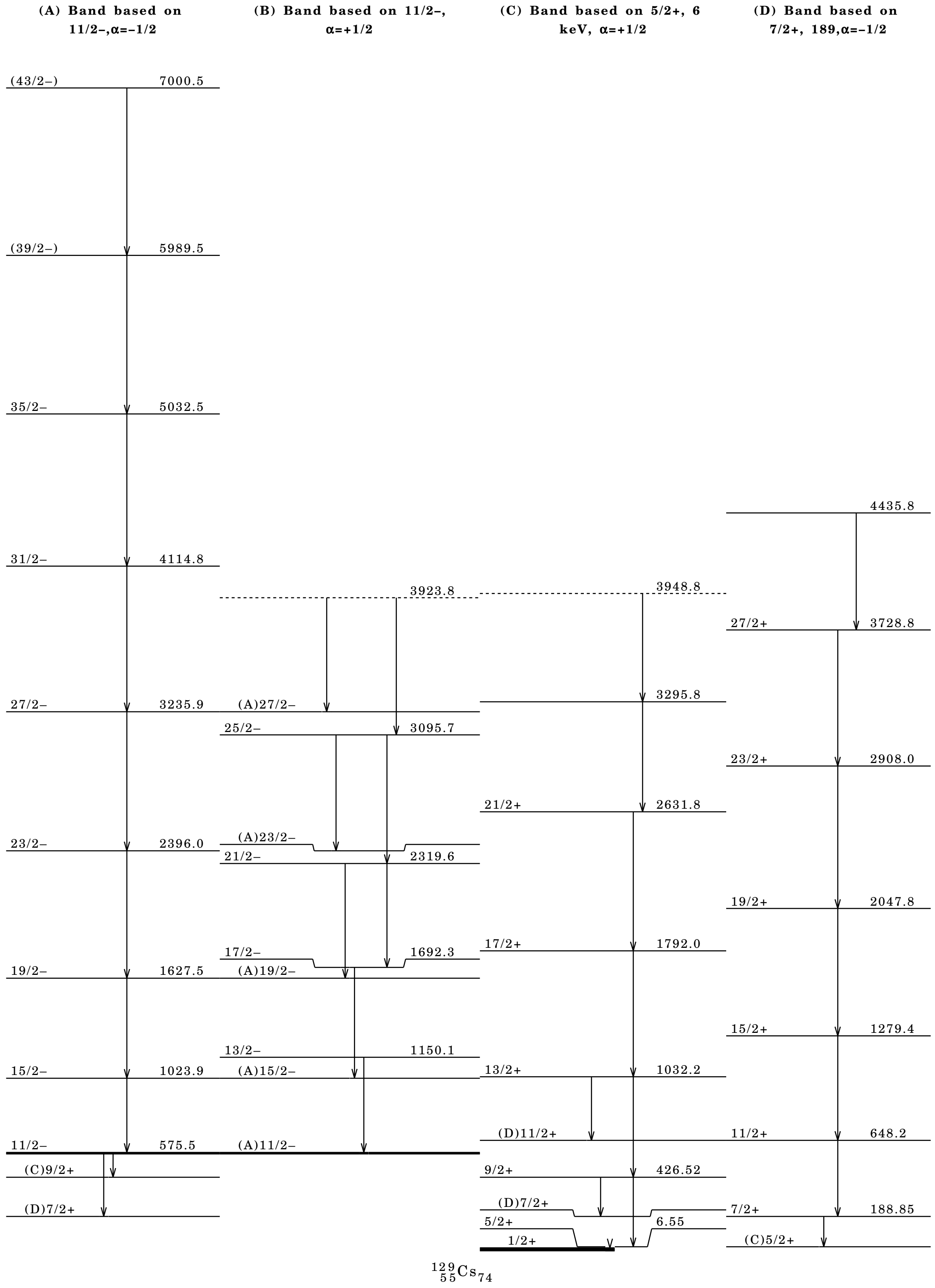
γ(^{129}Cs) (continued)

Eγ	E(level)	Iγ	Mult.†	Comments
1011 *1*	7000.5	>2		
1020 *1*	2812.3			
1242 *1*	1890.1			
1387 *1*	2667.0	1.3 *1*	(Q)	A_2=+0.45 *38*; A_4=+0.03 *34*.

† Evaluators assign (Q) for positive A_2 and (M1+E2) for large negative A_2 values, whereas 1991Hi12 assign E2 in the former case. See also Adopted Gammas.

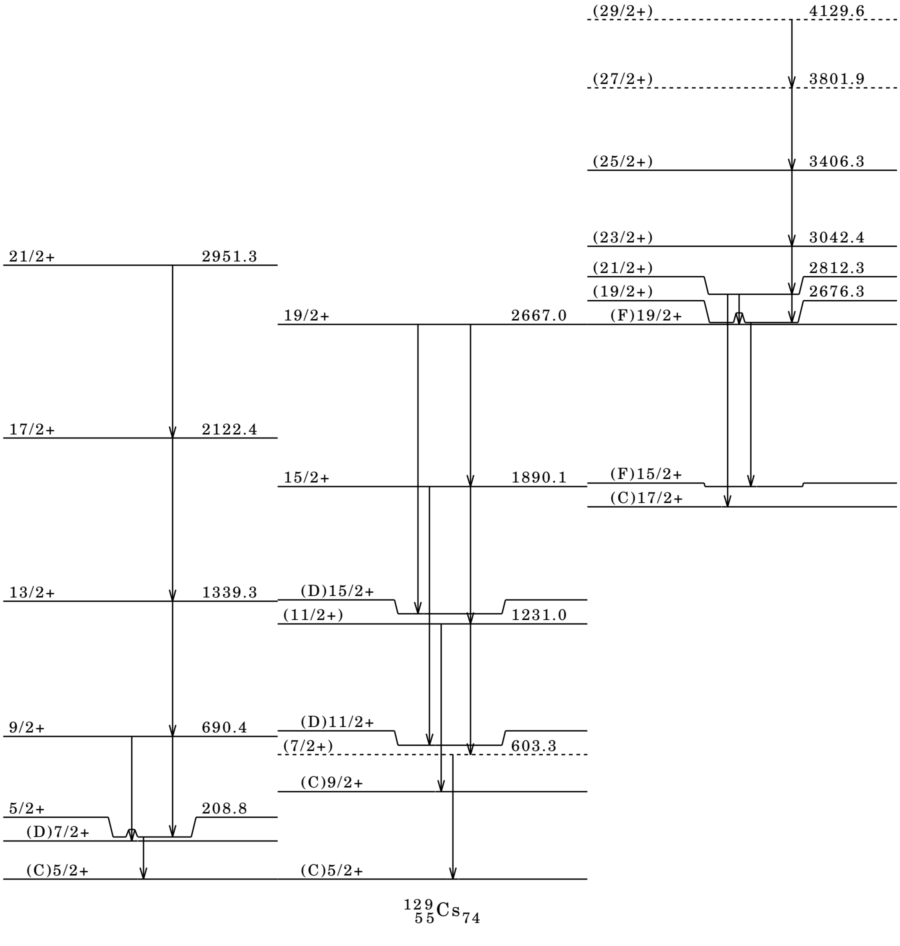
‡ Multiply placed; undivided intensity given.

^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)



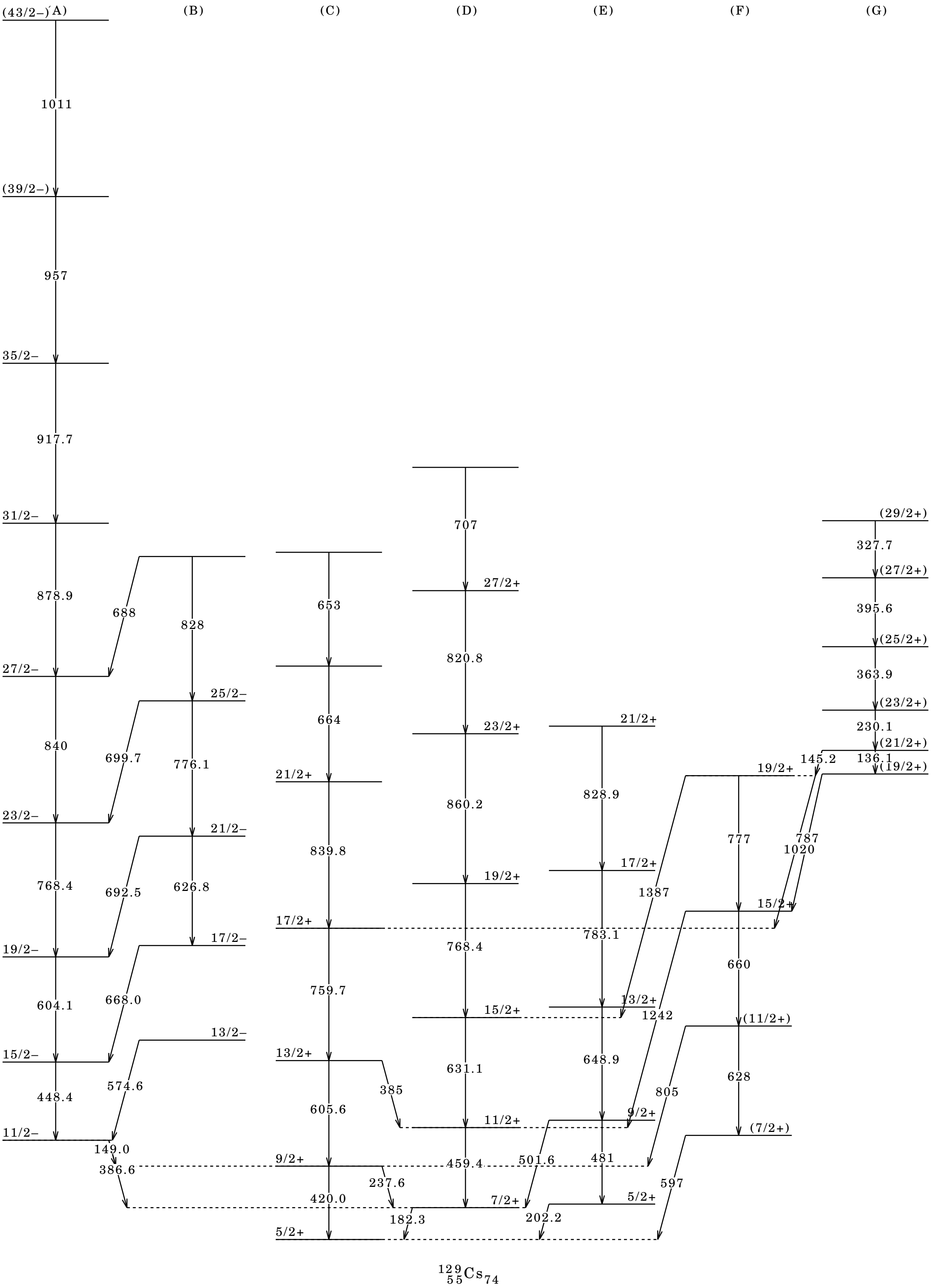
^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)

(E) Band based on 5/2+, 209, α=+1/2 **(F) Band based on 7/2+, 603, α=+1/2** **(G) Band based on (19/2+)**



^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)

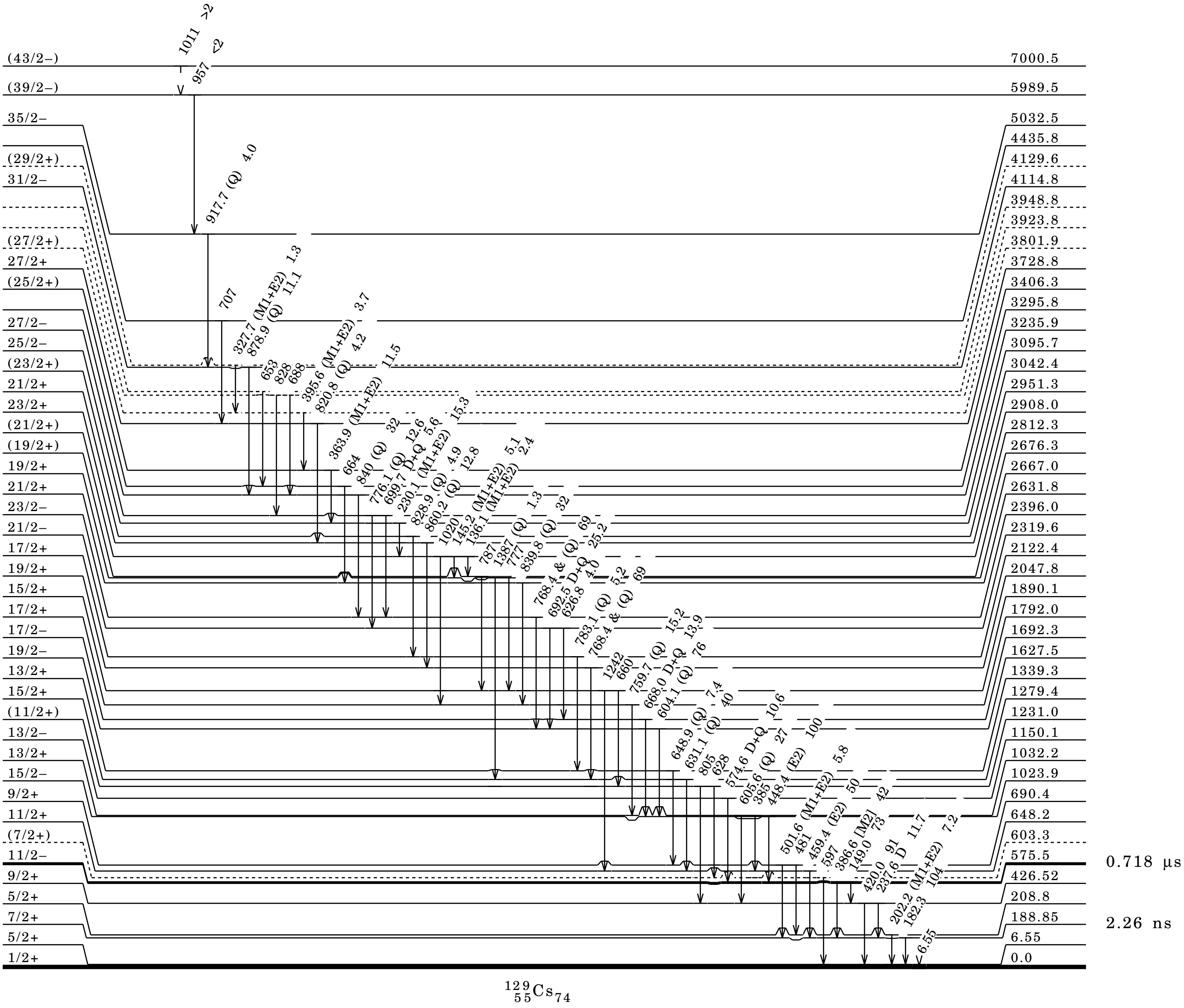
Bands for ^{129}Cs



^{116}Cd(^{18}O,4npγ) 1991Hi12 (continued)

Level Scheme

Intensities: relative Iγ
& Multiply placed; undivided intensity given



^{127}I(α,2nγ) 1977Ch23

1977Ch23: E=28 MeV, natural target, γ, γγ, γγ(t)–coin, γ(θ), γ(t), excitation function.
Others:
1979Ga01 (also 1979GaZP thesis): high–spin levels in ^{129}Cs studied using ^{127}I(α,2nγ), ^{126}Te(^{6}Li,3nγ) and ^{122}Sn(^{10}B,3nγ) reactions, but no data are presented, except that for half–life of 575–keV isomer.
1978De29: E=22 MeV; measured spin rotation in γ(θ,H,t). deduced g and half–life for 575–keV isomer.

^{129}Cs Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$	Comments
0.0	1/2+		
6.55[@] *5*	5/2+		
188.63[a] *21*	7/2+		
208.6[&] *3*	5/2+		
426.15[@] *22*	9/2+		
575.08[§] *22*	11/2−	0.718 μs *21*	%IT=100. $T_{1/2}$: from γγ(t); weighted average of 0.734 μs *23* (1978De29), and 0.69 μs *3* (1977Ch23). Other: 0.73 μs *7* (1979Ga01, same group as 1978De29).
647.4[a] *4*	11/2+		
689.4[&] *3*	9/2+		
1023.0[§] *4*	15/2−		
1031.7[@] *4*	13/2+		
1149.7[#] *4*	13/2−		
1277.8[a] *5*	15/2+		
1337.9[&] *5*	13/2+		
1626.8[§] *5*	19/2−		
1690.5 *5*	17/2−		
1693.1[#] *5*	(15/2−)		
1790.7[@] *5*	17/2+		
2045.6[a] *6*	19/2+		
2120.3[&] *5*	17/2+		
2212.8? *6*			
2318.6? *6*			
2348.9? *6*			E(level): level not included in Adopted Levels. A 658.3γ is placed from a level at 3291 keV; and a 659.0γ from 1890 level in Adopted dataset.

[†] From least–squares fit to Eγ data, assuming 0.3 keV uncertainty for each γ ray.
[‡] As assigned in 1977Ch23.
[§] (A): Band based on $1h_{11/2}$,α=−1/2.
[#] (B): Band based on $1h_{11/2}$,α=+1/2.
[@] (C): Band based on 5/2+.
[&] (D): Band based on 5/2+,α=+1/2.
[a] (E): Band based on 5/2+,α=+1/2.

γ(^{129}Cs)

When only A_2 is given, A_4 is set to zero.

Eγ	E(level)	Iγ	Mult.[†]	α	Comments
6.55 *5*	6.55				Eγ: from Adopted Gammas.
148.6	575.08	51	(E1)	0.0722 *12*	A_2=−0.13 *5*.
182.0	188.63	100			A_2=+0.02 *2*.
202.1	208.6	15			A_2=+0.10 *10*.
237.3	426.15	24			A_2=+0.02 *5*.
386.6	575.08	34	[M2]	0.0864	A_2=−0.01 *5*.
419.5	426.15	87			A_2=+0.07 *3*.
447.9	1023.0	58	(E2)		A_2=+0.28 *5*.
458.8	647.4	45	(E2)		A_2=+0.22 *5*.
480.8	689.4	11	(E2)		A_2=+0.26 *10*.
500.8	689.4	5	D		A_2=−0.14 *10*.
522.3[‡]	2212.8?	3			A_2≈−1.
543.4	1693.1	17	D		A_2=−0.09 *5*.
568.7	575.08	6.5	[E3]	0.0175	A_2=+0.06 *10*.
574.6	1149.7	19	D+Q		A_2=−0.55 *15*.
603.8	1626.8	27			
605.5	1031.7	20	(Q)		A_2=+0.24 *10*.

Continued on next page (footnotes at end of table)

^{127}I(α,2nγ) 1977Ch23 (continued)

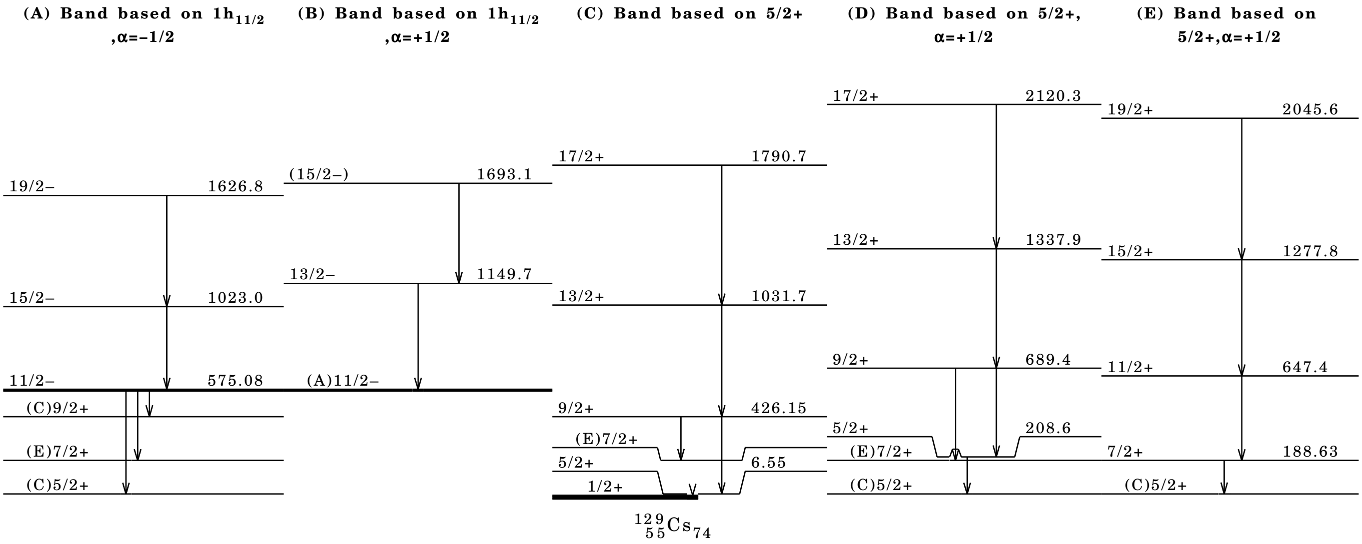
γ(^{129}Cs) (continued)

Eγ	E(level)	Iγ	Mult.†	Comments
630.4	1277.8	26	(Q)	A_2=+0.32 *5*.
648.5	1337.9	10	(Q)	A_2=+0.31 *10*.
658.4‡	2348.9?	8.5		A_2=+0.29 *10*.
667.5	1690.5	15	D+Q	A_2=−0.61 *15*.
691.8‡	2318.6?	≈10		A_2≈−0.3.
759.0	1790.7	8	(Q)	A_2=+0.34 *10*.
767.8	2045.6	19	(Q)	A_2=+0.25 *5*.
782.4	2120.3	5.5	(Q)	A_2=+0.22 *10*.

† Evaluators assign (Q) for positive A_2 and (M1+E2) for large negative A_2 values. See also Adopted Gammas.

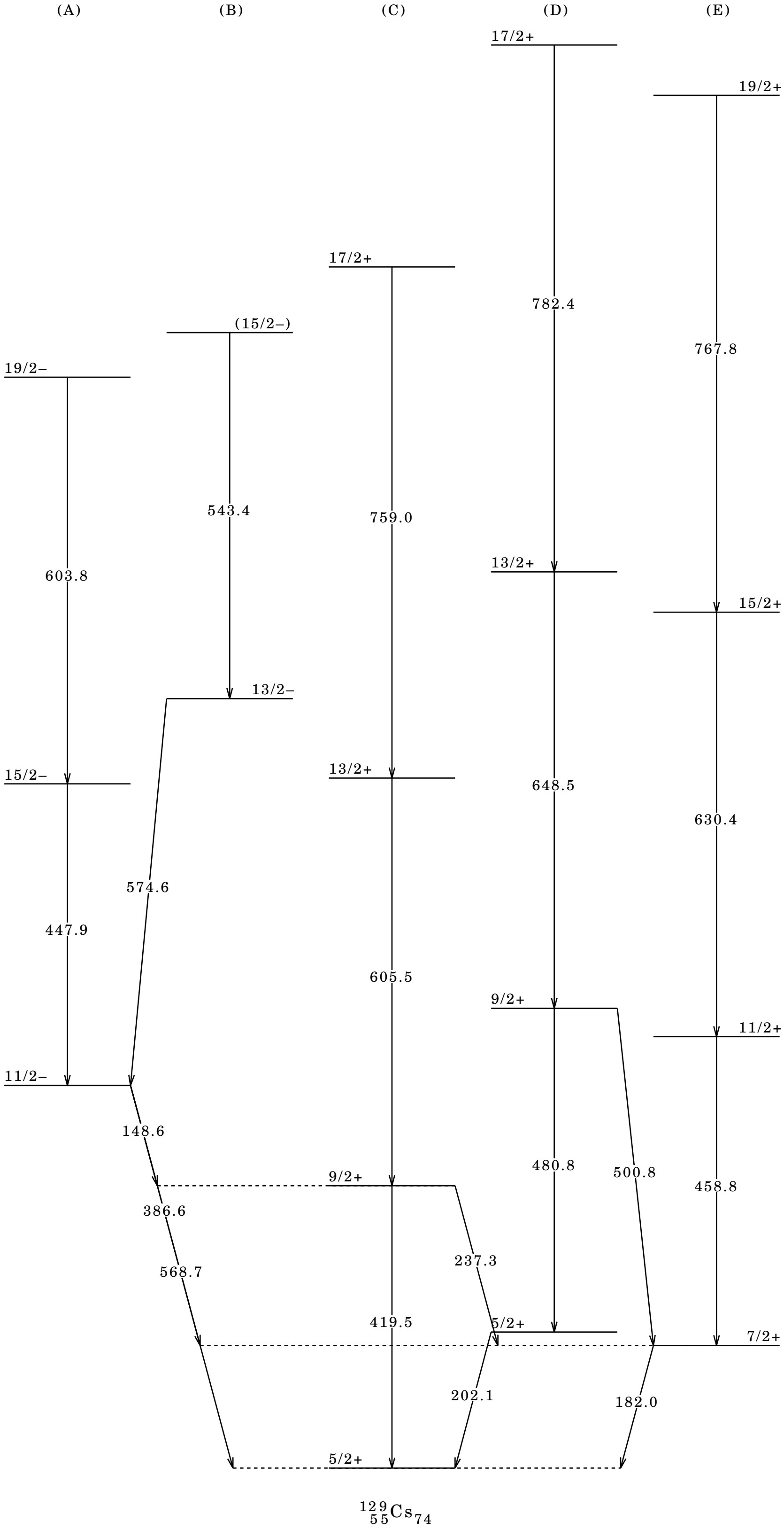
‡ Placement of transition in the level scheme is uncertain.

^{127}I(α,2nγ) 1977Ch23 (continued)



$^{127}I(\alpha,2n\gamma)$ 1977Ch23 (continued)

Bands for ^{129}Cs

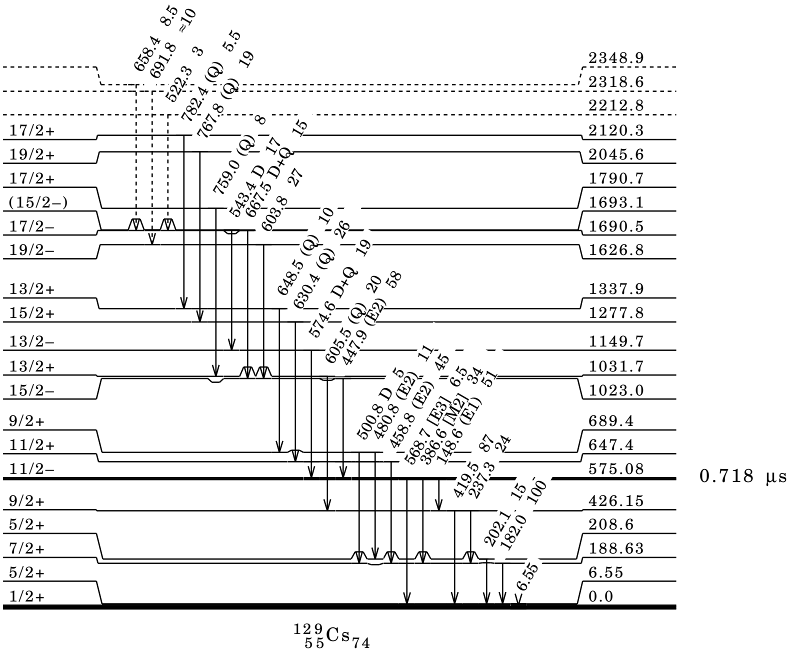


From NNDC(BNL)
program ENSDAT

^{127}I(α,2nγ) 1977Ch23 (continued)

Level Scheme

Intensities: relative Iγ



$^{129}_{55}$Cs$_{74}$

Adopted Levels, Gammas

Q(β^-)=−3739 *22*; S(n)=7756 *11*; S(p)=6421 *12*; Q(α)=−295 *11* 2012Wa38.
S(2n)=18388 *16*, S(2p)=11320 *11* (2012Wa38).
1950Th02, 1950Fi11: identification and production of ^{129}Ba in proton bombardment of ^{133}Cs, measured half–life. Later decay studies: 1959He45, 1961Ar05, 1963Ya05, 1966Li05, 1970Is04, 1971Is02, 1972Ta02, 1973Is04, 1983TaZI.

^{129}Ba Levels

Cross Reference (XREF) Flags

A ^{129}La ε Decay (11.6 min)
B ^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ)
C ^{130}Ba(pol d,t),(d,t)

E(level)[†]	Jπ[‡]	XREF	$T_{1/2}$[§]	Comments
0.0^{l}	1/2+	ABC	2.23 h$^{@}$ *11*	%ε+%β^+=100. μ=−0.398 *16* (1979Be25,1983Mu12,2014StZZ). μ: atomic beam with laser fluorescence spectroscopy (1979Be25); result of 1979Be25 re–evaluated by 1983Mu12. Evaluated rms charge radius=4.8248 fm *49* (2013An02). Charge radius measurements: 1983Mu12, 1979Ba74. Jπ: L=0 and analyzing power in (d,t).
8.42^{h} *6*	7/2+	ABC	2.135 h$^{\#}$ *10*	%ε+%β^+≈100; %IT=? μ=+0.930 *17* (1979Be25,1983Mu12,2014StZZ). Q=+1.75 *14* (1979Be25,2013StZZ,2014StZZ). μ,Q: atomic beam with laser fluorescence spectroscopy (1979Be25); re–evaluated by 2013StZZ. Other: +1.60 *13* (result of 1979Be25 re–evaluated by 1983Mu12). Jπ: L=4 and analyzing power in (d,t).
110.57^{m} *5*	3/2+	ABC		Jπ: L=2 and analyzing power in (d,t); M1 γ to 1/2+.
182.04^{a} *11*	9/2−	BC	15.2 ns *10*	μ=−0.864 *27* (2013Ka27,2014StZZ). μ: from g factor=−0.192 *6* (2013Ka27,TDPAD method). Jπ: L=5 and analyzing power in (d,t); E1 γ to 7/2+. $T_{1/2}$: from γ(t). Weighted average of 15 ns *1* (2013Ka27) and 16 ns *2* (1992By03).
253.76 *5*	3/2+	A C		Jπ: L=2 and analyzing power in (d,t).
263.1^{i} *1*	9/2+	B		
278.57 *5*	1/2+	A C		Jπ: L=0 and analyzing power in (d,t).
278.81$^{\&}$ *12*	11/2−	BC		Jπ: L=5 and analyzing power in (d,t); ΔJ=1, M1+E2 γ to 9/2−.
318.38^{l} *5*	1/2−,3/2−	A		E(level): level energy and deexciting Eγ are very similar to those of the 318.4 level in (HI,xnγ), but multipolarities are quite different. Evaluators regard it as a different level. Jπ: E1 gammas to 1/2+ and (3/2)+.
318.4 *1*	5/2+	BC		E(level): see comments on 318.38 level above. Jπ: L=2 and analyzing power in (d,t).
457.02 *6*	3/2+	A C		Jπ: L=2 and analyzing power in (d,t); M1,E2 γ to 1/2+; M1(+E2) γ to 3/2+; (E2) γ to 7/2+.
459.29 *9*	5/2+	A C		Jπ: L=2 and analyzing power in (d,t).
467.3^{m} *1*	7/2+	B		
542.27 *8*	5/2+	A C		Jπ: L=2 and analyzing power in (d,t).
544.74^{h} *10*	11/2+	B	10.6 ps *3*	
617.81 *7*	(3/2+,5/2+)	A		Jπ: gammas to 1/2+ and 7/2+; log *ft*=6.5 from (3/2+).
631.3 *13*	7/2−	C		Jπ: L=3 and analyzing power in (d,t). L(d,t)=2 was also reported by 1974Gr22, which is inconsistent.
643.6^{a} *1*	13/2−	B		
659.97 *8*	5/2+	A C		Jπ: L=2 and analyzing power in (d,t).
667.77 *10*	(1/2,3/2,5/2)	A		Jπ: gammas to 1/2−,3/2− and 3/2+.
711.92 *6*	(3/2,5/2)+	A		Jπ: M1,E2 γ to 3/2+; γ to 7/2+; log *ft*=6.0 from (3/2+).
787.07 *22*	(1/2,3/2,5/2)	A C		Jπ: log *ft*=7.5 from (3/2+).
797.4$^{\&}$ *1*	15/2−	B	6.5 ps *2*	
799.6 *50*	(3/2+,5/2+)	C		Jπ: L(d,t)=(2).
806.84^{l} *20*	9/2+	BC		
849.44 *9*	5/2+	A C		Jπ: L=2 and analyzing power in (d,t).
864.1^{i} *1*	13/2+	B		
883.43^{e} *13*	13/2−	B		
888.65 *6*	(3/2+,5/2+)	A		Jπ: gammas to 1/2+ and 7/2+; log *ft*=6.3 from (3/2+).
892.1 *15*		C		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Ba Levels (continued)

E(level)[†]	Jπ[‡]	XREF	T$_{1/2}$[§]	Comments
906.70 *9*	1/2–,3/2–	A C		Jπ: L(d,t)=1.
911.38 *21*	(1/2,3/2,5/2)	A		Jπ: log *ft*=7.9 from (3/2+).
928.59 *9*	1/2+	A C		Jπ: L=0 and analyzing power in (d,t).
999.1[m] *1*	11/2+	B		
1012.4 *9*		C		
1035.4 *15*	9/2–,11/2–	C		Jπ: L(d,t)=5.
1062.65 *10*	3/2+	A C		Jπ: L=2 and analyzing power in (d,t).
1068.1 *3*	(1/2,3/2,5/2)	A		Jπ: log *ft*=7.8 from (3/2+).
1094.96 *8*	(3/2+,5/2+)	A		Jπ: gammas to 1/2+ and 7/2+.
1097.8 *15*	1/2–	C		Jπ: L=1 and analyzing power in (d,t).
1119.85 *12*	1/2+	A C		Jπ: L=0 and analyzing power in (d,t).
1204.1 *2*	7/2+	C		Jπ: L=4 and analyzing power in (d,t).
1210.0[d] *1*	15/2–	B		Jπ: (M1+E2) γ to 13/2–; ΔI=0 dipole γ to 15/2–; (M1+E2) from 17/2–.
1210.5[h] *2*	15/2+	B	1.68 ps *5*	
1219.73 *25*	3/2+,5/2+	A C		Jπ: L(d,t)=2.
1258.1 *3*	(1/2,3/2,5/2)	A		Jπ: log *ft*=7.5 from (3/2+).
1282.5 *8*	5/2+	C		Jπ: L=2 and analyzing power in (d,t).
1303.8 *8*	(9/2)+	C		Jπ: L=4 and analyzing power in (d,t).
1318.4[a] *1*	17/2–	BC		XREF: C(1324.7).
1338.9 *10*	9/2–	C		Jπ: L=5 and analyzing power in (d,t).
1389.54 *9*	(1/2,3/2,5/2)	A C		Jπ: log *ft*=6.9 from (3/2+).
1401.0 *20*	5/2+	C		Jπ: L=2 and analyzing power in (d,t).
1438.4[l] *3*	(13/2+)	B		
1439.23 *6*	3/2+,5/2+	A C		Jπ: L(d,t)=2.
1475.4[&] *1*	19/2–	B	1.0 ps *4*	
1504.3 *5*	(5/2)+	C		Jπ: L=2 and analyzing power in (d,t).
1530.2 *30*		C		
1536.9 *46*	7/2+,9/2+	C		Jπ: L(d,t)=4.
1545.3[e] *2*	17/2–	B		
1566.0 *17*	(3/2+,5/2+)	C		Jπ: L(d,t)=(2).
1590.2[i] *2*	17/2+	B		
1610.20 *8*	(5/2–)	A C		Jπ: L(d,t)=(3); γ to 1/2+.
1635.40 *10*	1/2+	A C		Jπ: L=0 and analyzing power in (d,t).
1651.4 *24*	(9/2–,11/2–)	C		Jπ: L(d,t)=(5).
1654.6[m] *2*	(15/2+)	B		
1692.3 *13*	11/2–	C		Jπ: L=5 and analyzing power in (d,t).
1712.9 *23*	1/2+	C		Jπ: L=0 and analyzing power in (d,t).
1768.2 *30*	1/2+	C		Jπ: L=0 and analyzing power in (d,t).
1778.28 *10*	(1/2,3/2,5/2+)	A C		XREF: C(1782.8). Jπ: γ to 1/2+; log *ft*=6.4 from (3/2+).
1804.80 *18*	3/2+,5/2+	A C		Jπ: L(d,t)=2.
1837.3 *30*		C		
1845.0[d] *2*	19/2–	B		
1866.33 *9*	3/2+,5/2+	A C		Jπ: L(d,t)=2.
1906.1 *57*	3/2+,5/2+	C		Jπ: L(d,t)=2.
1951.8 *55*	(1/2+)	C		Jπ: L=(0) and analyzing power in (d,t).
1976.3 *45*		C		
1989.9[h] *1*	19/2+	B	0.82 ps *10*	
1990.50 *12*	1/2+	A C		Jπ: L=0 and analyzing power in (d,t).
2008.1 *55*	3/2–	C		Jπ: L=1 and analyzing power in (d,t).
2071.60 *17*	(1/2,3/2,5/2+)	A		Jπ: possible γ to 1/2+; log *ft*=6.7 from (3/2+).
2146.3[a] *2*	(21/2–)	B		
2171.4[l] *4*	(17/2+)	B		
2281.2[&] *2*	(23/2–)	B		
2285.31 *17*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.9 from (3/2+).
2336.7[e] *2*	(21/2–)	B		
2340.2[m] *3*	(19/2+)	B		
2369.40 *22*	(1/2,3/2,5/2)	A		Jπ: log *ft*=6.9 from (3/2+).
2387.4 *4*	(13/2– to 21/2–)	B		Jπ: γ to 17/2–.
2412.9[i] *2*	21/2+	B		
2429.7 *3*	(19/2+)	B		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Ba Levels (continued)

E(level)†	Jπ‡	XREF	$T_{1/2}$§	Comments
2462.6^{f} *2*	(23/2+)	B	47 ns *1*	μ=−2.68 *8* (2013Ka27,2014StZZ). Jπ: 2013Ka27 propose 3−qp admixture of configurations= ν(7/2[404]⊗7/2[523]⊗9/2[514]) and ν(5/2[402]⊗7/2[523]⊗11/2[505]). $T_{1/2}$: from γ(t), pulsed beam. Weighted average of 47 ns *1* (2013Ka27) and 47 ns *2* (1992By03). μ: from g factor=−0.233 *7* (2013Ka27, TDPAD method).
2509.9 *3*	(19/2+)	B		
2599.6^{d} *2*	(23/2−)	B		
2653.7 *2*	(21/2+)	B		
2674.7 *2*	(21/2+)	B		
2742.6 *3*	(17/2 to 21/2−)	B		Jπ: γ to 17/2−.
2815.5^{h} *2*	23/2+	B		
2874.0 *2*	(23/2+)	B		
2903.1^{m} *4*	(23/2+)	B		
2913.7^{g} *2*	(25/2+)	B		
3044.2 *3*		B		
3079.1^{k} *2*	25/2+	B	1.2 ps *3*	
3094.2^{a} *2*	(25/2−)	B		
3179.4$^{\&}$ *2*	(27/2−)	B		
3368.2^{j} *2*	(27/2+)	B		
3378.9^{f} *2*	(27/2+)	B		
3430.6^{d} *2*	(27/2−)	B		
3525.3 *4*	(27/2 to 31/2−)	B		Jπ: γ to 27/2−.
3687.5 *2*	(27/2−)	B		
3704.5 *2*	(31/2−)	B		
3741.8^{k} *2*	(29/2+)	B		
3848.5 *3*	(27/2 to 31/2+)	B		Jπ: γ to 27/2+.
3852.8 *5*		B		
3895.9^{g} *2*	(29/2+)	B		
3948.1^{a} *2*	(29/2−)	B		
4054.4^{j} *2*	(31/2+)	B		
4137.6$^{\&}$ *2*	(31/2−)	B		
4286.1^{b} *2*	(31/2−)	B		
4320.2 *2*	(31/2+)	B		
4333.6 *3*		B		
4351.4 *3*	(31/2−)	B		
4458.7^{f} *3*	(31/2+)	B		
4502.8^{k} *2*	(33/2+)	B		
4617.1^{c} *2*	(33/2−)	B		
4663.9 *3*	(31/2 to 35/2+)	B		Jπ: γ to 31/2+.
4871.5^{j} *2*	(35/2+)	B		
4951.1^{g} *6*	(33/2+)	B		
5047.4^{b} *2*	(35/2−)	B		
5152.0$^{\&}$ *4*	(35/2−)	B		
5379.6^{k} *3*	(37/2+)	B		
5469.3^{c} *3*	(37/2−)	B		
5807.6^{j} *3*	(39/2+)	B		
5975.6^{b} *3*	(39/2−)	B		
6223.8$^{\&}$ *6*	(39/2−)	B		
6352.1^{k} *4*	(41/2+)	B		
6450.7^{c} *3*	(41/2−)	B		
6843.6^{j} *4*	(43/2+)	B		
6975.3^{b} *4*	(43/2−)	B		
7434.0^{k} *5*	(45/2+)	B		
7501.9^{c} *6*	(45/2−)	B		
7964.1^{j} *5*	(47/2+)	B		
9144.2^{j} *7*	(51/2+)	B		
10388.3^{c} *13*	(55/2+)	B		

† From least-squares fit to the adopted Eγ values.

Footnotes continued on next page

Adopted Levels, Gammas (continued)

^{129}Ba Levels (continued)

‡ For high–spin (J>13/2) levels populated in ^{120}Sn(^{12}C,3nγ), ^{116}Cd(^{18}O,5nγ), assignments are from multipolarities assigned on the basis of γ(θ), DCO, and band structures. No separate arguments are given for most of these levels. Ascending order of spins with excitation energy is assumed based on yrast pattern of population in high–spin studies.

§ From recoil distance technique (2000St07) unless otherwise noted.

Weighted average of 2.11 h 5 for 420ce, 2.10 h 5 for 597ce, 2.10 h 5 for 459ce, 2.04 h 10 for 481ce, 2.14 h 10 for 501ce, 2.08 h 5 for 534ce, 2.22 h 10 for 546ce, 2.13 h 5 for 748ce, 2.13 h 6 for 690ce, 2.07 h 12 for 872ce, 2.07 h 10 for 780ce, 2.00 h 12 for 803ce, 2.22 h 12 for 1034ce, 2.15 h 10 for 1045+1047ce, 2.09 h 5 for 392ce, 2.08 h 5 for 679ce, 2.16 h 8 for 893ce, 2.18 h 8 for 999ce, 2.19 h 10 for 1222ce, 2.11 h 5 for 1459ce, 2.18 h 10 for 1122ce, 2.18 h 10 for 1209ce, 2.10 h 12 for 1624ce (1961Ar05); 2.13 h 6 for 182.3γ (1966Li05), 2.19 h 4 for 1459γ, 2.09 h 7 for 1623γ (1972Ta02); 2.16 h 2 for 182γ, 2.15 h 3 for 1459γ (1973Is04). All γ rays listed are from decay of only the isomer. Others (for composite g.s.+isomer activities): 2.28 h 6, 2.47 h 7, 2.53 h 7 for γ$^{\pm}$ (1973Is04), 2.20 h 15 (1966Li05), 2.20 h 5 (1963Ya05), 2.61 h 2 (1961Ar05) for total positrons, 2.45 h 5 (1959He45), 2.0 h 1 (1950Fi11), 1.8 h 2 (1950Th08).

@ Weighted average of 2.20 h +17–12 for 1164.6γ and 2.25 h +15–11 for 1947γ+1954γ (1972Ta02); all three γ rays are emitted only by the decay of g.s. of ^{129}Ba. Others (composite for g.s.+isomer activities): 2.28 h 6, 2.47 h 7, 2.53 h 7 (1973Is04), 02.20 h 15 (1966Li05), 2.20 h 5 (1963Ya05), 2.61 h 2 (1961Ar05) for total positrons, 2.45 h 5 (1959He45), 2.0 h 1 (1950Fi11), 1.8 h 2 (1950Th08).

& (A): ν9/2[514],α=–1/2.

a (B): ν9/2[514],α=+1/2.

b (C): ν9/2[514]⊗π$h_{11/2}{}^2$,α=–1/2.

c (D): ν9/2[514]⊗π$h_{11/2}{}^2$,α=+1/2.

d (E): Yrare ν$h_{11/2}$ band,α=–1/2.

e (F): Yrare ν$h_{11/2}$ band,α=+1/2.

f (G): ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=–1/2.

g (H): ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=+1/2.

h (I): ν7/2[404],α=–1/2.

i (J): ν7/2[404],α=+1/2.

j (K): ν7/2[404]⊗π$h_{11/2}{}^2$,α=–1/2.

k (L): ν7/2[404]⊗π$h_{11/2}{}^2$,α=+1/2.

l (M): ν(1/2[411]+1/2[400]),α=–1/2. Admixture of 1/2[411] and 1/2[400] neutron configurations.

m (N): ν(1/2[411]+1/2[400]),α=+1/2. Admixture of 1/2[411] and 1/2[400] neutron configurations.

γ(^{129}Ba)

Eγ and Iγ data are from (HI,xnγ) (1992By03) for high–spin states and from ^{129}La ε decay (1979Br05) for low–spin states, unless otherwise noted.

E(level)	Eγ	Iγ	Mult.†	δ	α‡	Comments
8.42	(8.4 *2*)		[M3]		1.05×10^{8} *19*	B(M3)(W.u.)<0.041 *7*. α(L)=7.8E7 14; α(M)=2.2E7 4; α(N)=4.6E6 8; α(O)=5.9E5 11; α(P)=6.5E3 11. Eγ: deduced from energy difference of γ rays to 7/2+ and 1/2+ levels (1979Br05).
110.57	102.3 *3*	≤0.15	[E2]		1.78 *4*	α(K)=1.133 *19*; α(L)=0.507 *10*; α(M)=0.1108 *22*. α(N)=0.0230 *5*; α(O)=0.00305 *6*; α(P)=5.24×10^{-5} *9*.
	110.5 *1*	100 *5*	M1		0.743	α(K)=0.636 *9*; α(L)=0.0853 *13*; α(M)=0.0176 *3*. α(N)=0.00380 *6*; α(O)=0.000580 *9*; α(P)=4.19×10^{-5} *6*. Mult.: from α(exp) and γ(θ).
182.04	173.6 *1*	100	E1		0.0493	B(E1)(W.u.)=3.2×10^{-6} *2*. α(K)=0.0424 *6*; α(L)=0.00555 *8*; α(M)=0.001137 *16*. α(N)=0.000243 *4*; α(O)=3.63×10^{-5} *6*; α(P)=2.35×10^{-6} *4*. Mult.: from A_2, A_4, linear pol (1978Gi04).
253.76	143.3 *1*	15.7 *6*	E2(+M1)§	>1.7	0.519 *25*	α(K)=0.381 *13*; α(L)=0.109 *10*; α(M)=0.0234 *23*. α(N)=0.0049 *5*; α(O)=0.00067 *6*; α(P)=1.95×10^{-5} *3*.
	253.8 *1*	100 *4*	E2§		0.0777	α(K)=0.0621 *9*; α(L)=0.01227 *18*; α(M)=0.00260 *4*. α(N)=0.000549 *8*; α(O)=7.80×10^{-5} *11*; α(P)=3.43×10^{-6} *5*.
263.1	254.7 *1*	100	M1+E2		0.0757 *15*	α(K)=0.0628 *16*; α(L)=0.0103 *19*; α(M)=0.0022 *5*. α(N)=0.00046 *9*; α(O)=6.7×10^{-5} *10*; α(P)=3.8×10^{-6} *4*.
278.57	168.1 *1*	5.2 *2*	E2,M1§		0.27 *5*	α(K)=0.216 *19*; α(L)=0.044 *18*; α(M)=0.009 *4*. α(N)=0.0020 *8*; α(O)=0.00028 *10*; α(P)=1.25×10^{-5} *5*.
	278.6 *1*	100	M1§		0.0589	α(K)=0.0505 *7*; α(L)=0.0066 *1*; α(M)=0.00137 *2*. α(N)=0.000295 *5*; α(O)=4.52×10^{-5} *7*; α(P)=3.30×10^{-6} *5*.

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Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.[†]	δ	α[‡]	Comments
278.81	96.8 *1*	100	M1+E2		1.6 *6*	α(K)=1.13 *21*; α(L)=0.4 *3*; α(M)=0.08 *6*. α(N)=0.017 *12*; α(O)=0.0024 *16*; α(P)=6.12×10^{-5} *9*.
318.38	64.6 *1*	11 *1*	E1[§]		0.756	α(K)=0.641 *10*; α(L)=0.0920 *14*; α(M)=0.0189 *3*. α(N)=0.00398 *6*; α(O)=0.000572 *9*; α(P)=3.14×10^{-5} *5*.
	207.9 *1*	23 *5*	[E1]		0.0302	α(K)=0.0259 *4*; α(L)=0.00337 *5*; α(M)=0.000690 *10*. α(N)=0.0001476 *21*; α(O)=2.21×10^{-5} *4*; α(P)=1.467×10^{-6} *21*.
	318.4 *1*	100 *6*	E1[§]		0.00979	α(K)=0.00843 *12*; α(L)=0.001078 *16*; α(M)=0.000221 *3*. α(N)=4.74×10^{-5} *7*; α(O)=7.16×10^{-6} *10*; α(P)=4.93×10^{-7} *7*.
318.4	207.5 *3*	12 *6*	[M1+E2]		0.141 *12*	α(K)=0.115 *5*; α(L)=0.021 *6*; α(M)=0.0043 *14*. α(N)=0.0009 *3*; α(O)=0.00013 *4*; α(P)=6.8×10^{-6} *5*.
	318.3 *2*	100 *14*	[E2]		0.0375	α(K)=0.0306 *5*; α(L)=0.00542 *8*; α(M)=0.001141 *17*. α(N)=0.000242 *4*; α(O)=3.49×10^{-5} *5*; α(P)=1.753×10^{-6} *25*.
457.02	138.7 *1*	4.9 *6*	[E1]		0.0917	α(K)=0.0786 *12*; α(L)=0.01042 *15*; α(M)=0.00214 *3*. α(N)=0.000455 *7*; α(O)=6.75×10^{-5} *10*; α(P)=4.26×10^{-6} *6*.
	178.3 *3*	1.5 *3*	[M1+E2]		0.23 *3*	α(K)=0.181 *14*; α(L)=0.035 *13*; α(M)=0.007 *3*. α(N)=0.0016 *6*; α(O)=0.00023 *8*; α(P)=1.05×10^{-5} *6*.
	202.9 *3*	2.5 *9*	[M1+E2]		0.151 *14*	α(K)=0.123 *6*; α(L)=0.022 *7*; α(M)=0.0047 *15*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.3×10^{-6} *5*.
	346.5 *1*	64 *3*	M1(+E2)[§]	<0.4	0.0330 *6*	α(K)=0.0283 *6*; α(L)=0.00375 *6*; α(M)=0.000773 *13*. α(N)=0.000167 *3*; α(O)=2.55×10^{-5} *4*; α(P)=1.83×10^{-6} *5*.
	448.6 *1*	65 *4*	(E2)[§]		0.01336	α(K)=0.01117 *16*; α(L)=0.001738 *25*; α(M)=0.000363 *5*. α(N)=7.74×10^{-5} *11*; α(O)=1.140×10^{-5} *16*; α(P)=6.65×10^{-7} *10*.
	457.0 *1*	100 *8*	M1,E2[§]		0.0146 *20*	α(K)=0.0124 *18*; α(L)=0.00173 *10*; α(M)=0.000359 *18*. α(N)=7.7×10^{-5} *5*; α(O)=1.16×10^{-5} *9*; α(P)=7.8×10^{-7} *15*.
459.29	205.6 *2*	17 *3*	[M1+E2]		0.145 *13*	α(K)=0.118 *5*; α(L)=0.021 *7*; α(M)=0.0045 *14*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.0×10^{-6} *5*.
	348.7 *1*	100 *9*	M1(+E2)[§]	<0.6	0.0322 *8*	α(K)=0.0275 *8*; α(L)=0.00371 *7*; α(M)=0.000765 *15*. α(N)=0.000165 *3*; α(O)=2.51×10^{-5} *4*; α(P)=1.77×10^{-6} *7*.
467.3	149.0 *2*	9.8 *23*	[M1+E2]		0.40 *8*	α(K)=0.31 *4*; α(L)=0.07 *4*; α(M)=0.015 *7*. α(N)=0.0031 *15*; α(O)=0.00043 *19*; α(P)=1.77×10^{-5} *5*.
	356.7 *1*	100 *15*	(E2)		0.0263	α(K)=0.0217 *3*; α(L)=0.00366 *6*; α(M)=0.000769 *11*. α(N)=0.0001633 *23*; α(O)=2.37×10^{-5} *4*; α(P)=1.261×10^{-6} *18*.
542.27	85.1[#] *2*	≤6	[M1+E2]		2.5 *10*	α(K)=1.6 *4*; α(L)=0.7 *5*; α(M)=0.15 *11*. α(N)=0.030 *23*; α(O)=0.004 *3*; α(P)=8.79×10^{-5} *15*.
	431.8 *2*	94 *12*				
	533.9 *1*	100 *12*				
544.74	281.7 *1*	28 *4*	(M1+E2)		0.0562 *13*	α(K)=0.0469 *23*; α(L)=0.0074 *10*; α(M)=0.00155 *23*. α(N)=0.00033 *5*; α(O)=4.9×10^{-5} *5*; α(P)=2.9×10^{-6} *4*.
	536.3 *1*	100 *3*	E2		0.00814	B(E2)(W.u.)=24.0 *14*. α(K)=0.00686 *10*; α(L)=0.001014 *15*; α(M)=0.000211 *3*. α(N)=4.51×10^{-5} *7*; α(O)=6.71×10^{-6} *10*; α(P)=4.15×10^{-7} *6*.
617.81	339.1 *2*	21 *5*				
	507.3 *2*	93 *9*				
	609.3 *2*	21 *5*				
	617.8 *1*	100 *7*				
643.6	364.7 *1*	100 *4*	M1+E2		0.0269 *24*	α(K)=0.0227 *25*; α(L)=0.00333 *9*; α(M)=0.000692 *23*. α(N)=0.000148 *4*; α(O)=2.22×10^{-5} *4*; α(P)=1.41×10^{-6} *23*.
	461.6 *1*	25.4 *12*	E2		0.01232	α(K)=0.01032 *15*; α(L)=0.001591 *23*; α(M)=0.000332 *5*. α(N)=7.08×10^{-5} *10*; α(O)=1.045×10^{-5} *15*; α(P)=6.16×10^{-7} *9*.
659.97	341.5 *2*	55 *9*				
	381.5 *2*	18 *5*				

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Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.[†]	α[‡]	Comments
659.97	406.2 *1*	91 *9*	M1,E2[§]	0.0200 *22*	α(K)=0.0170 *22*; α(L)=0.00243 *6*; α(M)=0.000503 *9*. α(N)=0.0001079 *24*; α(O)=1.62×10^{-5} *7*; α(P)=1.06×10^{-6} *19*.
	549.5 *2*	100 *14*			
	651.5 *2*	55 *9*			
667.77	349.4 *2*	80 *40*			
	414.0 *1*	100 *40*			
711.92	254.9 *2*	15 *4*			
	393.5 *2*	5 *2*			
	433.3 *2*	12 *2*			
	458.2 *1*	100 *7*	M1,E2[§]	0.0145 *19*	α(K)=0.0123 *18*; α(L)=0.00172 *10*; α(M)=0.000357 *18*. α(N)=7.7×10^{-5} *5*; α(O)=1.15×10^{-5} *9*; α(P)=7.7×10^{-7} *15*.
	601.3 *2*	48 *4*			
	703.5 *1*	31 *2*			
	711.9 *1*	6 *1*			
787.07	244.8 *2*	100			
797.4	153.8 *1*	7.4 *4*	M1+E2	0.36 *7*	α(K)=0.28 *3*; α(L)=0.06 *3*; α(M)=0.013 *6*. α(N)=0.0027 *13*; α(O)=0.00039 *16*; α(P)=1.61×10^{-5} *5*.
	518.6 *1*	100 *2*	E2	0.00892	B(E2)(W.u.)=54.5 *23*. α(K)=0.00751 *11*; α(L)=0.001119 *16*; α(M)=0.000233 *4*. α(N)=4.98×10^{-5} *7*; α(O)=7.39×10^{-6} *11*; α(P)=4.53×10^{-7} *7*.
806.84	340.0 *5*	3.9 *20*			
	488.7 *3*	100 *20*	(E2)	0.01050	α(K)=0.00881 *13*; α(L)=0.001336 *19*; α(M)=0.000278 *4*. α(N)=5.94×10^{-5} *9*; α(O)=8.80×10^{-6} *13*; α(P)=5.29×10^{-7} *8*.
849.44	307.2[#] *2*				
	531.2 *2*	45 *18*			
	738.8 *1*	100 *9*			
864.1	319.4 *1*	14 *4*	(M1+E2)	0.0391 *22*	α(K)=0.033 *3*; α(L)=0.0050 *4*; α(M)=0.00104 *9*. α(N)=0.000222 *18*; α(O)=3.30×10^{-5} *16*; α(P)=2.0×10^{-6} *3*.
	600.7 *2*	100 *5*	E2	0.00604	α(K)=0.00511 *8*; α(L)=0.000734 *11*; α(M)=0.0001523 *22*. α(N)=3.26×10^{-5} *5*; α(O)=4.88×10^{-6} *7*; α(P)=3.11×10^{-7} *5*.
883.43	604.7 *1*	61 *8*	(M1+E2)	0.0071 *12*	α(K)=0.0061 *11*; α(L)=0.00081 *10*; α(M)=0.000168 *19*. α(N)=3.6×10^{-5} *5*; α(O)=5.5×10^{-6} *7*; α(P)=3.8×10^{-7} *8*.
	701.3 *1*	100 *7*	E2		
888.65	270.7 *2*	12 *4*			
	346.4 *2*	≤12			
	570.2 *2*	27 *12*			
	610.1 *2*	19 *4*			
	778.1 *1*	100 *12*			
	880.2 *1*	62 *8*			
	888.7 *1*	77 *8*			
906.70	588.3 *1*	100 *25*			
	628.1 *2*	75 *25*			
	653.0 *2*	50 *25*			
911.38	632.8 *2*	100			
928.59	674.8 *2*	18 *9*			
	928.6 *1*	100 *9*			
999.1	192.4 *3*	2.5 *9*	[M1+E2]	0.178 *19*	α(K)=0.144 *8*; α(L)=0.027 *9*; α(M)=0.0057 *20*. α(N)=0.0012 *4*; α(O)=0.00017 *5*; α(P)=8.4×10^{-6} *5*.
	531.7 *1*	100 *19*	(E2)	0.00833	α(K)=0.00702 *10*; α(L)=0.001040 *15*; α(M)=0.000216 *3*. α(N)=4.62×10^{-5} *7*; α(O)=6.87×10^{-6} *10*; α(P)=4.24×10^{-7} *6*.
1062.65	744.2 *2*	50 *25*			
	808.9 *1*	100 *25*			
1068.1	814.3 *3*	100			
1094.96	776.6 *2*	≤20			
	816.4 *1*	60 *20*			
	841.2 *2*	80 *20*			
	984.3 *2*	60 *10*			
	1086.5 *2*	100 *10*			
	1095.0 *3*	30 *10*			
1119.85	841.3 *2*	100 *15*			
	866.0 *2*	≤15			
	1119.9 *2*	23 *8*			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.[†]	α[‡]	Comments
1210.0	412.6 *1*	15 *3*	D	0.0213	α(K)=0.0183 *3*; α(L)=0.00237 *4*; α(M)=0.000488 *7*. α(N)=0.0001054 *15*; α(O)=1.618×10^{-5} *23*; α(P)=1.192×10^{-6} *17*.
	566.4 *1*	100 *4*	(M1+E2)	0.0084 *14*	α(K)=0.0071 *12*; α(L)=0.00097 *11*; α(M)=0.000200 *20*. α(N)=4.3×10^{-5} *5*; α(O)=6.5×10^{-6} *8*; α(P)=4.5×10^{-7} *9*.
1210.5	346.5 *2*	10 *2*	(M1+E2)	0.0311 *24*	α(K)=0.026 *3*; α(L)=0.00389 *17*; α(M)=0.00081 *5*. α(N)=0.000173 *8*; α(O)=2.58×10^{-5} *6*; α(P)=1.62×10^{-6} *25*.
	665.8 *1*	100 *5*	E2		B(E2)(W.u.)=60 *5*.
1219.73	901.3 *4*	60 *20*			
	966.0 *3*	100 *20*			
1258.1	1004.3 *3*	100			
1318.4	521.0 *1*	100 *10*	(M1+E2)	0.0103 *16*	α(K)=0.0088 *15*; α(L)=0.00121 *11*; α(M)=0.000250 *21*. α(N)=5.4×10^{-5} *5*; α(O)=8.1×10^{-6} *9*; α(P)=5.5×10^{-7} *11*.
	674.8 *1*	94 *5*	E2		
1389.54	771.6 *2*	60 *20*			
	1071.2 *2*	≤60			
	1135.8 *1*	100 *20*			
1438.4	631.7 *3*	100	(Q)		
1439.23	1160.8 *1*	86 *14*			
	1185.6 *1*	71 *14*			
	1328.4 *1*	100 *14*			
	1439.2 *1*	43 *14*			
1475.4	157.0 *1*	6.7 *18*	(M1+E2)	0.34 *6*	α(K)=0.27 *3*; α(L)=0.056 *25*; α(M)=0.012 *6*. α(N)=0.0025 *12*; α(O)=0.00036 *15*; α(P)=1.52×10^{-5} *5*.
	678.0 *1*	100 *2*	E2		B(E2)(W.u.)=90 *40*.
1545.3	335.7 *3*	7.3 *13*	(M1+E2)	0.0340 *23*	α(K)=0.029 *3*; α(L)=0.00428 *24*; α(M)=0.00089 *6*. α(N)=0.000190 *11*; α(O)=2.84×10^{-5} *9*; α(P)=1.8×10^{-6} *3*.
	661.8 *1*	100 *10*	Q		
	747.8 *2*	20 *4*	D		
1590.2	379.8 *3*	13 *9*	[M1+E2]	0.0241 *23*	α(K)=0.0203 *24*; α(L)=0.00295 *5*; α(M)=0.000613 *13*. α(N)=0.0001314 *21*; α(O)=1.97×10^{-5} *5*; α(P)=1.26×10^{-6} *21*.
	726.1 *2*	100 *5*	E2		
1610.20	760.6 *2*	≤19			
	1068.0 *1*	63 *6*			
	1150.9 *2*	13 *6*			
	1291.8 *1*	100 *13*			
	1356.4 *2*	31 *6*			
	1610.2 *2*	19 *6*	[M2]		
1635.40	1017.6 *1*	100 *11*			
	1356.6 *2*	56 *11*			
	1381.8 *2*	11 *6*			
1654.6	216.5 *3*	1.8 *9*	[M1+E2]	0.124 *9*	α(K)=0.101 *3*; α(L)=0.018 *5*; α(M)=0.0037 *11*. α(N)=0.00079 *22*; α(O)=0.00012 *3*; α(P)=6.0×10^{-6} *5*.
	655.6 *2*	100 *26*	(Q)		
1778.28	1321.3 *2*	60 *20*			
	1459.7 *2*	100 *20*			
	1499.8 *2*	80 *20*			
	1524.5 *3*	80 *20*			
	1778.3 *2*	80 *20*			
1804.80	1486.7 *3*	≤40			
	1550.9 *2*	100 *20*			
1845.0	526.6 *1*	93 *9*	(M1+E2)	0.0101 *16*	α(K)=0.0086 *14*; α(L)=0.00117 *11*; α(M)=0.000243 *21*. α(N)=5.2×10^{-5} *5*; α(O)=7.9×10^{-6} *9*; α(P)=5.4×10^{-7} *11*.
	634.9 *1*	100 *5*	E2	0.00524	α(K)=0.00445 *7*; α(L)=0.000631 *9*; α(M)=0.0001307 *19*. α(N)=2.80×10^{-5} *4*; α(O)=4.20×10^{-6} *6*; α(P)=2.72×10^{-7} *4*.
1866.33	1409.3 *1*	100 *20*			
	1547.9 *3*	20 *10*			
	1587.8 *2*	60 *20*			
	1755.6[#] *2*	20 *10*			
	1866.3 *2*	40 *20*			
1989.9	400.0 *3*	6.3 *14*	[M1+E2]	0.0209 *23*	α(K)=0.0177 *22*; α(L)=0.00254 *5*; α(M)=0.000527 *8*. α(N)=0.0001129 *21*; α(O)=1.69×10^{-5} *7*; α(P)=1.10×10^{-6} *19*.
	779.3 *1*	100 *5*	E2		B(E2)(W.u.)=58 *9*.
1990.50	1061.9 *2*	100 *25*			

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Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.[†]	α[‡]	Comments
1990.50	1533.5 *3*	25 *13*			
	1672.1 *3*	25 *13*			
	1712.0[#] *3*	50 *25*			
	1736.7 *2*	75 *25*			
	1990.5 *3*	50 *25*			
2071.60	1793.0 *2*	100 *20*			
	2071.6 *3*	≤40			
2146.3	670.8 *2*	47 *5*	D+Q		
	827.9 *2*	100 *16*	(Q)		
2171.4	733.0 *3*	100			
2281.2	805.8 *1*	100	Q		
2285.31	1966.9 *2*	≤50			
	2285.3 *3*	≤100			
2336.7	492.3 *3*	49 *8*			
	791.5 *1*	100 *8*	(Q)		
	861.3 *2*	6 *4*			
2340.2	685.6 *2*	100	Q		
2369.40	1910.1 *2*	100 *10*			
2387.4	1069.7 *7*	100			
2412.9	423.2 *2*	9 *4*	D		
	822.7 *1*	100 *8*	E2		
2429.7	258.0 *5*	33 *13*			
	775.2 *3*	100 *47*	(Q)		
2462.6	126.0 *1*	33 *5*	(E1)	0.1196	B(E1)(W.u.)=6.2×10^{-7} *11*. α(K)=0.1025 *15*; α(L)=0.01368 *20*; α(M)=0.00280 *4*. α(N)=0.000597 *9*; α(O)=8.83×10^{-5} *13*; α(P)=5.49×10^{-6} *8*. Mult.: 1992By03 deduced α(t)=0.1 *2* from intensity balance.
	316.3 *1*	11 *3*	[E1]	0.00995	B(E1)(W.u.)=1.3×10^{-8} *4*. α(K)=0.00858 *12*; α(L)=0.001096 *16*; α(M)=0.000225 *4*. α(N)=4.82×10^{-5} *7*; α(O)=7.28×10^{-6} *11*; α(P)=5.02×10^{-7} *7*.
	472.8 *1*	100 *7*	(E2)	0.01151	B(E2)(W.u.)=0.0088 *7*. α(K)=0.00965 *14*; α(L)=0.001478 *21*; α(M)=0.000308 *5*. α(N)=6.58×10^{-5} *10*; α(O)=9.72×10^{-6} *14*; α(P)=5.78×10^{-7} *8*.
2509.9	855.4 *3*	100			
2599.6	453.6 *2*	21 *4*	(M1+E2)	0.0149 *20*	α(K)=0.0126 *19*; α(L)=0.00177 *10*; α(M)=0.000367 *18*. α(N)=7.9×10^{-5} *5*; α(O)=1.19×10^{-5} *9*; α(P)=7.9×10^{-7} *15*.
	754.5 *1*	100 *4*	Q		
	1124.3 *3*	18 *2*	(Q)		
2653.7	1063.5 *2*	100	Q		
2674.7	164.9 *3*	52 *3*	(M1+E2)	0.29 *5*	α(K)=0.229 *22*; α(L)=0.047 *20*; α(M)=0.010 *5*. α(N)=0.0021 *9*; α(O)=0.00030 *11*; α(P)=1.32×10^{-5} *5*.
	245.1 *3*	100 *23*	(M1+E2)	0.085 *3*	α(K)=0.0702 *13*; α(L)=0.0117 *24*; α(M)=0.0024 *6*. α(N)=0.00052 *11*; α(O)=7.6×10^{-5} *13*; α(P)=4.2×10^{-6} *5*.
	334.5 *3*	29 *13*	(M1+E2)	0.0343 *23*	α(K)=0.029 *3*; α(L)=0.00432 *25*; α(M)=0.00090 *6*. α(N)=0.000193 *12*; α(O)=2.87×10^{-5} *9*; α(P)=1.8×10^{-6} *3*.
	1084.5 *2*	58 *16*	(Q)		
2742.6	1424.2 *5*	100			
2815.5	402.7 *3*	10 *2*	(M1+E2)	0.0205 *23*	α(K)=0.0174 *22*; α(L)=0.00249 *6*; α(M)=0.000516 *9*. α(N)=0.0001107 *22*; α(O)=1.66×10^{-5} *7*; α(P)=1.08×10^{-6} *19*.
	825.6 *1*	100 *6*	E2		
2874.0	199.3 *1*	24 *4*	(M1+E2)	0.159 *16*	α(K)=0.129 *6*; α(L)=0.024 *8*; α(M)=0.0050 *17*. α(N)=0.0011 *4*; α(O)=0.00015 *5*; α(P)=7.6×10^{-6} *5*.
	884.1 *1*	100 *5*	Q		
2903.1	562.9 *3*	100	(Q)		
2913.7	451.0 *2*	100	(M1+E2)	0.0151 *20*	α(K)=0.0128 *19*; α(L)=0.00180 *10*; α(M)=0.000373 *17*. α(N)=8.0×10^{-5} *4*; α(O)=1.21×10^{-5} *9*; α(P)=8.0×10^{-7} *15*.
3044.2	301.6 *2*	100 *33*	D		
	656.9 *3*	100 *50*			
3079.1	205.1 *1*	78 *9*	(M1+E2)	0.146 *13*	α(K)=0.119 *5*; α(L)=0.021 *7*; α(M)=0.0045 *14*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.0×10^{-6} *5*.
	263.5 *1*	100 *10*	(M1+E2)	0.0685	α(K)=0.0569 *19*; α(L)=0.0092 *15*; α(M)=0.0019 *4*. α(N)=0.00041 *7*; α(O)=6.0×10^{-5} *8*; α(P)=3.4×10^{-6} *4*.

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Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.†	α‡	Comments
3079.1	425.4 *3*	13 *3*	E2	0.01557	B(E2)(W.u.)=45 *16*. α(K)=0.01298 *19*; α(L)=0.00205 *3*; α(M)=0.000429 *6*. α(N)=9.15×10^{-5} *13*; α(O)=1.344×10^{-5} *19*; α(P)=7.69×10^{-7} *11*.
	666.4 *3*	44 *7*	E2		B(E2)(W.u.)=16 *5*.
3094.2	812.9 *3*	48 *8*	D+Q		
	948.1 *2*	100 *8*	(Q)		
3179.4	898.2 *1*	100	Q		
3368.2	289.1 *1*	100 *6*	(M1+E2)	0.0521 *15*	α(K)=0.0436 *24*; α(L)=0.0068 *9*; α(M)=0.00142 *19*. α(N)=0.00030 *4*; α(O)=4.5×10^{-5} *4*; α(P)=2.7×10^{-6} *4*.
	454.4 *1*	6.3 *10*	(M1+E2)	0.0148 *20*	α(K)=0.0126 *19*; α(L)=0.00176 *10*; α(M)=0.000365 *18*. α(N)=7.8×10^{-5} *5*; α(O)=1.18×10^{-5} *9*; α(P)=7.9×10^{-7} *15*.
	552.6 *1*	2.8 *10*			
	905.5 *1*	4.3 *5*	(Q)		
3378.9	465.5 *3*	100 *12*	(M1+E2)	0.0139 *19*	α(K)=0.0118 *18*; α(L)=0.00165 *10*; α(M)=0.000341 *19*. α(N)=7.3×10^{-5} *5*; α(O)=1.10×10^{-5} *9*; α(P)=7.4×10^{-7} *14*.
	916.3 *1*	35 *8*	(Q)		
3430.6	830.9 *1*	100 *13*	(Q)		
	1149.4 *3*	29 *4*	(Q)		
3525.3	345.9 *3*	100			
3687.5	508.2@ *2*	100@ *15*	(D)		
	643.4 *3*	24 *13*			
	1406.7 *3*	47 *11*	(Q)		
3704.5	525.1 *2*	100 *21*	(Q)		
	660.3 *4*	63 *42*			
3741.8	362.9 *1*	5 *1*	(M1+E2)	0.0273 *24*	α(K)=0.0230 *25*; α(L)=0.00338 *9*; α(M)=0.000703 *25*. α(N)=0.000150 *5*; α(O)=2.25×10^{-5} *4*; α(P)=1.43×10^{-6} *23*.
	373.6 *1*	100 *15*	(M1+E2)	0.0252 *24*	α(K)=0.0213 *24*; α(L)=0.00310 *6*; α(M)=0.000644 *16*. α(N)=0.000138 *3*; α(O)=2.06×10^{-5} *4*; α(P)=1.32×10^{-6} *22*.
	662.8 *2*	50 *7*	(Q)		
3848.5	480.3 *3*	100			
3852.8	327.5 *3*	100			
3895.9	517.0 *1*	100 *19*	D		
	982.2 *1*	62 *10*	Q		
3948.1	243.5 *2*	58 *3*	(M1+E2)	0.087 *3*	α(K)=0.0716 *12*; α(L)=0.0119 *25*; α(M)=0.0025 *6*. α(N)=0.00053 *11*; α(O)=7.8×10^{-5} *13*; α(P)=4.3×10^{-6} *5*.
	260.6 *1*	100 *5*	(M1+E2)	0.0707 *11*	α(K)=0.0587 *18*; α(L)=0.0095 *16*; α(M)=0.0020 *4*. α(N)=0.00043 *8*; α(O)=6.2×10^{-5} *9*; α(P)=3.6×10^{-6} *4*.
	768.7 *1*	36 *5*	D		
	854.0 *4*	37 *6*	(Q)		
4054.4	312.6 *1*	100 *13*	(M1+E2)	0.0416 *21*	α(K)=0.035 *3*; α(L)=0.0053 *5*; α(M)=0.00111 *11*. α(N)=0.000237 *21*; α(O)=3.52×10^{-5} *20*; α(P)=2.1×10^{-6} *3*.
	675.5 *2*	4 *2*			
	686.2 *1*	83 *4*	(Q)		
4137.6	958.2 *1*	100	Q		
4286.1	338.1 *1*	100 *4*	(M1+E2)	0.0333 *23*	α(K)=0.028 *3*; α(L)=0.00419 *22*; α(M)=0.00087 *6*. α(N)=0.000186 *10*; α(O)=2.78×10^{-5} *8*; α(P)=1.7×10^{-6} *3*.
	598.9 *3*	12 *2*			
	855.5 *1*	27 *4*	Q		
4320.2	424.4 *2*	32 *16*			
	471.5 *3*	100 *53*			
	941.2 *2*	53 *16*			
4333.6	485.1 *3*	100			
4351.4	920.9 *2*	88 *15*	Q		
	1171.7 *5*	100 *35*			
4458.7	562.7 *2*	88 *25*			
	1080.1 *3*	≤100			
4502.8	448.4 *1*	100 *17*	D		
	761.2 *3*	50 *7*	(Q)		
4617.1	331.0 *1*	100 *6*	(M1+E2)	0.0353 *23*	α(K)=0.030 *3*; α(L)=0.0045 *3*; α(M)=0.00093 *7*. α(N)=0.000199 *13*; α(O)=2.96×10^{-5} *11*; α(P)=1.8×10^{-6} *3*.
	669.0 *2*	27 *3*	(Q)		
4663.9	330.4 *3*	12 *6*			
	609.5 *3*	100 *29*			

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Adopted Levels, Gammas (continued)

γ(^{129}Ba) (continued)

E(level)	Eγ	Iγ	Mult.[†]	α[‡]	Comments
4871.5	368.6 *2*	46 *12*	(M1+E2)	0.0261 *24*	α(K)=0.0221 *24*; α(L)=0.00323 *7*; α(M)=0.000671 *20*. α(N)=0.000144 *4*; α(O)=2.15×10^{-5} *4*; α(P)=1.37×10^{-6} *23*.
	817.1 *1*	100 *5*	Q		
4951.1	1055.2 *5*	100			
5047.4	430.2 *1*	100 *7*	(M1+E2)	0.0171 *21*	α(K)=0.0145 *20*; α(L)=0.00206 *8*; α(M)=0.000427 *14*. α(N)=9.2×10^{-5} *4*; α(O)=1.38×10^{-5} *8*; α(P)=9.1×10^{-7} *17*.
	761.3 *3*	33 *4*			
5152.0	1014.4 *3*	100	(Q)		
5379.6	508.2[@] *2*	100[@] *14*	D		
	876.4 *6*	65 *19*			
5469.3	421.9 *1*	78 *8*	(M1+E2)	0.0181 *22*	α(K)=0.0153 *21*; α(L)=0.00218 *8*; α(M)=0.000451 *12*. α(N)=9.7×10^{-5} *4*; α(O)=1.45×10^{-5} *8*; α(P)=9.6×10^{-7} *17*.
	852.2 *2*	100 *9*	Q		
5807.6	428.0 *3*	36 *12*	(M1+E2)	0.0174 *21*	α(K)=0.0147 *20*; α(L)=0.00209 *8*; α(M)=0.000433 *14*. α(N)=9.3×10^{-5} *4*; α(O)=1.40×10^{-5} *8*; α(P)=9.2×10^{-7} *17*.
	935.9 *3*	100 *10*	(Q)		
5975.6	506.3 *2*	100 *34*	D		
	928.1 *5*	50 *20*	(Q)		
6223.8	1071.8 *4*	100	(Q)		
6352.1	544.4 *3*	72 *44*			
	972.7 *3*	100 *39*	(Q)		
6450.7	475.1 *3*	33 *10*			
	981.6 *3*	100 *16*	(Q)		
6843.6	491.6 *3*	8 *4*			
	1035.6 *7*	100 *20*			
6975.3	524.6 *3*	100 *50*			
	999.6 *3*	56 *25*			
7434.0	590.3 *3*	18 *9*			
	1082.1 *5*	100 *46*			
7501.9	1051.1 *5*	100			
7964.1	530.0 *3*	5 *3*			
	1120.7 *5*	100 *37*			
9144.2	1180.1 *5*	100			
10388.3	1244.1 *10*	100			

[†] Multipolarities are from ^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ), unless otherwise noted. The assignments are based on γ(θ), DCO data in general, and from linear polarization data for selected transitions. RUL is also used for levels of known half–lives, or assumed ≈10 ns resolving time in γγ coincident data in high–spin studies.

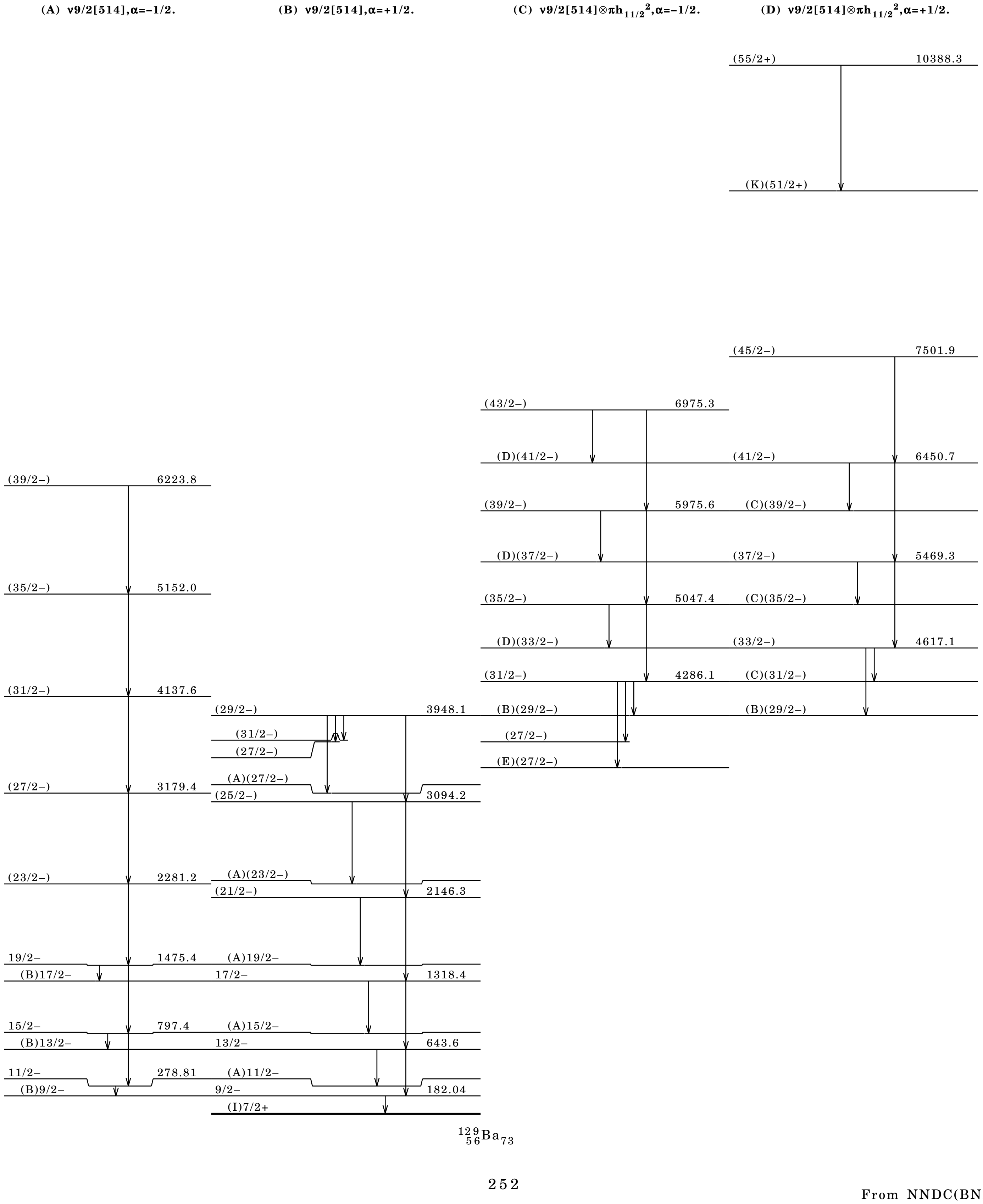
[‡] δ(E2/M1)=0.5 assumed for M1+E2 transitions from high–spin levels, when δ not given.

[§] From α(exp) in ^{129}La ε decay.

[#] Placement of transition in the level scheme is uncertain.

[@] Multiply placed; intensity suitably divided.

Adopted Levels, Gammas (continued)



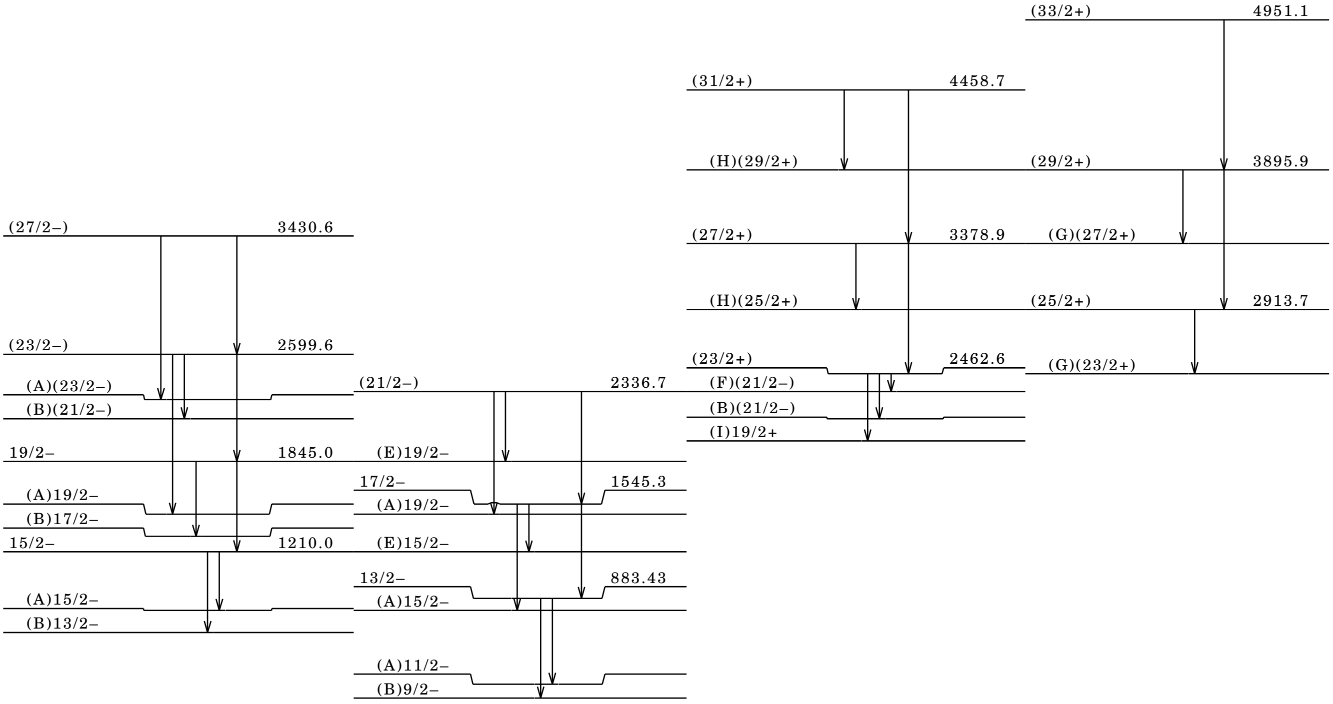
Adopted Levels, Gammas (continued)

(E) Yrare νh$_{11/2}$ band,α=−1/2.

(F) Yrare νh$_{11/2}$ band, α=+1/2.

(G) ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=−1/2.

(H) ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=+1/2.



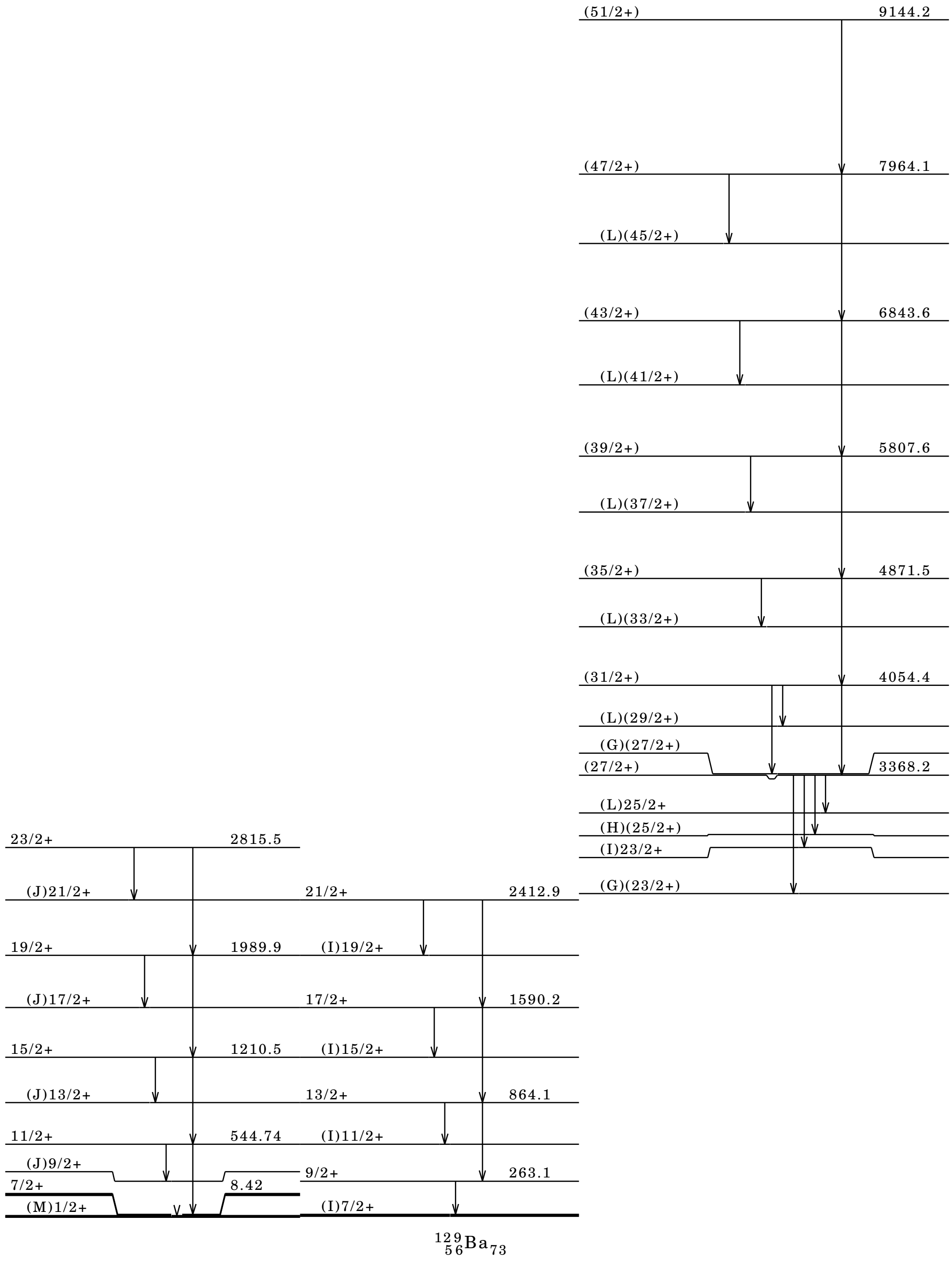
$^{129}_{56}$Ba$_{73}$

Adopted Levels, Gammas (continued)

(I) ν7/2[404],α=−1/2.

(J) ν7/2[404],α=+1/2.

(K) ν7/2[404]⊗πh$_{11/2}$^{2},α=−1/2.

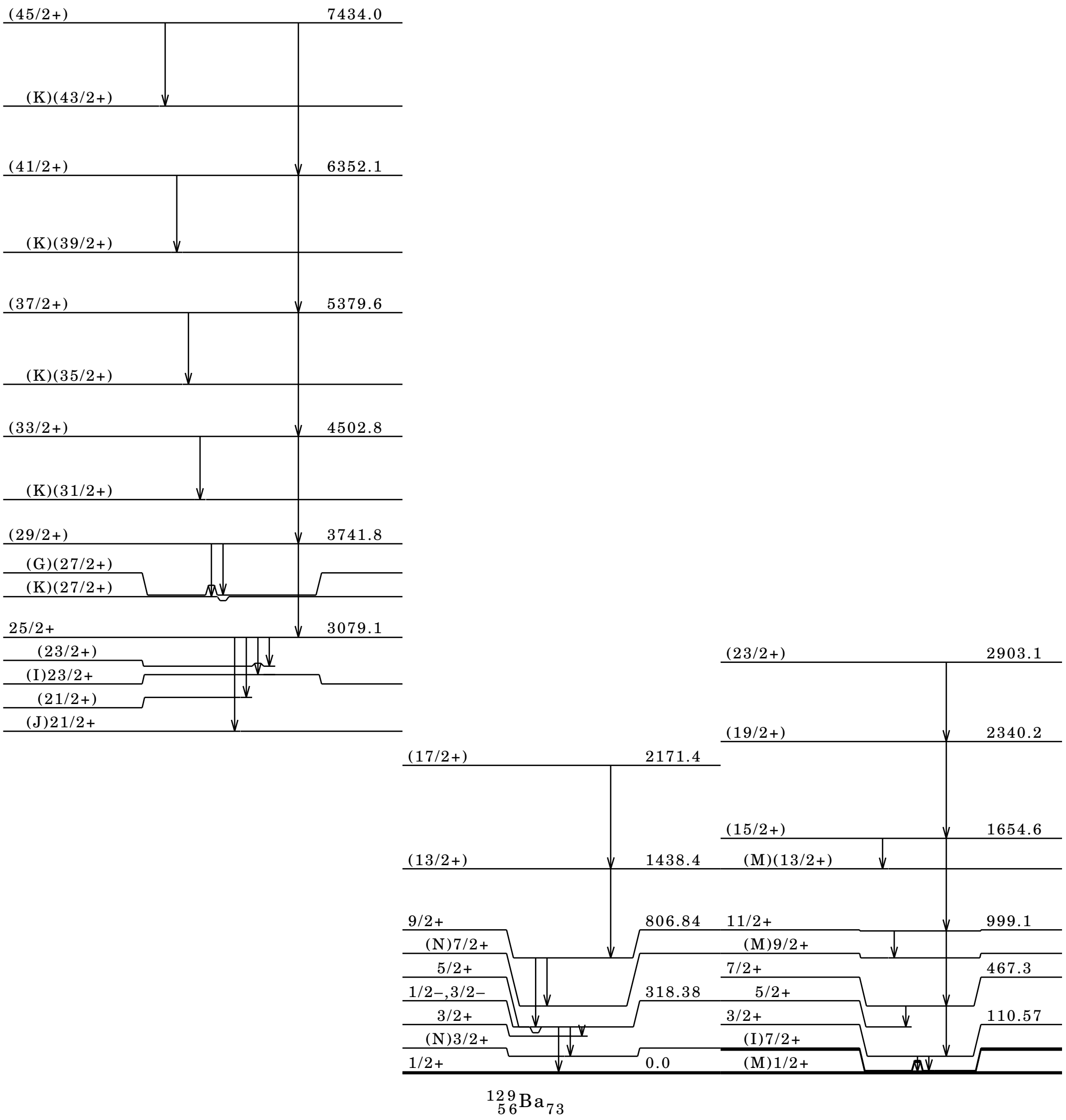


Adopted Levels, Gammas (continued)

(L) ν7/2[404]⊗πh$_{11/2}$^{2},α=+1/2.

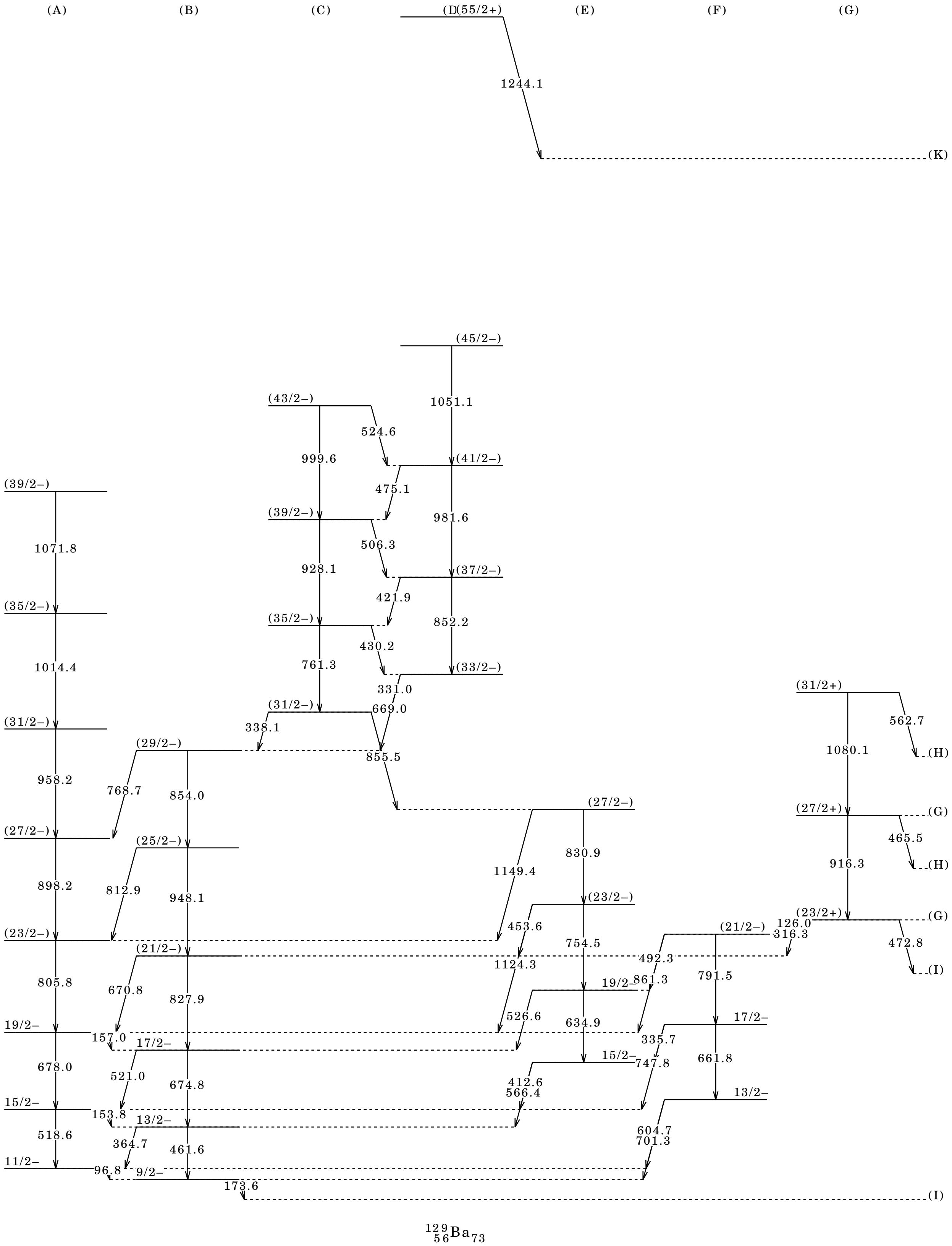
(M) ν(1/2[411]+1/2[400]), α=−1/2.

(N) ν(1/2[411]+1/2[400]), α=+1/2.



Adopted Levels, Gammas (continued)

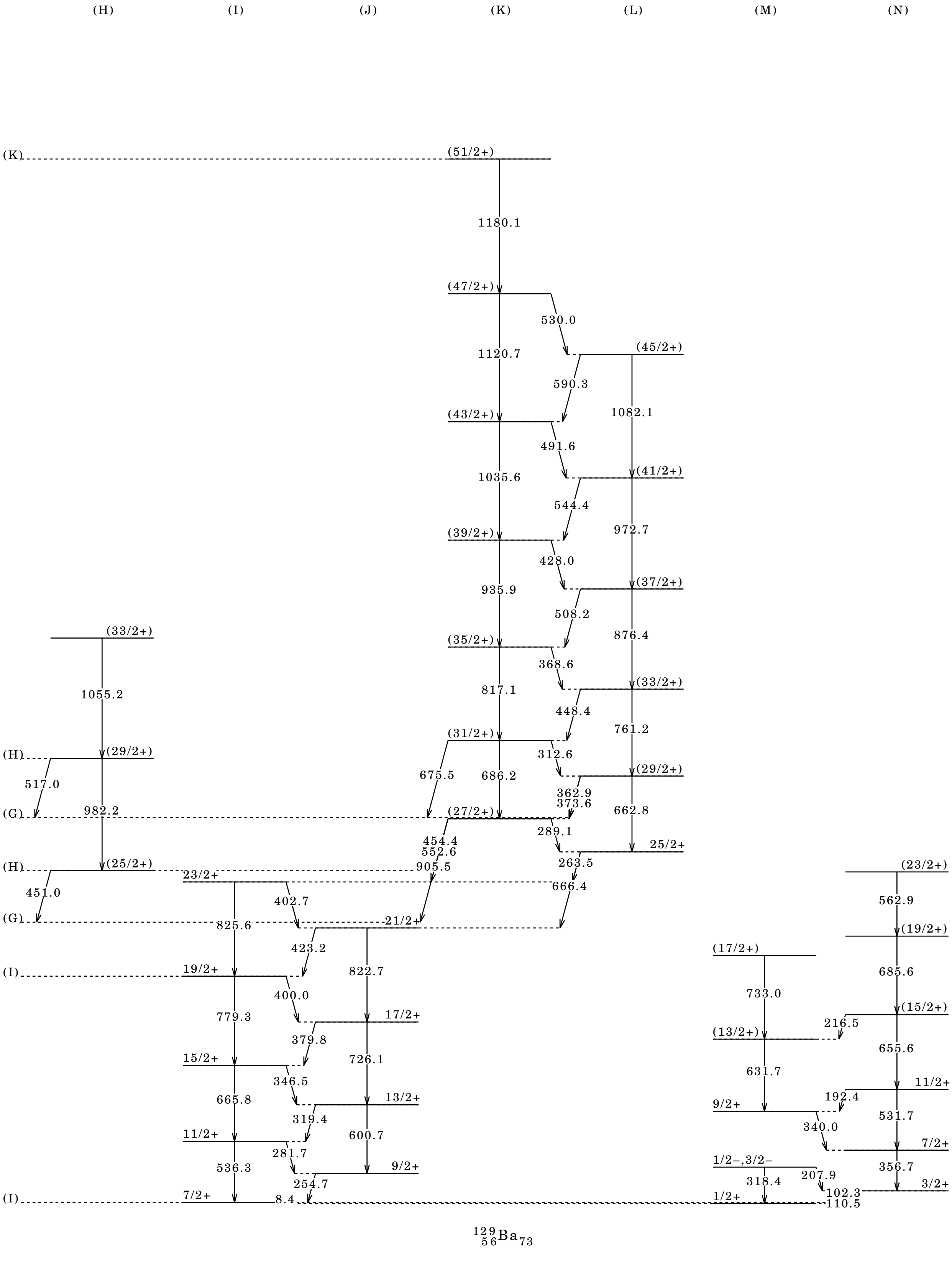
Bands for ^{129}Ba



$^{129}_{56}$Ba$_{73}$

Adopted Levels, Gammas (continued)

Bands for ^{129}Ba

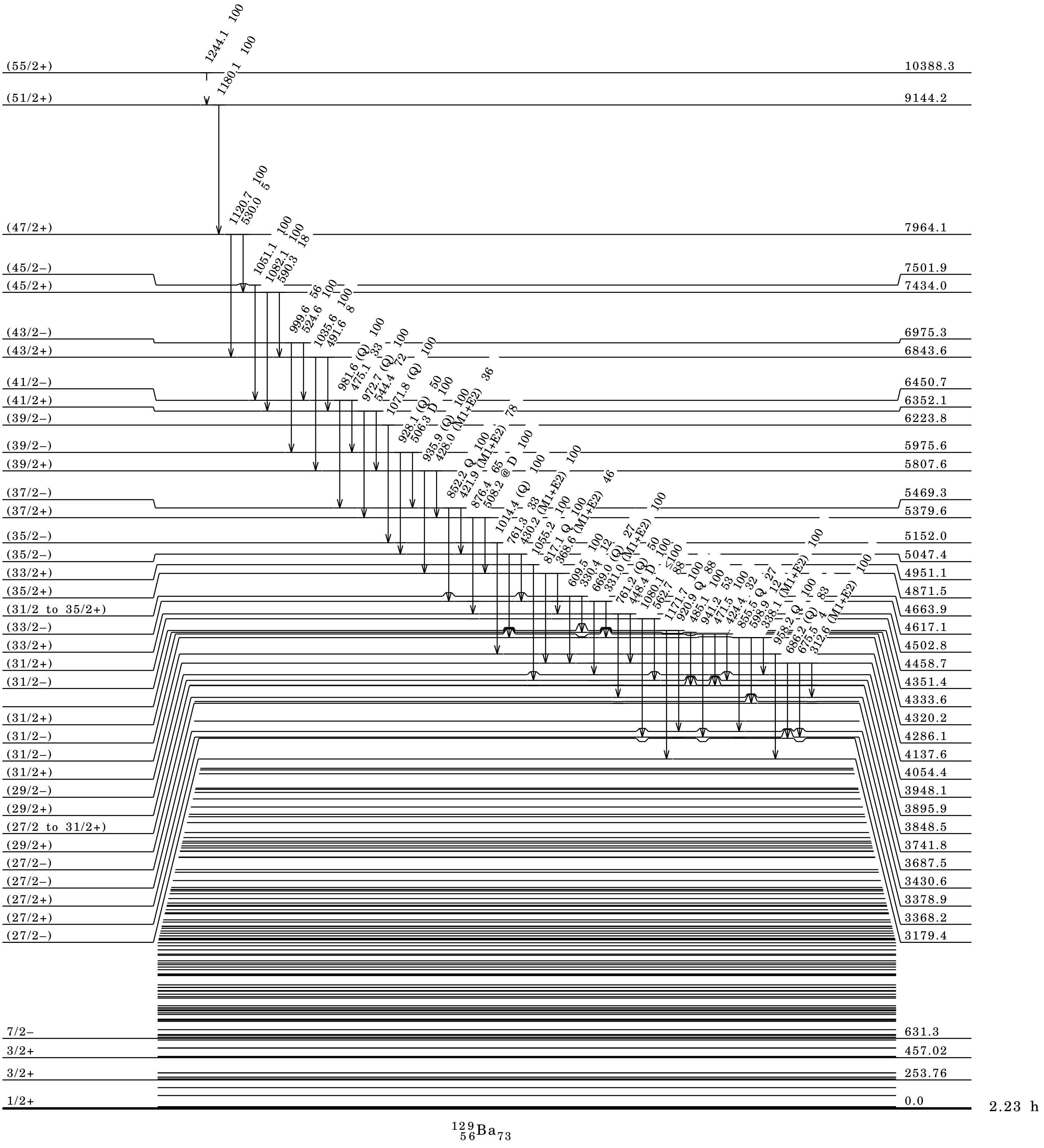


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided

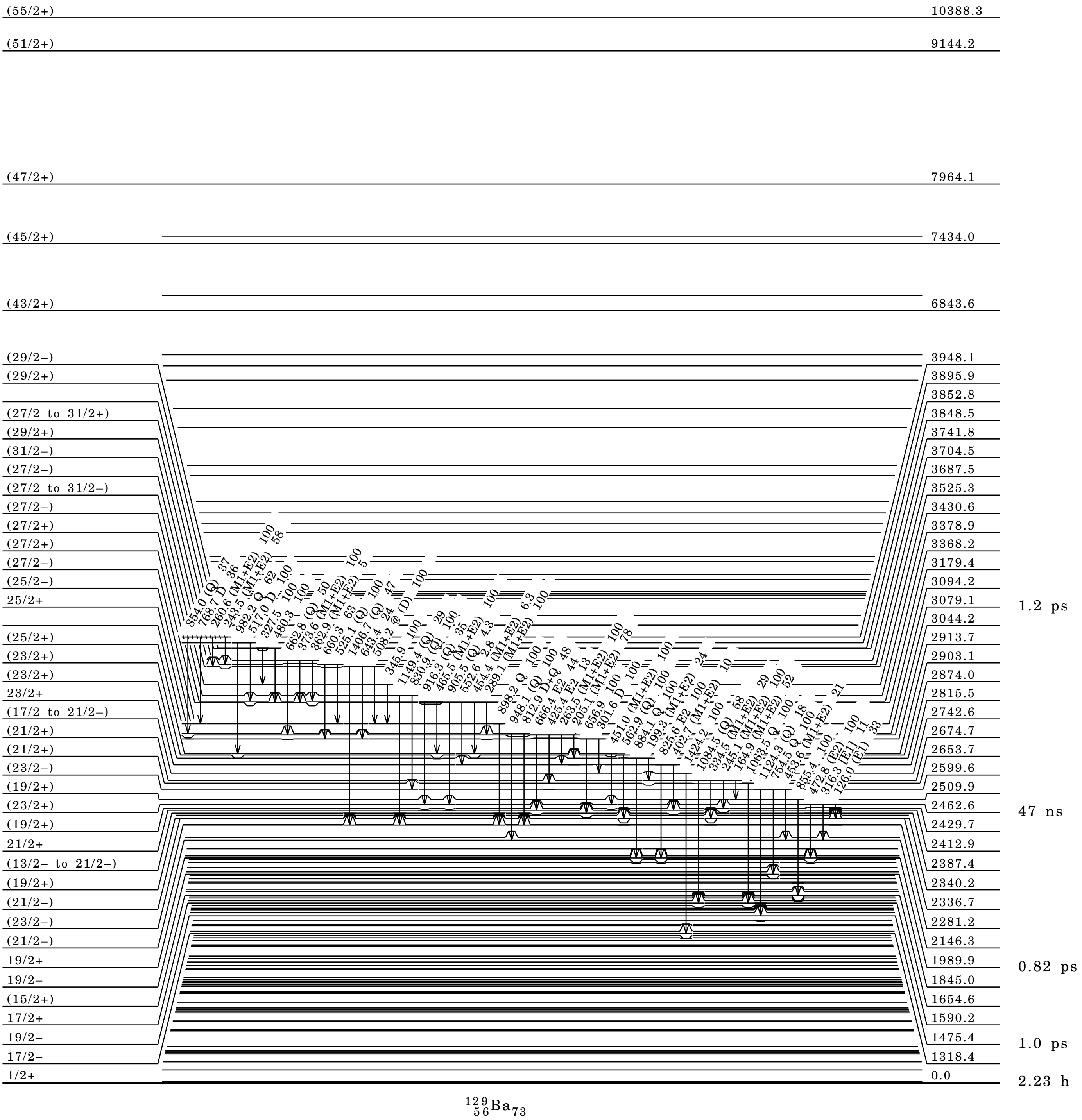


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

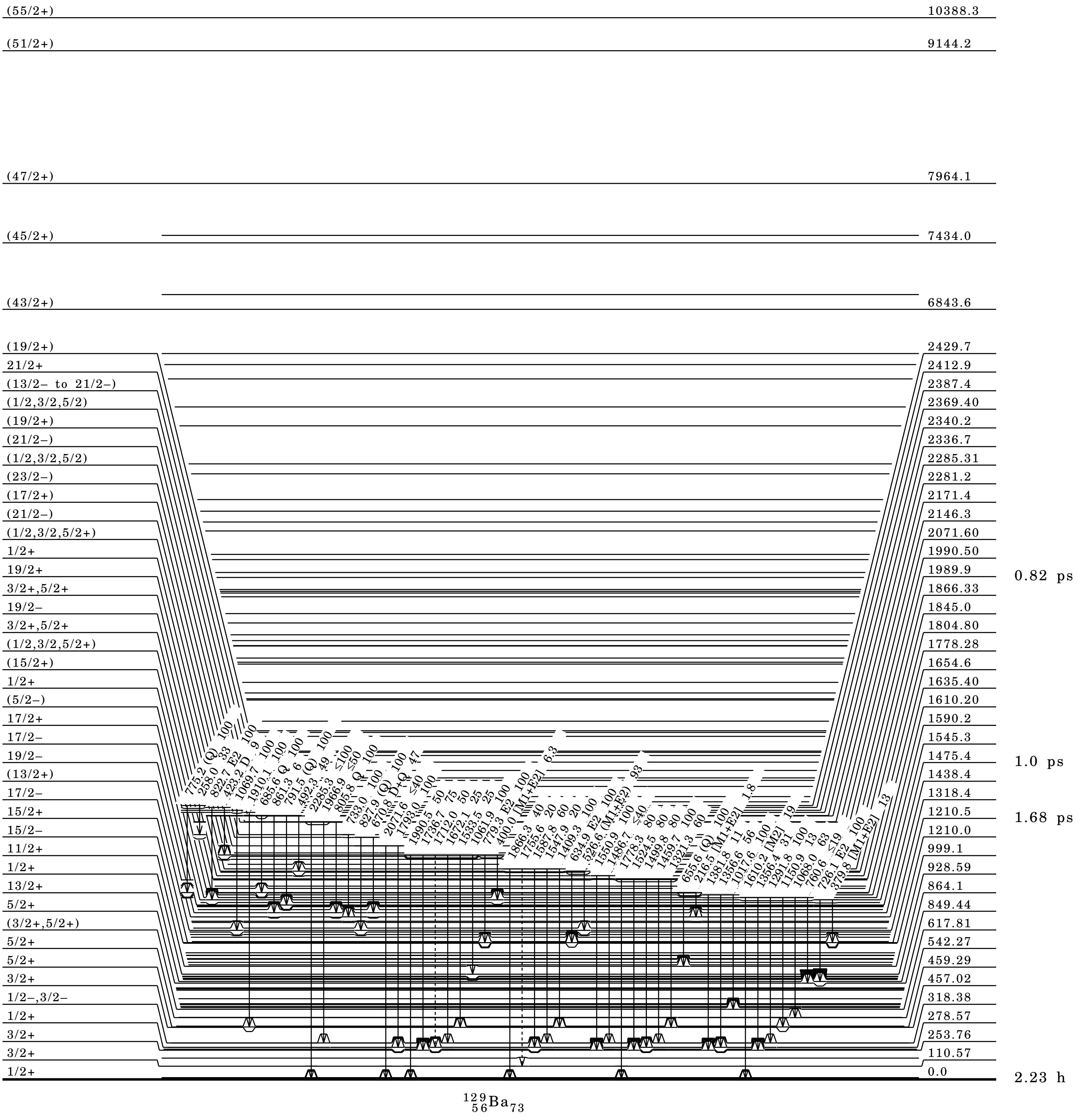
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



Adopted Levels, Gammas (continued)

Level Scheme (continued)

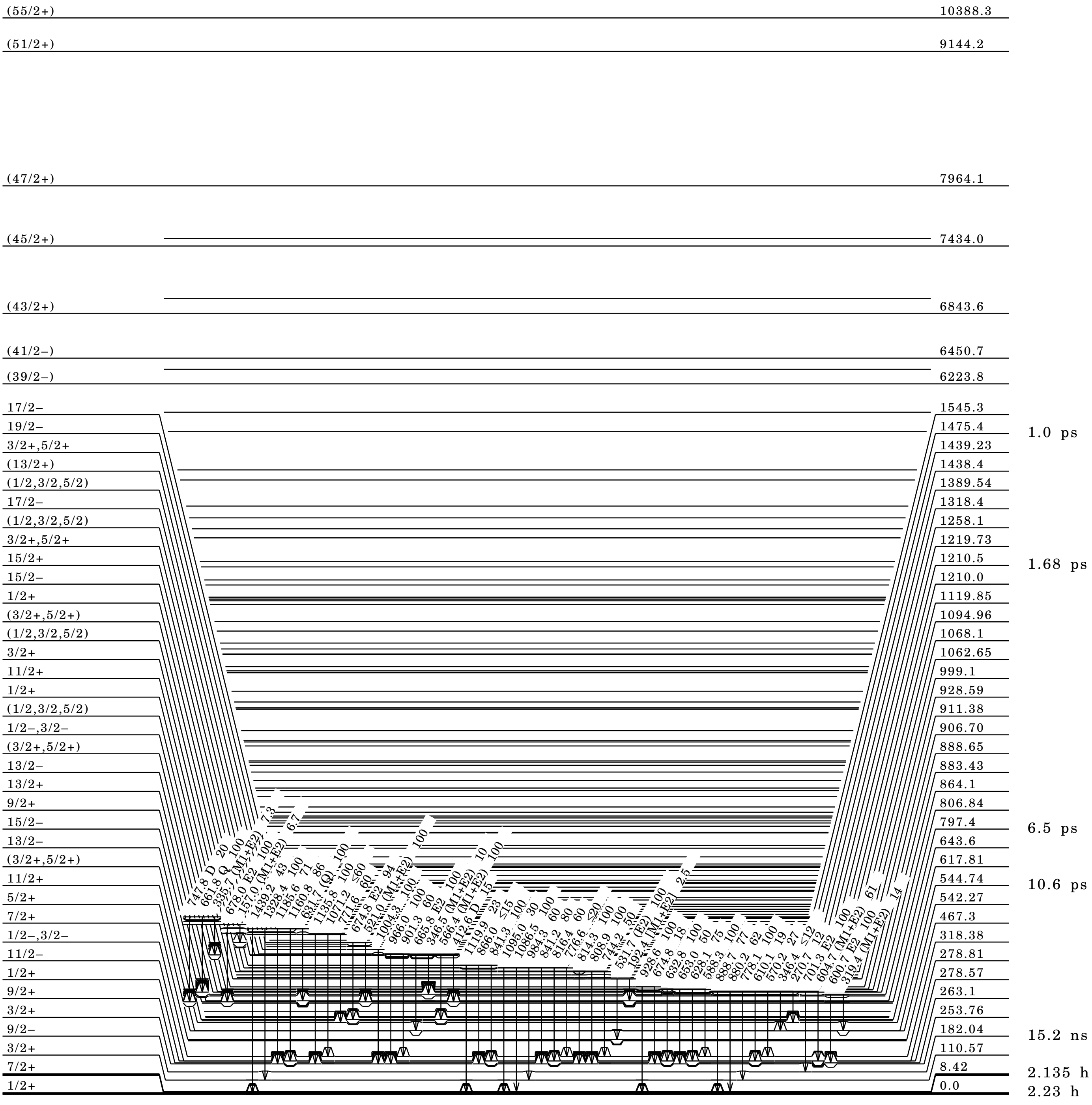
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided

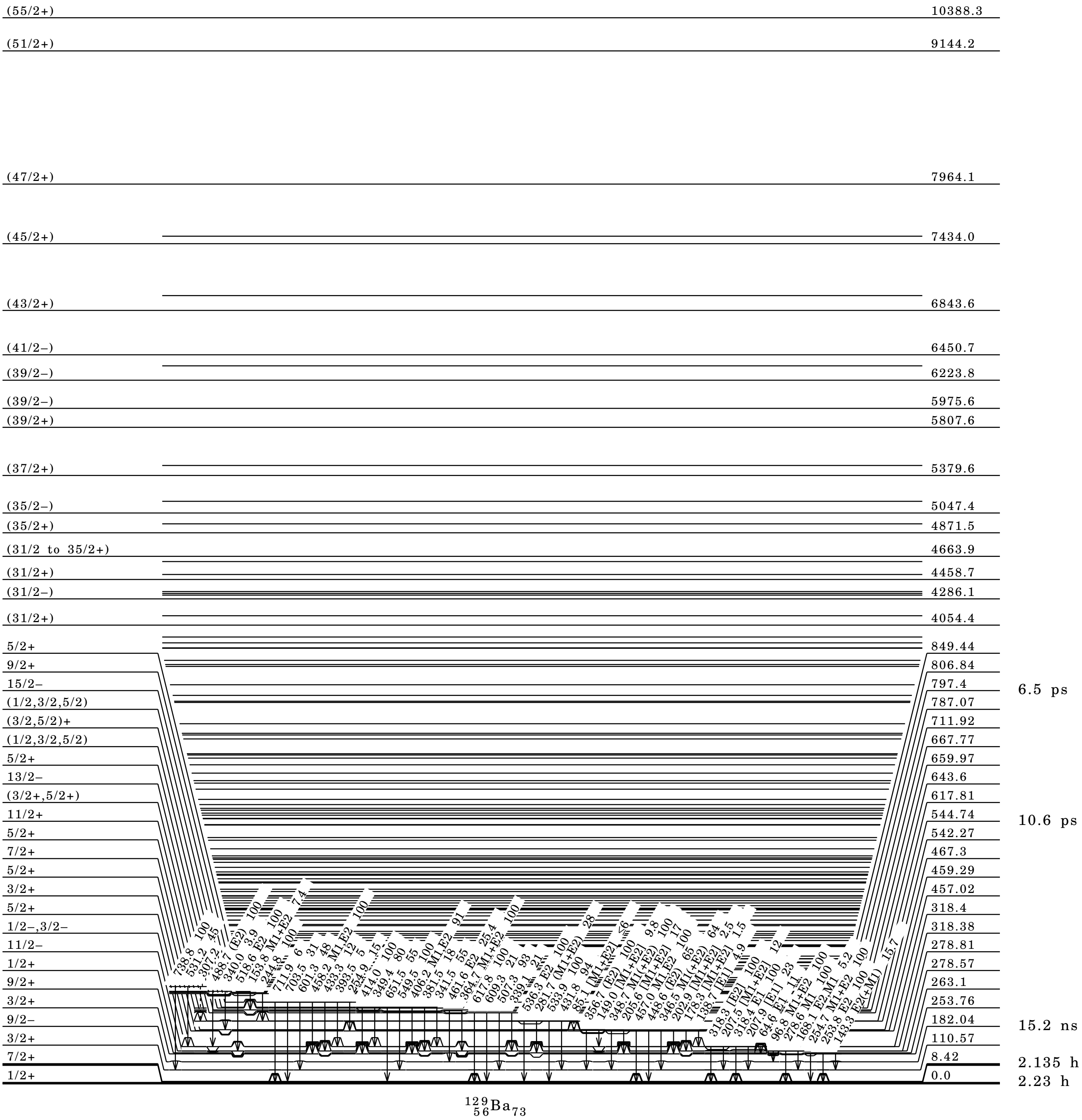


$^{129}_{56}$Ba$_{73}$

Adopted Levels, Gammas (continued)

Level Scheme (continued)

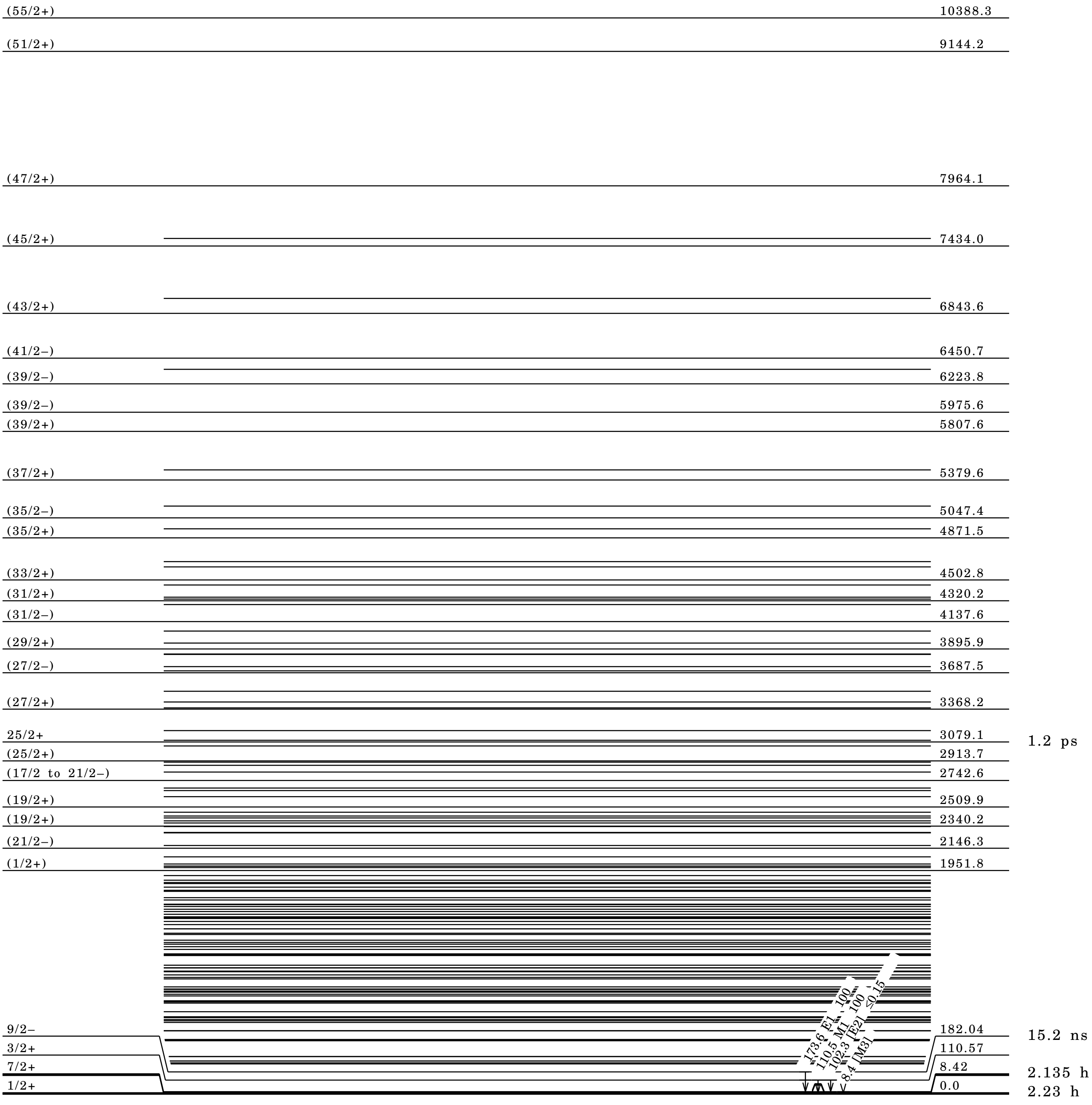
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



$^{129}_{56}Ba_{73}$

From NNDC(BNL)
program ENSDAT

^{129}La ε Decay (11.6 min) 1979Br05

Parent ^{129}La: E=0.0; Jπ=(3/2+); $T_{1/2}$=11.6 min *2*; Q(g.s.)=3739 *22*; %ε+%β$^+$ decay=100.
^{129}La–Q(ε): From 2012Wa38.
^{129}La–J,$T_{1/2}$: From ^{129}La Adopted Levels.
1979Br05: ^{130}Ba(p,2n) E=25 MeV, no chem sep; Ge γ, γγ–coin, semi ce, semi β$^+$, γβ$^-$coin, half–life.
Others: 1998Ko66 (Q value=3.74 MeV *4* from βγ coin data), 1963Ya05, 1963Pr02, 1963La03.

^{129}Ba Levels

E(level)	Jπ†	$T_{1/2}$†
0.0	1/2+	2.23 h *11*
8.42 *6*	7/2+	2.135 h *10*
110.57 *5*	3/2+	
253.76 *5*	3/2+	
278.57 *5*	1/2+	
318.38 *5*	1/2–,3/2–	
457.02 *6*	3/2+	
459.29 *9*	5/2+	
542.27 *8*	5/2+	
617.81 *7*	(3/2+,5/2+)	
659.97 *8*	5/2+	
667.77 *10*	(1/2,3/2,5/2)	
711.92 *6*	(3/2,5/2)+	
787.07 *22*	(1/2,3/2,5/2)	
849.44 *9*	5/2+	
888.65 *6*	(3/2+,5/2+)	
906.70 *9*	1/2–,3/2–	
911.38 *21*	(1/2,3/2,5/2)	
928.59 *9*	1/2+	
1062.65 *10*	3/2+	
1068.1 *3*	(1/2,3/2,5/2)	
1094.96 *8*	(3/2+,5/2+)	
1119.85 *12*	1/2+	
1219.73 *25*	3/2+,5/2+	
1258.1 *3*	(1/2,3/2,5/2)	
1389.54 *9*	(1/2,3/2,5/2)	
1439.23 *6*	3/2+,5/2+	
1610.21 *8*	(5/2–)	
1635.40 *10*	1/2+	
1778.28 *10*	(1/2,3/2,5/2)	
1804.80 *18*	3/2+,5/2+	
1866.33 *9*	3/2+,5/2+	
1990.50 *12*	1/2+	
2071.60 *17*	(1/2,3/2,5/2)	
2285.31 *17*	(1/2,3/2,5/2)	
2369.40 *22*	(1/2,3/2,5/2)	

† From Adopted Levels.

β$^+$,ε Data

1979Br05 determined Eβ+ endpoints from F–K analyses in γβ+ coin and deduced Q(ε)=3720 *50*.

Eε	E(level)	Iβ$^+$†	Iε†	Log *ft*	I(ε+β$^+$)†	Comments
(1370 *22*)	2369.40	0.00010 *5*	0.074 *25*	6.9 *2*	0.074 *25*	av Eβ=166.5 *98*; εK=0.8472 *3*; εL=0.11835 *13*; εM+=0.03308 *4*.
(1454 *22*)	2285.31	0.00025 *6*	0.0738 *21*	6.95 *2*	0.0741 *21*	av Eβ=203.5 *97*; εK=0.8458 *6*; εL=0.11784 *16*; εM+=0.03292 *5*.
(1667 *22*)	2071.60	0.0027 *6*	0.17 *3*	6.72 *8*	0.17 *3*	av Eβ=296.9 *96*; εK=0.8360 *17*; εL=0.1158 *3*; εM+=0.03233 *9*.
(1749 *22*)	1990.50	0.0066 *14*	0.26 *5*	6.6 *1*	0.27 *5*	av Eβ=332.3 *97*; εK=0.8290 *23*; εL=0.1146 *4*; εM+=0.03199 *11*.
(1873 *22*)	1866.33	0.011 *2*	0.26 *5*	6.6 *1*	0.27 *5*	av Eβ=386.7 *97*; εK=0.814 *4*; εL=0.1123 *5*; εM+=0.03133 *14*.
(1934 *22*)	1804.80	0.0091 *18*	0.16 *3*	6.87 *8*	0.17 *3*	av Eβ=413.6 *97*; εK=0.805 *4*; εL=0.1109 *6*; εM+=0.03093 *16*.
(1961 *22*)	1778.28	0.029 *4*	0.46 *6*	6.42 *6*	0.49 *6*	av Eβ=425.3 *97*; εK=0.800 *4*; εL=0.1102 *6*; εM+=0.03075 *17*.
(2104 *22*)	1635.40	0.034 *4*	0.34 *4*	6.62 *5*	0.37 *4*	av Eβ=488.1 *97*; εK=0.772 *5*; εL=0.1061 *8*; εM+=0.02959 *20*.
(2129 *22*)	1610.21	0.095 *10*	0.87 *7*	6.22 *4*	0.96 *8*	av Eβ=499.2 *98*; εK=0.767 *6*; εL=0.1053 *8*; εM+=0.02936 *21*.
(2300 *22*)	1439.23	0.078 *10*	0.44 *5*	6.58 *6*	0.52 *6*	av Eβ=575.0 *98*; εK=0.723 *7*; εL=0.0990 *9*; εM+=0.02760 *25*.
(2349 *22*)	1389.54	0.045 *7*	0.22 *3*	6.89 *7*	0.27 *4*	av Eβ=597.0 *98*; εK=0.708 *7*; εL=0.0970 *10*; εM+=0.0270 *3*.
(2481 *22*)	1258.1	0.016 *5*	0.058 *20*	7.5 *2*	0.074 *25*	av Eβ=655.6 *99*; εK=0.668 *7*; εL=0.0914 *10*; εM+=0.0255 *3*.
(2519 *22*)	1219.73	0.046 *9*	0.15 *3*	7.1 *1*	0.20 *4*	av Eβ=672.8 *99*; εK=0.656 *8*; εL=0.0896 *10*; εM+=0.0250 *3*.
(2619 *22*)	1119.85	0.12 *2*	0.32 *4*	6.83 *7*	0.44 *6*	av Eβ=717.5 *99*; εK=0.623 *8*; εL=0.0850 *11*; εM+=0.0237 *3*.
(2644 *22*)	1094.96	0.24 *3*	0.62 *7*	6.56 *5*	0.86 *9*	av Eβ=728.7 *99*; εK=0.614 *8*; εL=0.0839 *11*; εM+=0.0234 *3*.

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^{129}La ε Decay (11.6 min) 1979Br05 (continued)

β^+,ε Data (continued)

Eε	E(level)	$I\beta^{+\dagger}$	Iε†	Log *ft*	$I(\varepsilon+\beta^+)^\dagger$	Comments
(2671 *22*)	1068.1	0.014 *7*	0.035 *18*	7.8 *2*	0.049 *25*	av Eβ=740.8 *99*; εK=0.605 *8*; εL=0.0826 *11*; εM+=0.0230 *3*.
(2676 *22*)	1062.65	0.044 *12*	0.11 *3*	7.3 *1*	0.15 *4*	av Eβ=743.2 *99*; εK=0.603 *8*; εL=0.0824 *11*; εM+=0.0229 *3*.
(2810 *22*)	928.59	0.076 *17*	0.14 *3*	7.2 *1*	0.22 *5*	av Eβ=804 *10*; εK=0.558 *8*; εL=0.0760 *11*; εM+=0.0212 *3*.
(2828 *22*)	911.38	0.017 *9*	0.032 *16*	7.9 *2*	0.049 *25*	av Eβ=811 *10*; εK=0.552 *8*; εL=0.0752 *11*; εM+=0.0210 *3*.
(2832 *22*)	906.70	0.078 *18*	0.14 *3*	7.3 *1*	0.22 *5*	av Eβ=814 *10*; εK=0.550 *8*; εL=0.0750 *11*; εM+=0.0209 *3*.
(2850 *22*)	888.65	0.71 *6*	1.27 *10*	6.31 *4*	1.98 *15*	av Eβ=822 *10*; εK=0.544 *8*; εL=0.0742 *11*; εM+=0.0207 *3*.
(2890 *22*)	849.44	0.12 *2*	0.20 *4*	7.1 *1*	0.32 *6*	av Eβ=839 *10*; εK=0.531 *8*; εL=0.0723 *11*; εM+=0.0201 *3*.
(2952 *22*)	787.07	0.060 *12*	0.090 *18*	7.5 *1*	0.15 *3*	av Eβ=868 *10*; εK=0.510 *8*; εL=0.0695 *10*; εM+=0.0193 *3*.
(3027 *22*)	711.92	1.95 *11*	2.59 *14*	6.06 *3*	4.54 *24*	av Eβ=902 *10*; εK=0.485 *8*; εL=0.0661 *10*; εM+=0.0184 *3*.
(3071 *22*)	667.77	0.10 *3*	0.12 *4*	7.4 *2*	0.22 *7*	av Eβ=922 *10*; εK=0.471 *7*; εL=0.0641 *10*; εM+=0.0179 *3*.
(3079 *22*)	659.97	0.78 *6*	0.95 *7*	6.50 *4*	1.73 *13*	av Eβ=925 *10*; εK=0.469 *7*; εL=0.0638 *10*; εM+=0.0178 *3*.
(3121 *22*)	617.81	0.96 *8*	1.11 *9*	6.45 *4*	2.07 *16*	av Eβ=945 *10*; εK=0.455 *7*; εL=0.0620 *10*; εM+=0.0172 *3*.
(3197 *22*)	542.27	0.17 *4*	0.18 *4*	7.3 *1*	0.35 *8*	av Eβ=979 *10*; εK=0.432 *7*; εL=0.0588 *10*; εM+=0.0164 *3*.
(3280 *22*)	459.29	0.94 *9*	0.86 *8*	6.60 *5*	1.80 *17*	av Eβ=1017 *10*; εK=0.408 *7*; εL=0.0554 *9*; εM+=0.01542 *25*.
(3282 *22*)	457.02	9.8 *5*	9.0 *5*	5.59 *3*	18.8 *10*	av Eβ=1018 *10*; εK=0.407 *7*; εL=0.0553 *9*; εM+=0.01539 *25*.
(3421 *22*)	318.38	0.42 *13*	0.32 *10*	7.1 *2*	0.74 *23*	av Eβ=1081 *10*; εK=0.368 *6*; εL=0.0500 *8*; εM+=0.01392 *23*.
(3460 *22*)	278.57	15.0 *5*	10.9 *4*	5.55 *2*	25.9 *8*	av Eβ=1100 *11*; εK=0.358 *6*; εL=0.0486 *8*; εM+=0.01352 *22*.
(3485 *22*)	253.76	3.3 *3*	2.3 *2*	6.23 *5*	5.6 *5*	av Eβ=1111 *11*; εK=0.351 *6*; εL=0.0477 *8*; εM+=0.01328 *22*.
(3628 *22*)	110.57	9.1 *10*	5.4 *6*	5.90 *5*	14.5 *16*	av Eβ=1177 *11*; εK=0.317 *6*; εL=0.0429 *7*; εM+=0.01195 *20*.
(3739 *22*)	0.0	11 *2*	5.8 *10*	5.89 *8*	17 *3*	av Eβ=1228 *11*; εK=0.292 *5*; εL=0.0396 *7*; εM+=0.01102 *18*. $I(\varepsilon+\beta^+)$: from 1979Br05 based on the growth and decay of 372γ and 411γ from decay of the daughter ^{129}Cs.

† Absolute intensity per 100 decays.

γ(^{129}Ba)

Iγ normalization: From sum of $I(\gamma+ce+\varepsilon+\beta^+$ to g.s.)=100 with $I(\varepsilon+\beta^+)$ to g.s.=17% *3* (1979Br05).

Eγ	E(level)	Iγ&	Mult.	δ@	α§#	Comments
(8.4 *2*)	8.42		[M3]		1.05×10^{8} *19*	α(L)=7.8E7 14; α(M)=2.2E7 4. α(N)=4.6E6 8; α(O)=5.9E5 11; α(P)=6.5E3 11. Eγ: deduced from energy differences of gammas to 7/2+ and 1/2+ levels.
64.6 *1*	318.38	0.9 *1*	E1		0.756	α(K)=0.641 *10*; α(L)=0.0920 *14*; α(M)=0.0189 *3*. α(N)=0.00398 *6*; α(O)=0.000572 *9*; α(P)=3.14×10^{-5} *5*. α(L)exp=0.14 *5*.
85.1[a] *2*	542.27	≤0.1	[M1+E2]		2.5 *10*	α(K)=1.6 *4*; α(L)=0.7 *5*; α(M)=0.15 *11*. α(N)=0.030 *23*; α(O)=0.004 *3*; α(P)=8.79×10^{-5} *15*.
102.3[‡] *3*	110.57	≤0.1	[E2]		1.78 *4*	α(K)=1.133 *19*; α(L)=0.507 *10*; α(M)=0.1108 *22*. α(N)=0.0230 *5*; α(O)=0.00305 *6*; α(P)=5.24×10^{-5} *9*.

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^{129}La ε Decay (11.6 min) 1979Br05 (continued)

γ(^{129}Ba) (continued)

Eγ	E(level)	Iγ[&]	Mult.	δ[@]	α[§#]	Comments
110.5 *1*	110.57	68.5 *31*	M1		0.743	α(K)=0.636 *9*; α(L)=0.0853 *13*; α(M)=0.0176 *3*. α(N)=0.00380 *6*; α(O)=0.000580 *9*; α(P)=4.19×10^{-5} *6*. α(K)exp=0.64 *4*; α(M)exp=0.018 *2*.
138.7 *1*	457.02	1.6 *2*	[E1]		0.0917	α(K)=0.0786 *12*; α(L)=0.01042 *15*; α(M)=0.00214 *3*. α(N)=0.000455 *7*; α(O)=6.75×10^{-5} *10*; α(P)=4.26×10^{-6} *6*.
143.3 *1*	253.76	5.1 *2*	E2(+M1)	>1.7	0.519 *25*	α(K)=0.381 *13*; α(L)=0.109 *10*; α(M)=0.0234 *23*. α(N)=0.0049 *5*; α(O)=0.00067 *6*; α(P)=1.95×10^{-5} *3*. α(K)exp=0.49 *12*.
168.1 *1*	278.57	5.2 *2*	E2,M1		0.27 *5*	α(K)=0.216 *19*; α(L)=0.044 *18*; α(M)=0.009 *4*. α(N)=0.0020 *8*; α(O)=0.00028 *10*; α(P)=1.25×10^{-5} *5*. α(K)exp=0.23 *2*.
[x]173.6 *1*		2.0 *4*				
178.3 *3*	457.02	0.5 *1*	[M1+E2]		0.23 *3*	α(K)=0.181 *14*; α(L)=0.035 *13*; α(M)=0.007 *3*. α(N)=0.0016 *6*; α(O)=0.00023 *8*; α(P)=1.05×10^{-5} *6*.
202.9[†] *3*	457.02	0.8 *3*	[M1+E2]		0.151 *14*	α(K)=0.123 *6*; α(L)=0.022 *7*; α(M)=0.0047 *15*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.3×10^{-6} *5*.
205.6 *2*	459.29	1.1 *2*	[M1+E2]		0.145 *13*	α(K)=0.118 *5*; α(L)=0.021 *7*; α(M)=0.0045 *14*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.0×10^{-6} *5*.
207.9 *1*	318.38	1.9 *4*	[E1]		0.0302	α(K)=0.0259 *4*; α(L)=0.00337 *5*; α(M)=0.000690 *10*. α(N)=0.0001476 *21*; α(O)=2.21×10^{-5} *4*; α(P)=1.467×10^{-6} *21*.
244.8 *2*	787.07	0.6 *1*				
253.8 *1*	253.76	32.5 *14*	E2		0.0777	α(K)=0.0621 *9*; α(L)=0.01227 *18*; α(M)=0.00260 *4*. α(N)=0.000549 *8*; α(O)=7.80×10^{-5} *11*; α(P)=3.43×10^{-6} *5*. α(K)exp=0.065 *7*; α(L)exp=0.013 *2*.
254.9[‡] *2*	711.92	1.3 *3*				
270.7[‡] *2*	888.65	0.3 *1*				
278.6 *1*	278.57	100	M1		0.0589	α(K)=0.0505 *7*; α(L)=0.0066 *1*; α(M)=0.00137 *2*. α(N)=0.000295 *5*; α(O)=4.52×10^{-5} *7*; α(P)=3.30×10^{-6} *5*. α(K)exp=0.049 *3*; α(L)exp=0.0072 *5*; α(M)exp=0.0020 *3*. Mult.: ce data give M1(+E2) with δ<1.2, but ΔJπ forbids E2.
307.2[a] *2*	849.44	1.4 *2*				
318.4 *1*	318.38	8.2 *5*	E1		0.00979	α(K)=0.00843 *12*; α(L)=0.001078 *16*; α(M)=0.000221 *3*. α(N)=4.74×10^{-5} *7*; α(O)=7.16×10^{-6} *10*; α(P)=4.93×10^{-7} *7*. α(K)exp=0.012 *4*.
339.1 *2*	617.81	0.9 *2*				
341.5 *2*	659.97	1.2 *2*				
346.4[‡] *2*	888.65	≤0.3				
346.5 *1*	457.02	20.7 *10*	M1(+E2)	<0.4	0.0330 *6*	α(K)=0.0283 *6*; α(L)=0.00375 *6*; α(M)=0.000773 *13*. α(N)=0.000167 *3*; α(O)=2.55×10^{-5} *4*; α(P)=1.83×10^{-6} *5*. α(K)exp=0.033 *5*.
348.7 *1*	459.29	6.4 *6*	M1(+E2)	<0.6	0.0322 *8*	α(K)=0.0275 *8*; α(L)=0.00371 *7*; α(M)=0.000765 *15*. α(N)=0.000165 *3*; α(O)=2.51×10^{-5} *4*; α(P)=1.77×10^{-6} *7*. α(K)exp=0.045 *18*.
349.4[‡] *2*	667.77	0.4 *2*				
381.5 *2*	659.97	0.4 *1*				
393.5[†] *2*	711.92	0.4 *2*				
406.2 *1*	659.97	2.0 *2*	M1,E2		0.0200 *22*	α(K)=0.0170 *22*; α(L)=0.00243 *6*; α(M)=0.000503 *9*. α(N)=0.0001079 *24*; α(O)=1.62×10^{-5} *7*; α(P)=1.06×10^{-6} *19*. α(K)exp=0.030 *14*.
414.0 *1*	667.77	0.5 *2*				
431.8 *2*	542.27	1.6 *2*				
433.3 *2*	711.92	1.0 *2*				

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^{129}La ε Decay (11.6 min) 1979Br05 (continued)

γ(^{129}Ba) (continued)

Eγ	E(level)	Iγ[&]	Mult.	α[§#]	Comments
448.6 1	457.02	21.0 13	(E2)	0.01336	α(K)=0.01117 16; α(L)=0.001738 25; α(M)=0.000363 5. α(N)=7.74×10^{-5} 11; α(O)=1.140×10^{-5} 16; α(P)=6.65×10^{-7} 10. α(K)exp=0.007 4. Mult.: α(K)exp allows E1 also within uncertainty, but E1 rejected by ΔJπ.
457.0 1	457.02	32.5 26	M1,E2	0.0146 20	α(K)=0.0124 18; α(L)=0.00173 10; α(M)=0.000359 18. α(N)=7.7×10^{-5} 5; α(O)=1.16×10^{-5} 9; α(P)=7.8×10^{-7} 15. α(K)exp=0.012 2.
458.2 1	711.92	8.5 6	M1,E2	0.0145 19	α(K)=0.0123 18; α(L)=0.00172 10; α(M)=0.000357 18. α(N)=7.7×10^{-5} 5; α(O)=1.15×10^{-5} 9; α(P)=7.7×10^{-7} 15. α(K)exp=0.012 4.
507.3[‡] 2	617.81	3.9 4			
531.2 2	849.44	0.5 2			
533.9 1	542.27	1.7 2			
549.5[†‡] 2	659.97	2.2 3			
570.2[†] 2	888.65	0.7 3			
588.3 1	906.70	0.4 1			
601.3[†‡] 2	711.92	4.1 3			
609.3 2	617.81	0.9 2			
610.1[‡] 2	888.65	0.5 1			
617.8 1	617.81	4.2 3			
^{x}622.0 3		1.0 3			
628.1 2	906.70	0.3 1			
632.8[‡] 2	911.38	0.2 1			
651.5 2	659.97	1.2 2			
653.0[‡] 2	906.70	0.2 1			
674.8[‡] 2	928.59	0.2 1			
703.5 1	711.92	2.6 2			
711.9 1	711.92	0.5 1			
738.8 1	849.44	1.1 1			
744.2[‡] 2	1062.65	0.2 1			
760.6[†‡] 2	1610.21	≤0.3			
771.6 2	1389.54	0.3 1			
776.6[‡] 2	1094.96	≤0.2			
778.1 1	888.65	2.6 3			
808.9 1	1062.65	0.4 1			
814.3[†‡] 3	1068.1	0.2 1			
816.4[†‡] 1	1094.96	0.6 2			
^{x}831.8 2		0.6 2			
841.2[‡] 2	1094.96	0.8 2			
841.3[‡] 2	1119.85	1.3 2			
866.0 2	1119.85	≤0.2			
880.2 1	888.65	1.6 2			
888.7 1	888.65	2.0 2			
901.3 4	1219.73	0.3 1			
928.6 1	928.59	1.1 1			
966.0 3	1219.73	0.5 1			
984.3 2	1094.96	0.6 1			
1004.3[†‡] 3	1258.1	0.3 1			
1017.6 1	1635.40	0.9 1			
1061.9 2	1990.50	0.4 1			
1068.0 1	1610.21	1.0 1			
1071.2 2	1389.54	≤0.3			
1086.5 2	1094.96	1.0 1			
1095.0 3	1094.96	0.3 1			
1119.9[†] 2	1119.85	0.3 1			
1135.8 1	1389.54	0.5 1			
1150.9 2	1610.21	0.2 1			
1160.8 1	1439.23	0.6 1			
1185.6 1	1439.23	0.5 1			
^{x}1236.5 1		0.4 1			
1291.8 1	1610.21	1.6 2			
1321.3[†‡] 2	1778.28	0.3 1			

Continued on next page (footnotes at end of table)

^{129}La ε Decay (11.6 min) 1979Br05 (continued)

γ(^{129}Ba) (continued)

Eγ	E(level)	Iγ[&]	Mult.
1328.4 *1*	1439.23	0.7 *1*	
1356.4[‡] *2*	1610.21	0.5 *1*	
1356.6[‡] *2*	1635.40	0.5 *1*	
1381.8 *2*	1635.40	0.10 *5*	
1409.3 *1*	1866.33	0.5 *1*	
1439.2[†] *1*	1439.23	0.3 *1*	
1459.7[†‡] *2*	1778.28	0.5 *1*	
1486.7[†‡] *3*	1804.80	≤0.2	
1499.8 *2*	1778.28	0.4 *1*	
1524.5[†‡] *3*	1778.28	0.4 *1*	
1533.5 *3*	1990.50	0.10 *5*	
1547.9 *3*	1866.33	0.10 *5*	
1550.9 *2*	1804.80	0.5 *1*	
1587.8 *2*	1866.33	0.3 *1*	
1610.2 *2*	1610.21	0.3 *1*	[M2]
1672.1 *3*	1990.50	0.10 *5*	
1712.0[a] *3*	1990.50	0.2 *1*	
1736.7 *2*	1990.50	0.3 *1*	
1755.6[a] *2*	1866.33	0.10 *5*	
1778.3 *2*	1778.28	0.4 *1*	
[x]1785.5 *5*		0.2 *1*	
1793.0 *2*	2071.60	0.5 *1*	
1866.3 *2*	1866.33	0.2 *1*	
1910.1 *2*	2369.40	0.3 *1*	
1966.9 *2*	2285.31	≤0.1	
1990.5 *3*	1990.50	0.2 *1*	
2071.6 *3*	2071.60	≤0.2	
2285.3 *3*	2285.31	≤0.2	

[†] Composite line with impurity in singles spectrum.

[‡] Observed in γγ–coin only.

[§] α(exp) were deduced from Iγ data and Ice values normalized so that α(K)=0.0216 for 357.4–keV E2 transition in ^{130}Ba.

[#] Overlaps M1 and E2 for M1+E2 transitions when δ not given.

[@] If no value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.

[&] For absolute intensity per 100 decays, multiply by 0.247 *7*.

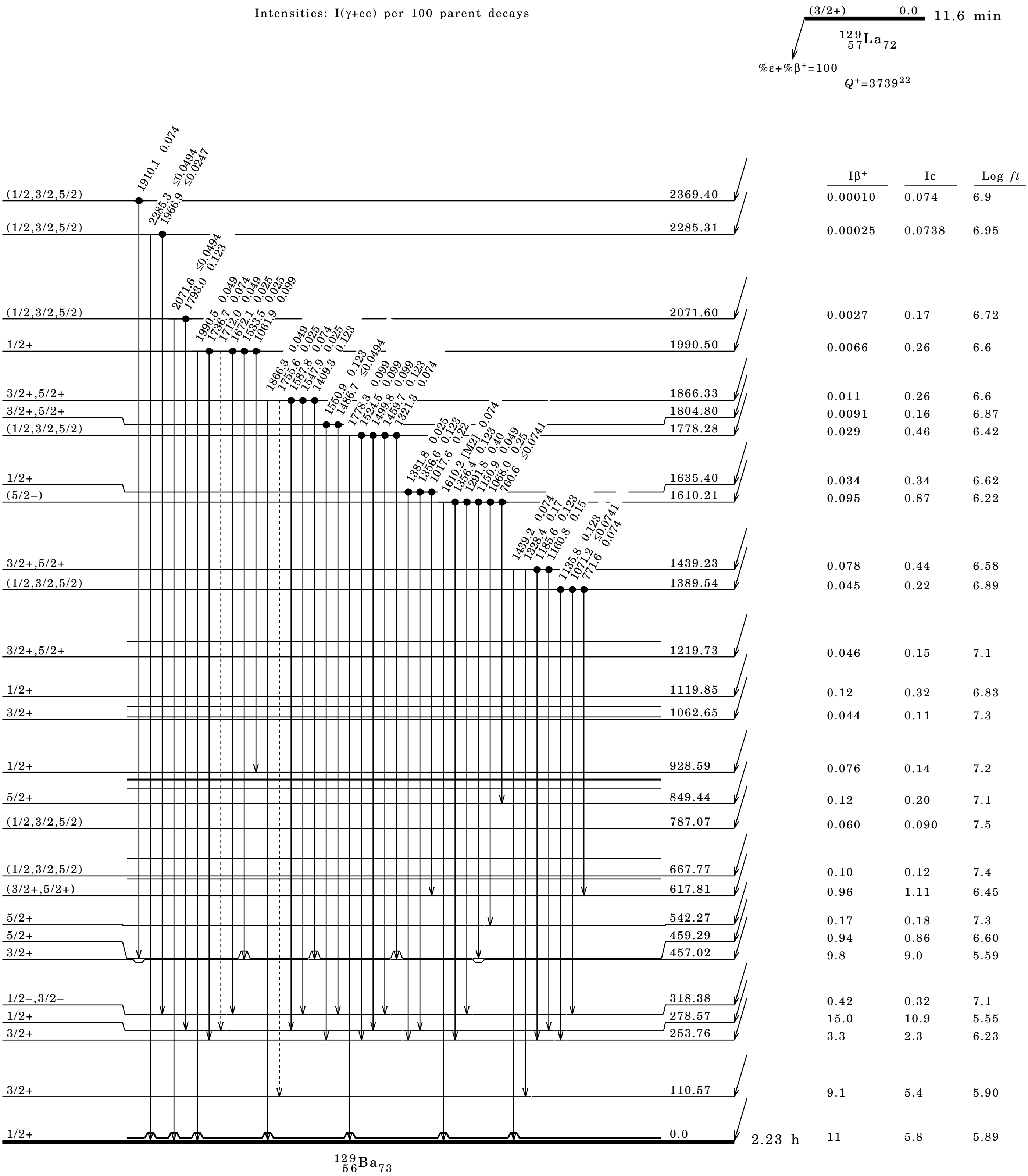
[a] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{129}La ε Decay (11.6 min) 1979Br05 (continued)

Decay Scheme

Intensities: I(γ+ce) per 100 parent decays

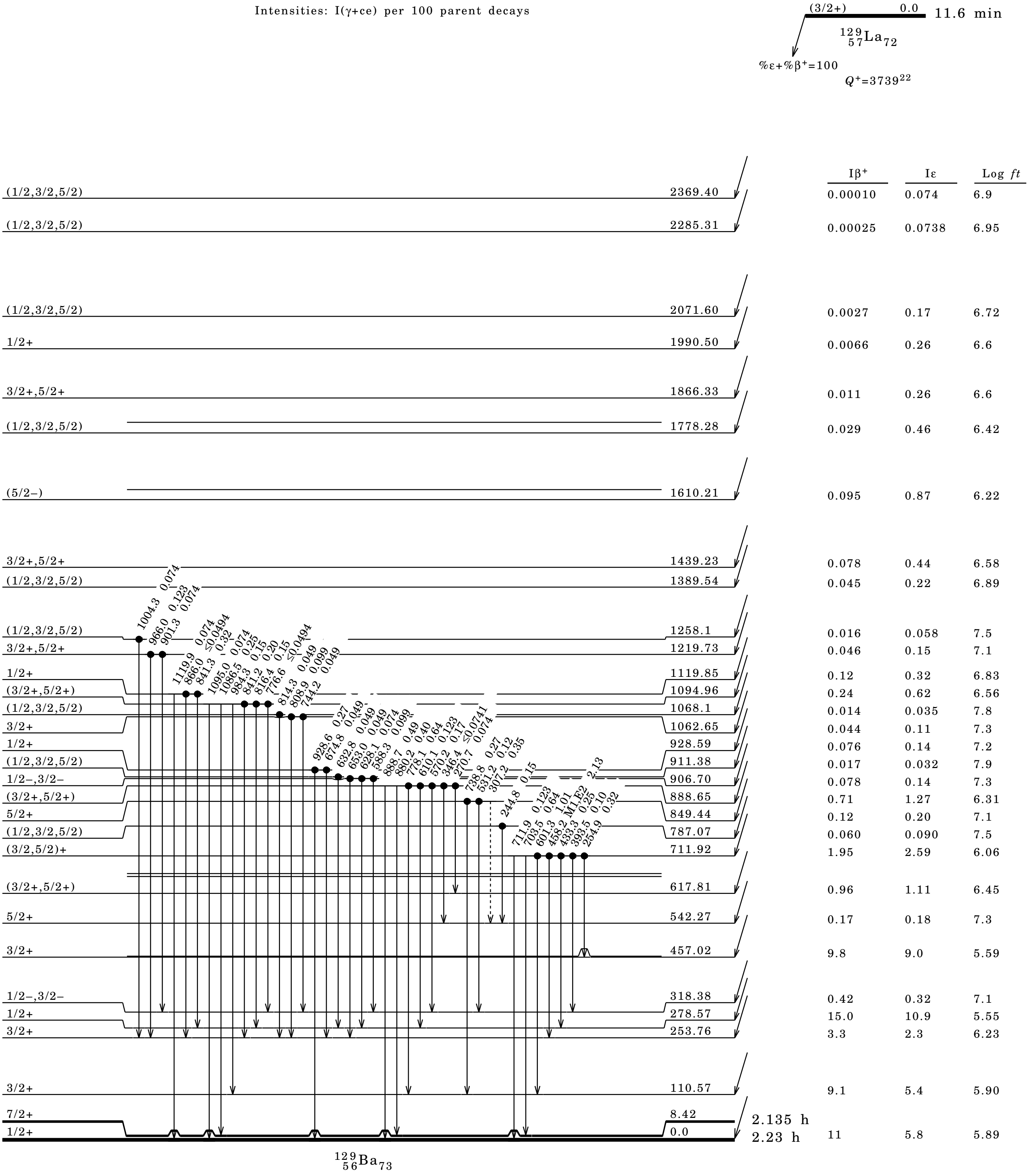


		Iβ⁺	Iε	Log *ft*
(1/2,3/2,5/2)	2369.40	0.00010	0.074	6.9
(1/2,3/2,5/2)	2285.31	0.00025	0.0738	6.95
(1/2,3/2,5/2)	2071.60	0.0027	0.17	6.72
1/2+	1990.50	0.0066	0.26	6.6
3/2+,5/2+	1866.33	0.011	0.26	6.6
3/2+,5/2+	1804.80	0.0091	0.16	6.87
(1/2,3/2,5/2)	1778.28	0.029	0.46	6.42
1/2+	1635.40	0.034	0.34	6.62
(5/2−)	1610.21	0.095	0.87	6.22
3/2+,5/2+	1439.23	0.078	0.44	6.58
(1/2,3/2,5/2)	1389.54	0.045	0.22	6.89
3/2+,5/2+	1219.73	0.046	0.15	7.1
1/2+	1119.85	0.12	0.32	6.83
3/2+	1062.65	0.044	0.11	7.3
1/2+	928.59	0.076	0.14	7.2
5/2+	849.44	0.12	0.20	7.1
(1/2,3/2,5/2)	787.07	0.060	0.090	7.5
(1/2,3/2,5/2)	667.77	0.10	0.12	7.4
(3/2+,5/2+)	617.81	0.96	1.11	6.45
5/2+	542.27	0.17	0.18	7.3
5/2+	459.29	0.94	0.86	6.60
3/2+	457.02	9.8	9.0	5.59
1/2−,3/2−	318.38	0.42	0.32	7.1
1/2+	278.57	15.0	10.9	5.55
3/2+	253.76	3.3	2.3	6.23
3/2+	110.57	9.1	5.4	5.90
1/2+	0.0	11	5.8	5.89

^{129}La ε Decay (11.6 min) 1979Br05 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays



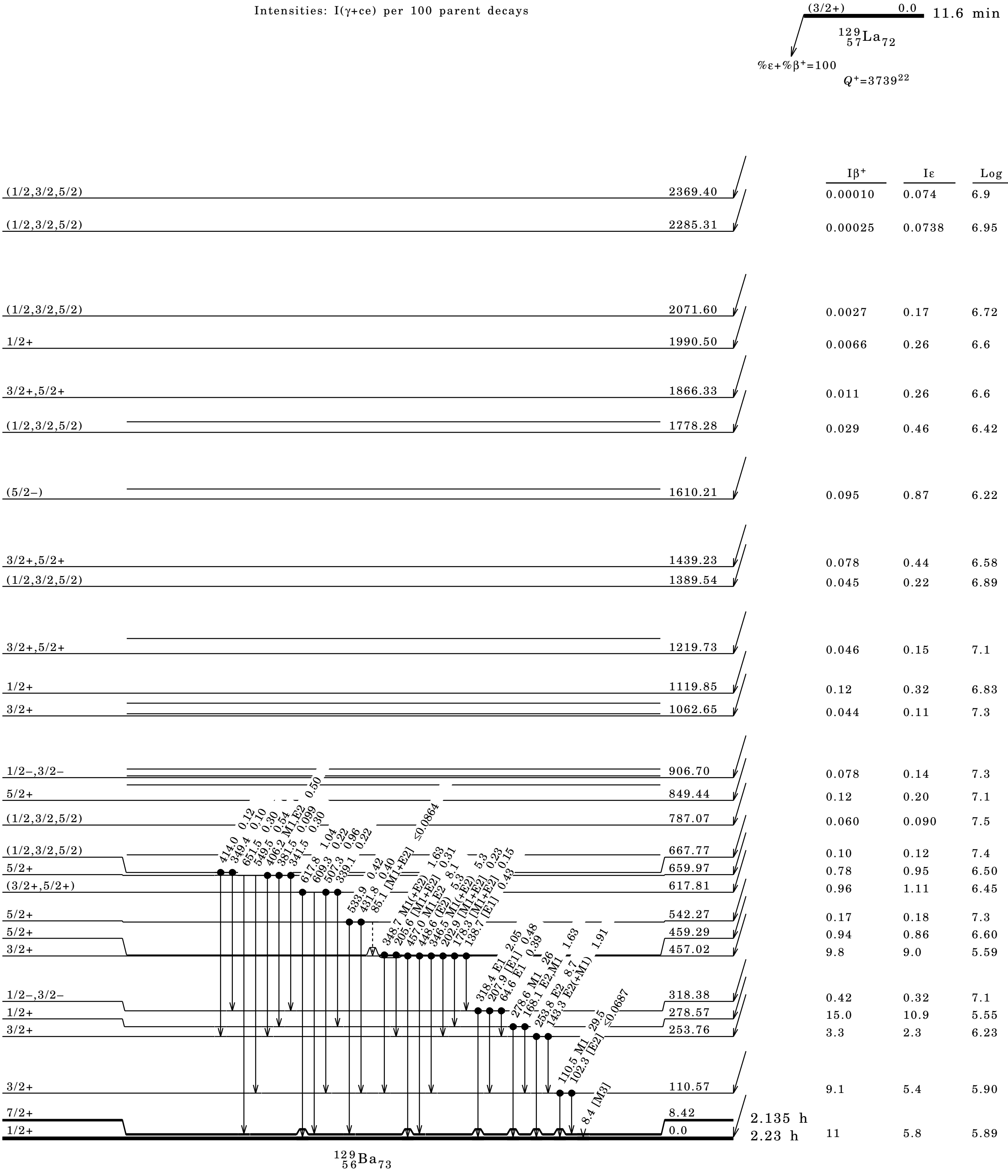
		Iβ+	Iε	Log ft
(1/2,3/2,5/2)	2369.40	0.00010	0.074	6.9
(1/2,3/2,5/2)	2285.31	0.00025	0.0738	6.95
(1/2,3/2,5/2)	2071.60	0.0027	0.17	6.72
1/2+	1990.50	0.0066	0.26	6.6
3/2+,5/2+	1866.33	0.011	0.26	6.6
(1/2,3/2,5/2)	1778.28	0.029	0.46	6.42
(5/2−)	1610.21	0.095	0.87	6.22
3/2+,5/2+	1439.23	0.078	0.44	6.58
(1/2,3/2,5/2)	1389.54	0.045	0.22	6.89
(1/2,3/2,5/2)	1258.1	0.016	0.058	7.5
3/2+,5/2+	1219.73	0.046	0.15	7.1
1/2+	1119.85	0.12	0.32	6.83
(3/2+,5/2+)	1094.96	0.24	0.62	6.56
(1/2,3/2,5/2)	1068.1	0.014	0.035	7.8
3/2+	1062.65	0.044	0.11	7.3
1/2+	928.59	0.076	0.14	7.2
(1/2,3/2,5/2)	911.38	0.017	0.032	7.9
1/2−,3/2−	906.70	0.078	0.14	7.3
(3/2+,5/2+)	888.65	0.71	1.27	6.31
5/2+	849.44	0.12	0.20	7.1
(1/2,3/2,5/2)	787.07	0.060	0.090	7.5
(3/2,5/2)+	711.92	1.95	2.59	6.06
(3/2+,5/2+)	617.81	0.96	1.11	6.45
5/2+	542.27	0.17	0.18	7.3
3/2+	457.02	9.8	9.0	5.59
1/2−,3/2−	318.38	0.42	0.32	7.1
1/2+	278.57	15.0	10.9	5.55
3/2+	253.76	3.3	2.3	6.23
3/2+	110.57	9.1	5.4	5.90
7/2+	8.42			
1/2+	0.0	11	5.8	5.89

From NNDC(BNL)
program ENSDAT

^{129}La ε Decay (11.6 min) 1979Br05 (continued)

Decay Scheme (continued)

Intensities: I(γ+ce) per 100 parent decays



	Iβ+	Iε	Log *ft*
2369.40	0.00010	0.074	6.9
2285.31	0.00025	0.0738	6.95
2071.60	0.0027	0.17	6.72
1990.50	0.0066	0.26	6.6
1866.33	0.011	0.26	6.6
1778.28	0.029	0.46	6.42
1610.21	0.095	0.87	6.22
1439.23	0.078	0.44	6.58
1389.54	0.045	0.22	6.89
1219.73	0.046	0.15	7.1
1119.85	0.12	0.32	6.83
1062.65	0.044	0.11	7.3
906.70	0.078	0.14	7.3
849.44	0.12	0.20	7.1
787.07	0.060	0.090	7.5
667.77	0.10	0.12	7.4
659.97	0.78	0.95	6.50
617.81	0.96	1.11	6.45
542.27	0.17	0.18	7.3
459.29	0.94	0.86	6.60
457.02	9.8	9.0	5.59
318.38	0.42	0.32	7.1
278.57	15.0	10.9	5.55
253.76	3.3	2.3	6.23
110.57	9.1	5.4	5.90
0.0	11	5.8	5.89

From NNDC(BNL)
program ENSDAT

^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27

1992By03 (also 1990Sc21): ^{120}Sn(^{12}C,3nγ), E=46–56 MeV, ^{116}Cd(^{18}O,5nγ) E=82,86 MeV; Ge γ, $\gamma\gamma$–coin, $\gamma(\theta)$, γ(t), $T_{1/2}$.
1978Gi04: ^{120}Sn(^{12}C,3nγ) E=52 MeV; Ge γ, linear polarization.
1977Gi02: ^{120}Sn(^{12}C,3nγ) E=45–54 MeV; Ge γ, excitation function, $\gamma\gamma$–, $\gamma\gamma$(t)–coin, $\gamma(\theta)$, $T_{1/2}$.
2000St07: ^{116}Cd(^{18}O,5nγ) E=76 MeV; Ge γ, $\gamma\gamma$–coin, recoil distance technique, differential decay curve method, $T_{1/2}$.
2013Ka27: ^{120}Sn(^{12}C,3nγ),E=52 MeV pulsed beam from 15UD Pelletron accelerator at IUAC, measured lifetimes and g factors of 182, 9/2– and 2463, 23/2+ isomers by TDPAD method. Target=500 µg/cm^2 ^{120}Sn evaporated on 1 mg/cm^{2}2 iron foil backed by tantalum foil. The internal magnetic field at Ba in iron was calibrated with respect to the g factor=–0.159 *5* (1996Da02) for 3116, 10+ isomeric state in ^{132}Ba.

^{129}Ba Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[§]	Comments
0.0[k]	1/2+	2.23 h[#] *11*	
8.4[g] *2*	7/2+	2.135 h[#] *10*	
110.6[l] *2*	3/2+		
182.04[&] *11*	9/2–	15.2 ns *10*	g=–0.192 *6* (2013Ka27). $T_{1/2}$: from γ(t). Weighted average of 15 ns *1* (2013Ka27) and 16 ns *2* (1992By03). g: TDPAD method (2013Ka27).
263.1 *1*	9/2+		
278.81[@] *12*	11/2–		
318.4[k] *1*	(5/2+)		
467.3[l] *1*	7/2+		
544.74[g] *10*	11/2+	10.6 ps *3*	
643.6[&] *1*	13/2–		
797.4[@] *1*	15/2–	6.5 ps *2*	
806.84[k] *20*	(9/2+)		
864.1[h] *1*	13/2+		
883.43[d] *13*	13/2–		
999.1[l] *1*	11/2+		
1210.0[c] *1*	15/2–		
1210.5[g] *2*	15/2+	1.68 ps *5*	
1318.4[&] *1*	17/2–		
1438.4[k] *3*	(13/2+)		
1475.4[@] *1*	19/2–	1.0 ps *4*	
1545.3[d] *2*	(17/2–)		
1590.2[h] *2*	17/2+		
1654.6[l] *2*	15/2+		
1845.0[c] *2*	19/2–		
1989.9[g] *1*	19/2+	0.82 ps *10*	
2146.3[&] *2*	21/2–		
2171.4[k] *4*	(17/2+)		
2281.2[@] *2*	23/2–		
2336.7[d] *2*	21/2–		
2340.2[l] *3*	19/2+		
2387.4 *4*			
2412.9[h] *2*	21/2+		
2429.7 *3*	19/2+		
2462.6[e] *2*	23/2+	47 ns *1*	g=–0.233 *7* (2013Ka27). $T_{1/2}$: from γ(t). Weighted average of 47 ns *1* (2013Ka27) and 47 ns *2* (1992By03). g: TDPAD method (2013Ka27).
2509.9 *3*	(19/2+)		
2599.6[c] *2*	23/2–		
2653.7 *2*	(21/2+)		
2674.7 *2*	21/2+		
2742.6 *3*			
2815.5[g] *2*	23/2+		
2874.0 *2*	23/2+		
2903.1[l] *4*	(23/2+)		
2913.7[f] *2*	25/2+		
3044.2 *3*			
3079.1[j] *2*	(25/2+)	1.2 ps *3*	
3094.2[&] *2*	25/2–		
3179.4[@] *2*	27/2–		
3368.2[i] *2*	(27/2+)		
3378.9[e] *2*	27/2+		
3430.6[c] *2*	(27/2–)		

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^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

^{129}Ba Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
3525.3 *4*		4333.6 *3*		5807.6[i] *3*	(39/2+)
3687.5 *2*	(27/2−)	4351.4 *3*	(31/2−)	5975.6[a] *3*	39/2−
3704.5 *2*	(31/2−)	4458.7[e] *3*	(31/2+)	6223.8[@] *6*	(39/2−)
3741.8[j] *2*	(29/2+)	4502.8[j] *2*	(33/2+)	6352.1[j] *4*	(41/2+)
3848.5 *3*		4617.1[b] *2*	(33/2−)	6450.7[b] *3*	41/2−
3852.8 *5*		4663.9 *3*		6843.6[i] *4*	(43/2+)
3895.9[f] *2*	29/2+	4871.5[i] *2*	(35/2+)	6975.3[a] *4*	(43/2−)
3948.1[&] *2*	(29/2−)	4951.1[f] *6*	(33/2+)	7434.0[j] *5*	(45/2+)
4054.4[i] *2*	(31/2+)	5047.4[a] *2*	(35/2−)	7501.9[b] *6*	(45/2−)
4137.6[@] *2*	31/2−	5152.0[@] *4*	(35/2−)	7964.1[i] *5*	(47/2+)
4286.1[a] *2*	(31/2−)	5379.6[j] *3*	(37/2+)	9144.2[i] *7*	(51/2+)
4320.2 *2*	(31/2+)	5469.3[b] *3*	(37/2−)	10388.3[i] *13*	(55/2+)

[†] From least-squares fit to Eγ data from 1992By03.

[‡] Band structures are constructed from the experimental results obtained by using standard in–beam techniques upon a few levels with known Jπ, and also interpreted on the basis of cranked–shell model and trs analyses (1977Gi02,1978Gi04,1992By03).

[§] From recoil distance (RDDS) technique (2000St07), unless otherwise stated.

[#] From Adopted Levels.

[@] (A): ν9/2[514],α=−1/2.

[&] (B): ν9/2[514],α=+1/2.

[a] (C): ν9/2[514]⊗$\pi h_{11/2}^{2}$,α=−1/2.

[b] (D): ν9/2[514]⊗$\pi h_{11/2}^{2}$,α=+1/2.

[c] (E): Yrare $\nu h_{11/2}$ band,α=−1/2.

[d] (F): Yrare $\nu h_{11/2}$ band,α=+1/2.

[e] (G): ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=−1/2.

[f] (H): ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=+1/2.

[g] (I): ν7/2[404],α=−1/2.

[h] (J): ν7/2[404],α=+1/2.

[i] (K): ν7/2[404]⊗$\pi h_{11/2}^{2}$,α=−1/2.

[j] (L): ν7/2[404]⊗$\pi h_{11/2}^{2}$,α=+1/2.

[k] (M): ν(1/2[411]+1/2[400]),α=−1/2. Admixture of 1/2[411] and 1/2[400] neutron configurations.

[l] (N): ν(1/2[411]+1/2[400]),α=+1/2. Admixture of 1/2[411] and 1/2[400] neutron configurations.

γ(^{129}Ba)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	α[#]	Comments
96.8 *1*	278.81	36.6 *25*	M1+E2[§]	1.6 *6*	Mult.: large negative A$_2$ in γ(θ) data suggests significant quadrupole admixture, favoring M1+E2 over E1+M2. α(K)=1.13 *21*; α(L)=0.4 *3*; α(M)=0.08 *6*. α(N)=0.017 *12*; α(O)=0.0024 *16*; α(P)=6.12×10^{-5} *9*. A$_2$=−0.67 *10*; DCO=0.44 *2*. A$_2$=−0.48 *3*; A$_4$=+0.02 *5*.
110.6 *2*	110.6	14.0 *25*	(M1)	0.741	α(K)=0.634 *10*; α(L)=0.0851 *13*; α(M)=0.0176 *3*; α(N)=0.00379 *6*; α(O)=0.000579 *9*. A$_2$=−0.18 *14*; DCO=0.64 *8*.
126.0 *1*	2462.6	5.3 *7*	(E1)	0.1196	α(K)=0.1025 *15*; α(L)=0.01368 *20*; α(M)=0.00280 *4*. α(N)=0.000597 *9*; α(O)=8.83×10^{-5} *13*; α(P)=5.49×10^{-6} *8*. A$_2$=−0.03 *41*; DCO=0.74 *9*.
^{x}131.4 *4*		14 *5*			
^{x}132.1 *3*		3 *1*			
149.0 *2*	467.3	1.3 *3*	[M1+E2]	0.40 *8*	α(K)=0.31 *4*; α(L)=0.07 *4*; α(M)=0.015 *7*. α(N)=0.0031 *15*; α(O)=0.00043 *19*; α(P)=1.77×10^{-5} *5*. A$_2$=−0.05 *9*.
153.8 *1*	797.4	7.4 *4*	M1+E2	0.36 *7*	α(K)=0.28 *3*; α(L)=0.06 *3*; α(M)=0.013 *6*. α(N)=0.0027 *13*; α(O)=0.00039 *16*; α(P)=1.61×10^{-5} *5*. A$_2$=−0.50 *10*; DCO=0.48 *1*. A$_2$=−0.46 *5*; A$_4$=+0.07 *6*.
157.0 *1*	1475.4	5.3 *14*	(M1+E2)	0.34 *6*	α(K)=0.27 *3*; α(L)=0.056 *25*; α(M)=0.012 *6*. α(N)=0.0025 *12*; α(O)=0.00036 *15*; α(P)=1.52×10^{-5} *5*. A$_2$=−0.12 *17*; DCO=0.55 *16*.
^{x}161.2 *4*		7 *3*			

Continued on next page (footnotes at end of table)

^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

γ(^{129}Ba) (continued)

Eγ†	E(level)	Iγ†	Mult.‡	α$^{\#}$	Comments
164.9 *3*	2674.7	1.6 *1*	(M1+E2)	0.261 *4*	A_2=−0.45 *19*.
173.6 *1*	182.04	138.8 *10*	E1§	0.0493	α(K)=0.0424 *6*; α(L)=0.00555 *8*; α(M)=0.001137 *16*. α(N)=0.000243 *4*; α(O)=3.63×10^{-5} *6*; α(P)=2.35×10^{-6} *4*. A_2=−0.19 *3*; DCO=0.63 *2*. A_2=−0.210 *13*; A_4=+0.03 *4*. POL=+0.25 *6*.
192.4 *3*	999.1	0.3 *1*	[M1+E2]	0.178 *19*	α(K)=0.144 *8*; α(L)=0.027 *9*; α(M)=0.0057 *20*. α(N)=0.0012 *4*; α(O)=0.00017 *5*; α(P)=8.4×10^{-6} *5*.
199.3 *1*	2874.0	5.6 *9*	(M1+E2)	0.159 *16*	α(K)=0.129 *6*; α(L)=0.024 *8*; α(M)=0.0050 *17*. α(N)=0.0011 *4*; α(O)=0.00015 *5*; α(P)=7.6×10^{-6} *5*. A_2=−0.37 *26*; DCO=0.47 *4*.
205.1 *1*	3079.1	16.3 *19*	(M1+E2)	0.146 *13*	α(K)=0.119 *5*; α(L)=0.021 *7*; α(M)=0.0045 *14*. α(N)=0.0010 *3*; α(O)=0.00014 *4*; α(P)=7.0×10^{-6} *5*. A_2=−0.46 *12*; DCO=0.51 *4*.
^{x}205.6 *3*		2 *1*			
207.5 *3*	318.4	0.8 *4*	[M1+E2]	0.141 *12*	α(K)=0.115 *5*; α(L)=0.021 *6*; α(M)=0.0043 *14*. α(N)=0.0009 *3*; α(O)=0.00013 *4*; α(P)=6.8×10^{-6} *5*. A_2=−0.27 *41*.
216.5 *3*	1654.6	0.2 *1*	[M1+E2]	0.124 *9*	α(K)=0.101 *3*; α(L)=0.018 *5*; α(M)=0.0037 *11*. α(N)=0.00079 *22*; α(O)=0.00012 *3*; α(P)=6.0×10^{-6} *5*.
243.5 *2*	3948.1	7.7 *4*	(M1+E2)	0.087 *3*	α(K)=0.0716 *12*; α(L)=0.0119 *25*; α(M)=0.0025 *6*. α(N)=0.00053 *11*; α(O)=7.8×10^{-5} *13*; α(P)=4.3×10^{-6} *5*. A_2=−0.30 *12*; DCO=0.37 *11*.
245.1 *3*	2674.7	3.1 *7*	(M1+E2)	0.085 *3*	α(K)=0.0702 *13*; α(L)=0.0117 *24*; α(M)=0.0024 *6*. α(N)=0.00052 *11*; α(O)=7.6×10^{-5} *13*; α(P)=4.2×10^{-6} *5*. A_2=−0.34 *28*; DCO=0.39 *22*.
254.7 *1*	263.1	43.0 *24*	M1+E2	0.0757 *15*	α(K)=0.0628 *16*; α(L)=0.0103 *19*; α(M)=0.0022 *5*. α(N)=0.00046 *9*; α(O)=6.7×10^{-5} *10*; α(P)=3.8×10^{-6} *4*. A_2=−0.76 *7*; DCO=0.42 *4*. A_2=−0.65 *2*; A_4=+0.16 *4*. POL=+0.208.
258.0 *5*	2429.7	0.5 *2*			
260.6 *1*	3948.1	13.2 *6*	(M1+E2)	0.0707 *11*	α(K)=0.0587 *18*; α(L)=0.0095 *16*; α(M)=0.0020 *4*. α(N)=0.00043 *8*; α(O)=6.2×10^{-5} *9*; α(P)=3.6×10^{-6} *4*. A_2=−0.49 *12*; DCO=0.51 *8*.
263.5 *1*	3079.1	21.0 *20*	(M1+E2)	0.0685	α(K)=0.0569 *19*; α(L)=0.0092 *15*; α(M)=0.0019 *4*. α(N)=0.00041 *7*; α(O)=6.0×10^{-5} *8*; α(P)=3.4×10^{-6} *4*. A_2=−0.56 *7*; DCO=0.49 *4*.
^{x}272.8 *3*		7 *4*			
281.7 *1*	544.74	16.0 *20*	(M1+E2)§	0.0562 *13*	α(K)=0.0469 *23*; α(L)=0.0074 *10*; α(M)=0.00155 *23*. α(N)=0.00033 *5*; α(O)=4.9×10^{-5} *5*; α(P)=2.9×10^{-6} *4*. A_2=−0.73 *18*; DCO=0.36 *5*. A_2=−0.61 *3*; A_4=+0.32 *10*.
289.1 *1*	3368.2	40.0 *22*	(M1+E2)	0.0521 *15*	α(K)=0.0436 *24*; α(L)=0.0068 *9*; α(M)=0.00142 *19*. α(N)=0.00030 *4*; α(O)=4.5×10^{-5} *4*; α(P)=2.7×10^{-6} *4*. A_2=−0.52 *10*; DCO=0.50 *3*.
301.6 *2*	3044.2	1.2 *4*	D		A_2=−0.83.
312.6 *1*	4054.4	20.0 *26*	(M1+E2)	0.0416 *21*	α(K)=0.035 *3*; α(L)=0.0053 *5*; α(M)=0.00111 *11*. α(N)=0.000237 *21*; α(O)=3.52×10^{-5} *20*; α(P)=2.1×10^{-6} *3*. A_2=−0.52 *7*; DCO=0.45 *9*.
316.3 *1*	2462.6	1.8 *4*	[E1]		α=0.00995 *14*; α(K)=0.00858 *12*; α(L)=0.001096 *16*; α(M)=0.000225 *4*. α(N)=4.82×10^{-5} *7*; α(O)=7.28×10^{-6} *11*; α(P)=5.02×10^{-7} *7*. A_2=−0.40 *41*.
318.3 *2*	318.4	6.7 *9*	[E2]	0.0375	α(K)=0.0306 *5*; α(L)=0.00542 *8*; α(M)=0.001141 *17*. α(N)=0.000242 *4*; α(O)=3.49×10^{-5} *5*; α(P)=1.753×10^{-6} *25*.
319.4 *1*	864.1	4.1 *11*	(M1+E2)	0.0391 *22*	α(K)=0.033 *3*; α(L)=0.0050 *4*; α(M)=0.00104 *9*. α(N)=0.000222 *18*; α(O)=3.30×10^{-5} *16*; α(P)=2.0×10^{-6} *3*. A_2=−0.92 *39*; DCO=0.34 *6*.
327.5 *3*	3852.8	3.0 *10*			
330.4 *3*	4663.9	0.4 *2*			

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^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ)   1992By03,1978Gi04,2013Ka27 (continued)

γ(^{129}Ba) (continued)

Eγ†	E(level)	Iγ†	Mult.‡	α$^{\#}$	Comments
331.0 *1*	4617.1	22.3 *12*	(M1+E2)	0.0353 *23*	α(K)=0.030 *3*; α(L)=0.0045 *3*; α(M)=0.00093 *7*. α(N)=0.000199 *13*; α(O)=2.96×10^{-5} *11*; α(P)=1.8×10^{-6} *3*. A_2=−0.78 *31*; DCO=0.45 *6*.
334.5 *3*	2674.7	0.9 *4*	(M1+E2)	0.0343 *23*	α(K)=0.029 *3*; α(L)=0.00432 *25*; α(M)=0.00090 *6*. α(N)=0.000193 *12*; α(O)=2.87×10^{-5} *9*; α(P)=1.8×10^{-6} *3*. A_2=−0.09 *25*; DCO=0.37 *22*.
335.7 *3*	1545.3	1.1 *2*	(M1+E2)	0.0340 *23*	α(K)=0.029 *3*; α(L)=0.00428 *24*; α(M)=0.00089 *6*. α(N)=0.000190 *11*; α(O)=2.84×10^{-5} *9*; α(P)=1.8×10^{-6} *3*. A_2=−0.77 *43*.
338.1 *1*	4286.1	18.6 *10*	(M1+E2)	0.0333 *23*	α(K)=0.028 *3*; α(L)=0.00419 *22*; α(M)=0.00087 *6*. α(N)=0.000186 *10*; α(O)=2.78×10^{-5} *8*; α(P)=1.7×10^{-6} *3*. A_2=−0.04 *30*; DCO=0.45 *5*.
340.0 *5*	806.84	0.2 *1*			
345.9 *3*	3525.3	2.5 *10*			
346.5 *2*	1210.5	7.5 *9*	(M1+E2)	0.0311 *24*	α(K)=0.026 *3*; α(L)=0.00389 *17*; α(M)=0.00081 *5*. α(N)=0.000173 *8*; α(O)=2.58×10^{-5} *6*; α(P)=1.62×10^{-6} *25*. A_2=−0.84 *13*; DCO=0.35 *6*.
356.7 *1*	467.3	13.2 *20*	(E2)	0.0263	α(K)=0.0217 *3*; α(L)=0.00366 *6*; α(M)=0.000769 *11*. α(N)=0.0001633 *23*; α(O)=2.37×10^{-5} *4*; α(P)=1.261×10^{-6} *18*. A_2=+0.32 *47*; DCO=1.05 *14*.
362.9 *1*	3741.8	1.1 *2*	(M1+E2)	0.0287 *4*	A_2=+0.02 *32*; DCO=0.62 *28*.
364.7 *1*	643.6	43.3 *17*	M1+E2§	0.0269 *24*	α(K)=0.0227 *25*; α(L)=0.00333 *9*; α(M)=0.000692 *23*. α(N)=0.000148 *4*; α(O)=2.22×10^{-5} *4*; α(P)=1.41×10^{-6} *23*. A_2=−0.68 *11*; DCO=0.36 *5*. A_2=−0.70 *3*; A_4=+0.16 *5*. POL=+0.07 *7*.
^{x}365.0 *5*		3 *1*			
368.6 *2*	4871.5	7.5 *19*	(M1+E2)	0.0261 *24*	α(K)=0.0221 *24*; α(L)=0.00323 *7*; α(M)=0.000671 *20*. α(N)=0.000144 *4*; α(O)=2.15×10^{-5} *4*; α(P)=1.37×10^{-6} *23*. A_2=−0.61 *36*; DCO=0.54 *19*.
373.6 *1*	3741.8	21.0 *31*	(M1+E2)	0.0252 *24*	α(K)=0.0213 *24*; α(L)=0.00310 *6*; α(M)=0.000644 *16*. α(N)=0.000138 *3*; α(O)=2.06×10^{-5} *4*; α(P)=1.32×10^{-6} *22*. A_2=−0.35 *9*; DCO=0.48 *11*.
379.8 *3*	1590.2	3.7 *24*	[M1+E2]	0.0241 *23*	α(K)=0.0203 *24*; α(L)=0.00295 *5*; α(M)=0.000613 *13*. α(N)=0.0001314 *21*; α(O)=1.97×10^{-5} *5*; α(P)=1.26×10^{-6} *21*.
^{x}392.2 *3*		15 *5*			
400.0 *3*	1989.9	5.0 *11*	[M1+E2]	0.0209 *23*	A_2=+0.07 *11*.
402.7 *3*	2815.5	3.2 *6*	(M1+E2)	0.0205 *23*	A_2=−1.1 *11*.
412.6 *1*	1210.0	2.9 *6*	D		A_2=+0.13 *56*; DCO=0.54 *10*.
421.9 *1*	5469.3	7.2 *7*	(M1+E2)		A_2=−0.52 *18*; DCO=0.37 *9*.
423.2 *2*	2412.9	2.0 *8*	D		A_2=−0.56 *53*.
424.4 *2*	4320.2	0.6 *3*			
425.4 *3*	3079.1	2.7 *7*	E2		A_2=−0.25 *37*; DCO=1.05 *29*.
428.0 *3*	5807.6	3.2 *11*	(M1+E2)		A_2=−0.64 *37*.
430.2 *1*	5047.4	12.3 *9*	(M1+E2)		A_2=−0.76 *16*; DCO=0.43 *8*.
448.4 *1*	4502.8	12.7 *21*	D		A_2=−0.17 *10*; DCO=0.44 *11*.
451.0 *2*	2913.7	10.4 *10*	(M1+E2)	0.0151 *20*	A_2=−0.67 *11*; DCO=0.37 *5*.
453.6 *2*	2599.6	2.9 *5*	(M1+E2)	0.0149 *20*	A_2=−1.1 *4*; DCO=0.60 *29*.
454.4 *1*	3368.2	2.5 *4*	(M1+E2)	0.0148 *20*	DCO=0.30 *9*.
461.6 *1*	643.6	11.0 *5*	E2§	0.01232	A_2=+0.19 *14*; DCO=0.84 *23*. A_2=+0.22 *2*; A_4=+0.08 *5*. POL=+0.44 *17*.
465.5 *3*	3378.9	5.1 *6*	(M1+E2)	0.0139 *19*	A_2=−0.91 *18*; DCO=0.39 *8*.
471.5 *3*	4320.2	1.9 *10*			
472.8 *1*	2462.6	15.9 *11*	(E2)	0.01151	B(E2)(W.u.)=0.0088 *9*. A_2=+0.16 *8*; DCO=0.89 *7*. A_2=+0.03 *1*; A_4=−0.01 *2*.
475.1 *3*	6450.7	1.7 *5*			
480.3 *3*	3848.5	8.8 *10*			
485.1 *3*	4333.6	3.0 *10*			
488.7 *3*	806.84	5.1 *10*	(E2)		A_2=+0.52 *10*.
491.6 *3*	6843.6	0.6 *3*			
492.3 *3*	2336.7	4.0 *6*			

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^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

γ(^{129}Ba) (continued)

Eγ†	E(level)	Iγ†	Mult.‡	α#	Comments
506.3 *2*	5975.6	5.0 *17*	D		DCO=0.37 *15*.
508.2@ *2*	3687.5	4.7@ *7*	(D)		DCO=0.95 *20*.
	5379.6	4.3@ *6*	D		DCO=0.53 *14*.
^{x}513.8 *3*		2 *1*			
517.0 *1*	3895.9	2.1 *4*	D		DCO=0.45 *23*.
518.6 *1*	797.4	100.0 *20*	E2§		A_2=+0.23 *4*; DCO=1.03 *5*. A_2=+0.170 *8*; A_4=−0.07 *2*. POL=+0.300 *26*.
521.0 *1*	1318.4	17.4 *17*	(M1+E2)§	0.0103 *16*	A_2=−0.90 *9*; DCO=0.32 *13*. A_2=−0.45 *4*; A_4=−0.04 *4*.
524.6 *3*	6975.3	1.6 *8*			
525.1 *2*	3704.5	2.4 *5*	(Q)		A_2=−0.33 *26*; DCO=0.98 *35*.
526.6 *1*	1845.0	11.7 *11*	(M1+E2)§	0.0101 *16*	A_2=−0.97 *16*; DCO=0.40 *10*. A_2=−0.70 *6*; A_4=+0.10 *7*.
530.0 *3*	7964.1	0.2 *1*			
531.7 *1*	999.1	11.6 *22*	(E2)		A_2=−0.02 *16*; DCO=0.95 *21*.
536.3 *1*	544.74	57.1 *17*	E2§		A_2=+0.23 *7*; DCO=1.03 *13*. A_2=+0.22 *1*; A_4=−0.09 *4*. POL=+0.36 *4*.
544.4 *3*	6352.1	1.3 *8*			
552.6 *1*	3368.2	1.1 *4*			A_2=+0.10 *7*.
562.7 *2*	4458.7	0.7 *2*			
562.9 *3*	2903.1	3.0 *5*	(Q)		A_2=−0.04 *15*; DCO=0.87 *20*.
566.4 *1*	1210.0	19.5 *8*	(M1+E2)§		A_2=−0.44 *5*; DCO=0.26 *5*. A_2=−0.47 *4*; A_4=−0.08 *4*.
590.3 *3*	7434.0	0.2 *1*			
598.9 *3*	4286.1	2.3 *3*			
600.7 *2*	864.1	31.0 *15*	E2§		A_2=+0.33 *3*; DCO=0.94 *9*. A_2=+0.14 *3*; A_4=−0.04 *4*. POL=+0.36 *17*.
604.7 *1*	883.43	7.3 *9*	(M1+E2)§		A_2=+0.09 *7*; DCO=0.53 *11*. A_2=+0.13 *6*; A_4=−0.02 *7*.
609.5 *3*	4663.9	3.5 *10*			
631.7 *3*	1438.4	4.5 *10*	(Q)		A_2=+0.11 *11*.
634.9 *1*	1845.0	12.6 *6*	E2§		A_2=+0.37 *11*; DCO=1.07 *20*. A_2=+0.20 *2*; A_4=−0.08 *5*. POL=+0.41 *16*.
643.4 *3*	3687.5	1.1 *6*			
655.6 *2*	1654.6	11.1 *29*	(Q)		A_2=+0.09 *9*; DCO=0.97.
656.9 *3*	3044.2	1.2 *6*			
660.3 *4*	3704.5	1.5 *10*			
661.8 *1*	1545.3	15.1 *15*	Q		A_2=+0.36 *11*; DCO=1.05 *26*.
662.8 *2*	3741.8	10.5 *14*	(Q)		A_2=+0.27 *8*; DCO=0.81 *19*.
665.8 *1*	1210.5	72.1 *36*	E2§		A_2=+0.31 *4*; DCO=1.00 *4*. A_2=+0.14 *2*; A_4=−0.05 *5*. POL=+0.24 *9*.
666.4 *3*	3079.1	9.3 *14*	E2		A_2=+1.5 *8*; DCO=1.08 *13*.
669.0 *2*	4617.1	6.0 *7*	(Q)		A_2=+0.35 *20*; DCO=0.93 *31*.
670.8 *2*	2146.3	6.4 *6*	(M1+E2)		A_2=−0.62 *27*; DCO=0.34 *9*.
674.8 *1*	1318.4	16.4 *8*	E2§		A_2=+0.33 *9*; DCO=1.34 *42*. A_2=+0.270 *25*; A_4=−0.03 *4*. POL=+0.39 *9*.
675.5 *2*	4054.4	0.8 *3*			
678.0 *1*	1475.4	79.6 *16*	E2§		A_2=+0.26 *5*; DCO=0.98 *8*. A_2=+0.24 *2*; A_4=−0.14 *5*. POL=+0.30 *9*.
685.6 *2*	2340.2	7.3 *8*	Q		A_2=+0.15 *31*; DCO=0.96 *8*.
686.2 *1*	4054.4	16.5 *8*	(Q)		A_2=+0.24 *6*; DCO=0.98 *22*.
701.3 *1*	883.43	12.0 *8*	E2§		A_2=+0.12 *8*; DCO=1.06 *12*. A_2=+0.14 *1*; A_4=−0.02 *3*. POL=+0.26 *7*.

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^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

γ(^{129}Ba) (continued)

E$\gamma^{\dagger}$	E(level)	I$\gamma^{\dagger}$	Mult.‡	Comments
726.1 *2*	1590.2	28.9 *15*	E2§	A_2=+0.26 *5*; DCO=1.08 *8*. A_2=+0.10 *2*; A_4=−0.04 *3*. POL=+0.26 *13*.
733.0 *3*	2171.4	1.7 *10*		
747.8 *2*	1545.3	3.0 *6*	D	A_2=−0.12 *10*.
754.5 *1*	2599.6	13.9 *6*	Q	A_2=+0.64 *30*; DCO=1.19 *24*.
761.2 *3*	4502.8	6.3 *8*	(Q)	A_2=+0.23 *12*.
761.3 *3*	5047.4	4.1 *5*		
^{x}761.8 *4*		4 *1*		
768.7 *1*	3948.1	4.7 *7*	D	A_2=−0.04 *7*; DCO=0.50 *8*.
775.2 *3*	2429.7	1.5 *7*	(Q)	DCO=1.05 *38*.
779.3 *1*	1989.9	79.6 *35*	E2§	A_2=+0.23 *3*; DCO=0.98 *4*. A_2=+0.22 *2*; A_4=−0.07 *5*.
791.5 *1*	2336.7	8.2 *6*	(Q)	A_2=+0.12 *7*; DCO=0.97 *19*.
805.8 *1*	2281.2	57.6 *12*	Q§	A_2=+0.27 *9*; DCO=1.07 *6*. A_2=+0.26 *9*; A_4=−0.04 *4*.
812.9 *3*	3094.2	3.9 *6*	D+Q	A_2=−0.08 *30*; DCO=0.36 *10*.
817.1 *1*	4871.5	16.3 *8*	Q	A_2=+0.31 *11*; DCO=1.08 *19*.
822.7 *1*	2412.9	23.2 *18*	E2§	A_2=+0.34 *6*; DCO=0.96 *9*. A_2=+0.17 *4*; A_4=−0.11 *10*. POL=+0.39 *24*.
825.6 *1*	2815.5	31.9 *19*	E2§	A_2=+0.31 *4*; DCO=1.08 *6*. A_2=+0.20 *6*; A_4=+0.11 *10*. POL=+0.48 *14*.
827.9 *2*	2146.3	13.7 *22*	(Q)	A_2=+0.25 *12*; DCO=0.95 *23*.
830.9 *1*	3430.6	10.3 *13*	(Q)	A_2=+0.36 *9*; DCO=0.80 *17*.
852.2 *2*	5469.3	9.2 *8*	Q	A_2=+0.41 *18*; DCO=1.05 *28*.
854.0 *4*	3948.1	4.9 *8*	(Q)	A_2=+0.59 *35*.
855.4 *3*	2509.9	1.1 *4*		
855.5 *1*	4286.1	5.1 *7*	Q	A_2=+0.61 *20*; DCO=1.00 *20*.
861.3 *2*	2336.7	0.5 *3*		
876.4 *6*	5379.6	2.8 *8*		
884.1 *1*	2874.0	23.7 *11*	Q	A_2=+0.30 *6*; DCO=1.04 *10*.
898.2 *1*	3179.4	37.2 *11*	Q§	A_2=+0.26 *6*; DCO=1.01 *10*. A_2=+0.13 *5*; A_4=+0.04 *10*.
905.5 *1*	3368.2	0.7 *2*	(Q)	DCO=0.80 *25*.
^{x}913.8 *4*		2 *1*		
916.3 *1*	3378.9	1.8 *4*	(Q)	A_2=+0.32 *21*; DCO=0.79 *36*.
920.9 *2*	4351.4	2.3 *4*	Q	A_2=+0.42 *33*; DCO=1.13 *37*.
928.1 *5*	5975.6	2.5 *10*	(Q)	A_2=+1.1 *3*.
935.9 *3*	5807.6	8.9 *9*	(Q)	A_2=+0.12 *7*.
941.2 *2*	4320.2	1.0 *3*		
948.1 *2*	3094.2	8.1 *6*	(Q)	A_2=+0.06 *18*; DCO=0.80 *33*.
958.2 *1*	4137.6	19.1 *8*	Q	A_2=+0.41 *6*; DCO=0.98 *9*.
972.7 *3*	6352.1	1.8 *7*	(Q)	A_2=+0.76 *26*.
981.6 *3*	6450.7	5.2 *8*	(Q)	A_2=−0.25 *20*; DCO=1.06 *40*.
982.2 *1*	3895.9	1.3 *2*	Q	DCO=1.30 *35*.
999.6 *3*	6975.3	0.9 *4*		
1014.4 *3*	5152.0	8.3 *9*	(Q)	DCO=0.87 *14*.
1035.6 *7*	6843.6	7.6 *15*		A_2=−0.06 *9*.
^{x}1048.5 *4*		16 *4*		
1051.1 *5*	7501.9	1.8 *7*		A_2=+0.05 *6*.
1055.2 *5*	4951.1	0.4 *2*		
1063.5 *2*	2653.7	4.2 *6*	Q	A_2=+1.0 *3*; DCO=1.02 *17*.
1069.7 *7*	2387.4	2.1 *8*		
1071.8 *4*	6223.8	2.6 *6*	(Q)	A_2=+0.52 *25*; DCO=0.86 *33*.
^{x}1075.2 *4*		8 *3*		
1080.1 *3*	4458.7	≤0.8		
1082.1 *5*	7434.0	1.1 *5*		
1084.5 *2*	2674.7	1.8 *5*	(Q)	DCO=1.00 *27*.
^{x}1110.3 *5*		20 *8*		
1120.7 *5*	7964.1	4.1 *15*		
1124.3 *3*	2599.6	2.5 *3*	(Q)	A_2=+0.15 *21*; DCO=0.95 *29*.

Continued on next page (footnotes at end of table)

^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

γ(^{129}Ba) (continued)

Eγ[†]	E(level)	Iγ[†]	Mult.[‡]	Comments
1149.4 *3*	3430.6	3.0 *4*	(Q)	DCO=1.31 *56*.
1171.7 *5*	4351.4	2.6 *9*		A_2=+0.12 *11*.
1180.1 *5*	9144.2	2.5 *9*		
1244.1 *10*	10388.3	1.6 *8*		
1406.7 *3*	3687.5	2.2 *5*	(Q)	A_2=−0.11 *7*; DCO=0.85 *30*.
1424.2 *5*	2742.6	1.2 *6*		

[†] From 1992By03.

[‡] From γ(θ), DCO and linear polarization data. All DCO values are from 1992By03 and POL values from 1978Gi04. When only one A_2 value is listed, it is from 1992By03. WhenA2 and A_4 are listed together, these are from 1977Gi02. The γ rays with DCO≈1 and A_2≥+0.2 are expected to be stretched quadrupole (most likely E2), cascading γ rays with DCO≈0.5 and large negative A_2 as D+Q (most likely M1+E2). RUL is also used when level half–lives are known; and also with assumed resolving time of ≈10 ns in γγ experiments.

[§] From γ(θ) and linear polarization (1977Gi02,1978Gi04).

[#] δ(E2/M1)=0.5 assumed for M1+E2 transitions when δ not given.

[@] Multiply placed; intensity suitably divided.

[x] γ ray not placed in level scheme.

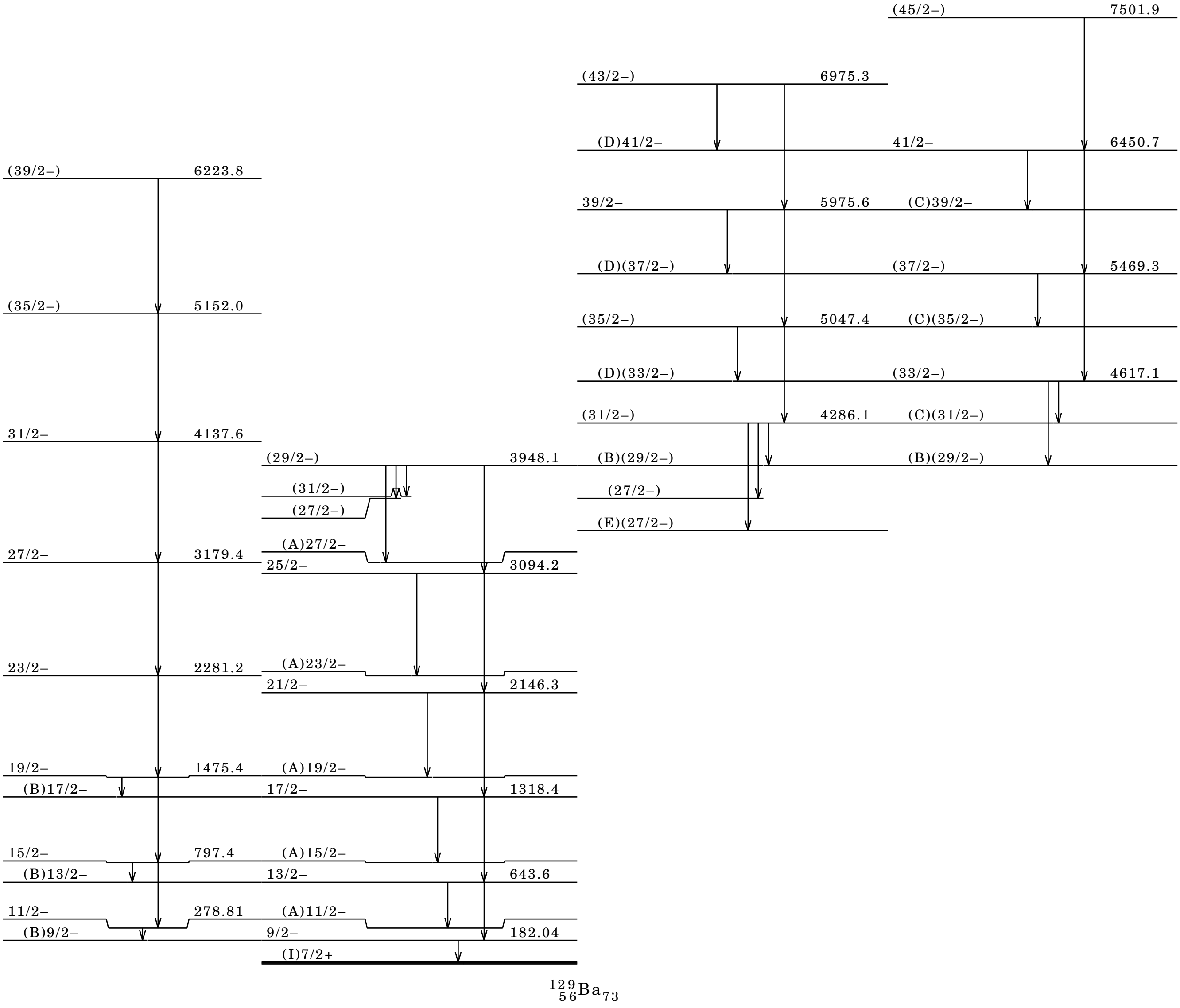
^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

(A) ν9/2[514],α=−1/2.

(B) ν9/2[514],α=+1/2.

(C) ν9/2[514]⊗πh$_{11/2}$^{2},α=−1/2.

(D) ν9/2[514]⊗πh$_{11/2}$^{2}, α=+1/2.



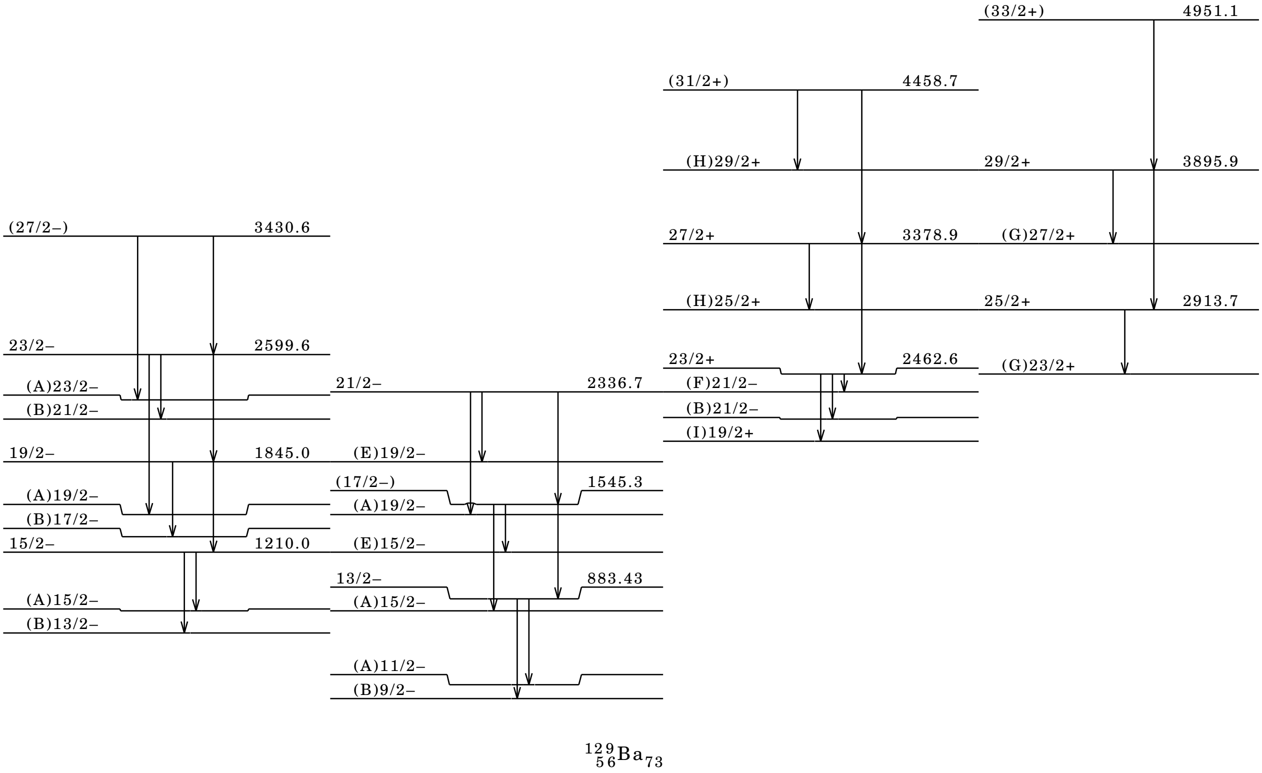
^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

(E) Yrare νh$_{11/2}$ band, α=−1/2.

(F) Yrare νh$_{11/2}$ band, α=+1/2.

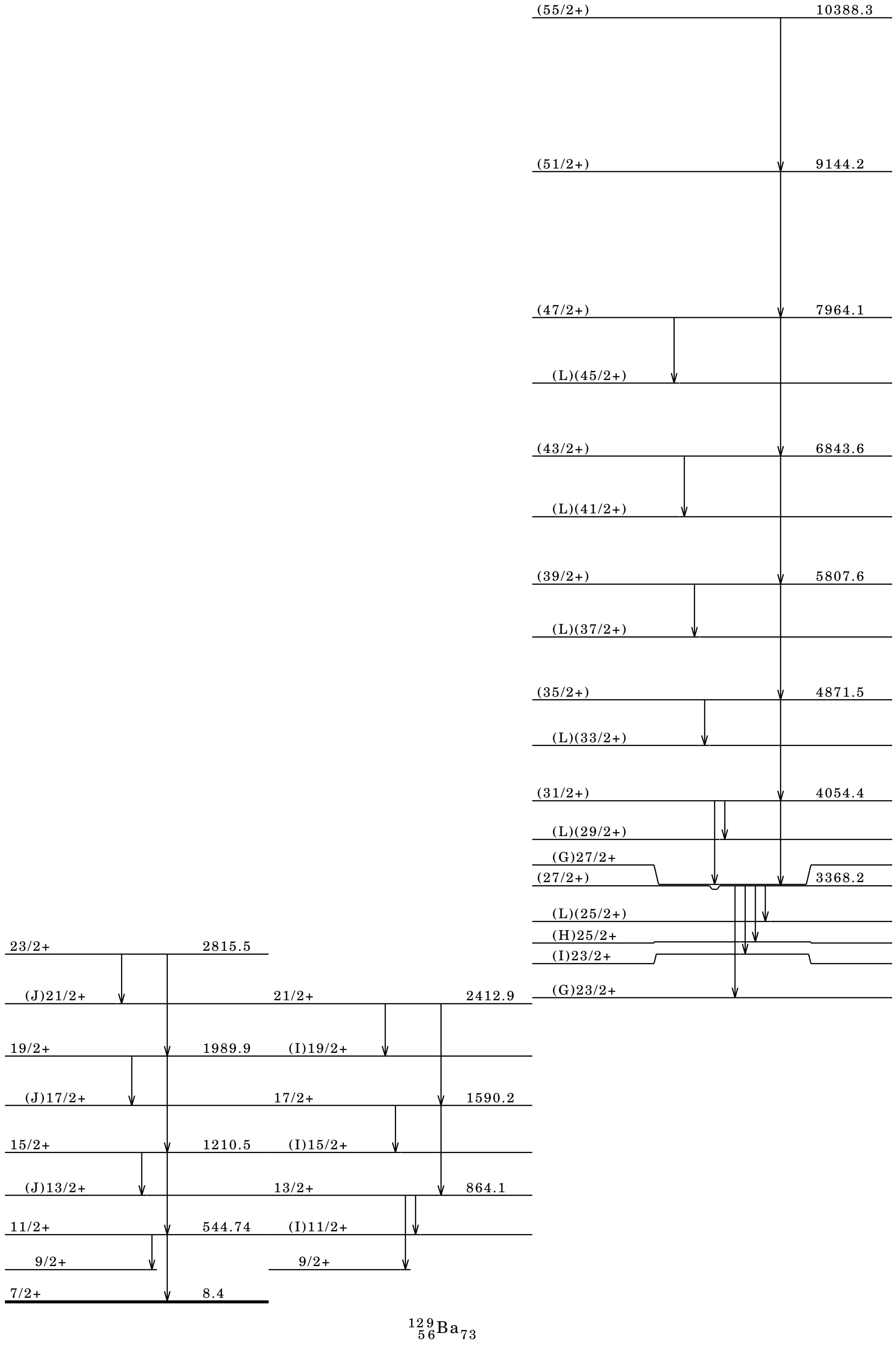
(G) ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=−1/2.

(H) ν7/2[402]⊗ν9/2[514]⊗ν7/2[523],α=+1/2.



$^{120}\mathrm{Sn}(^{12}\mathrm{C},3\mathrm{n}\gamma),^{116}\mathrm{Cd}(^{18}\mathrm{O},5\mathrm{n}\gamma)$ 1992By03,1978Gi04,2013Ka27 (continued)

(I) ν7/2[404],α=−1/2. **(J) ν7/2[404],α=+1/2.** **(K) ν7/2[404]⊗$\pi h_{11/2}{}^2$,α=−1/2.**



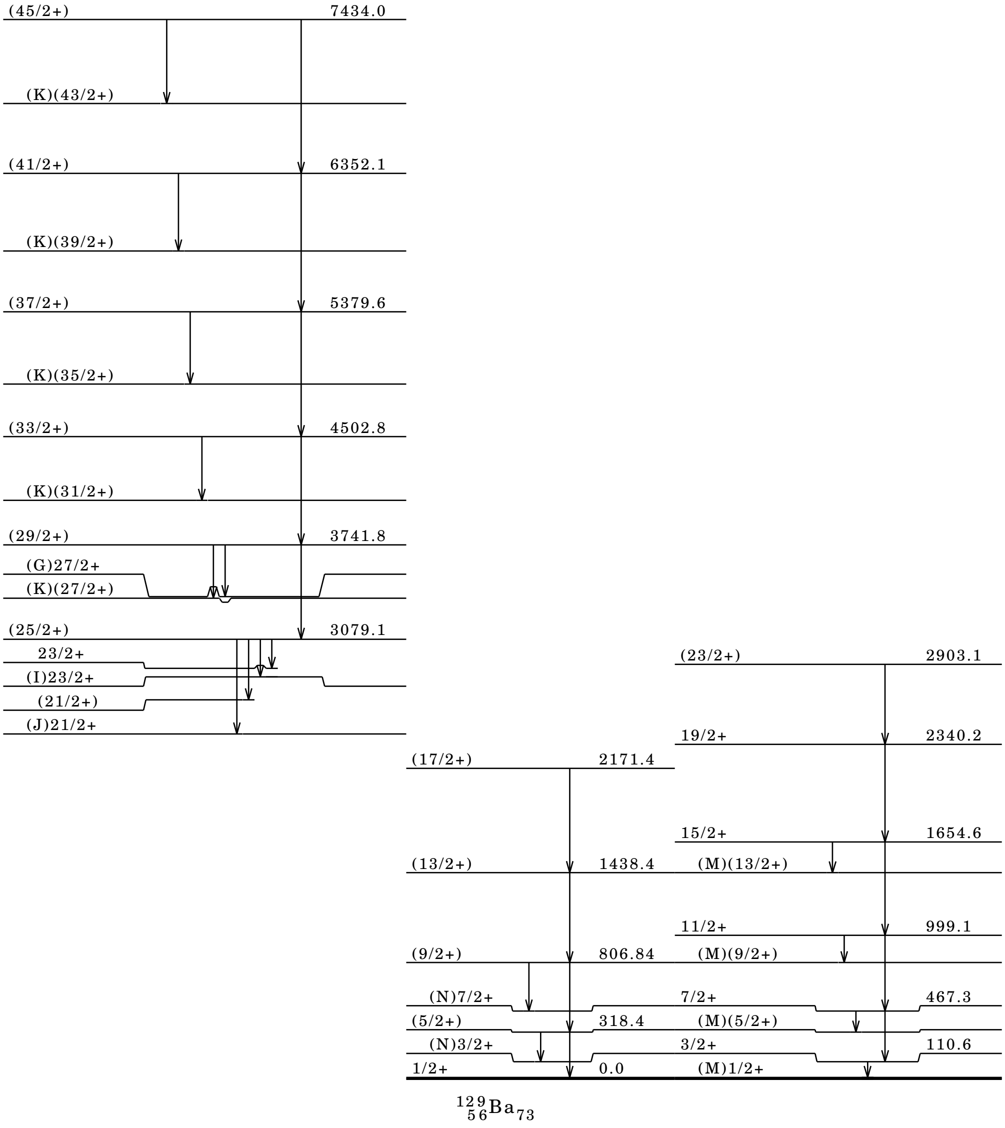
From NNDC(BNL)
program ENSDAT

^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

(L) ν7/2[404]$\otimes\pi h_{11/2}{}^2$,α=+1/2.

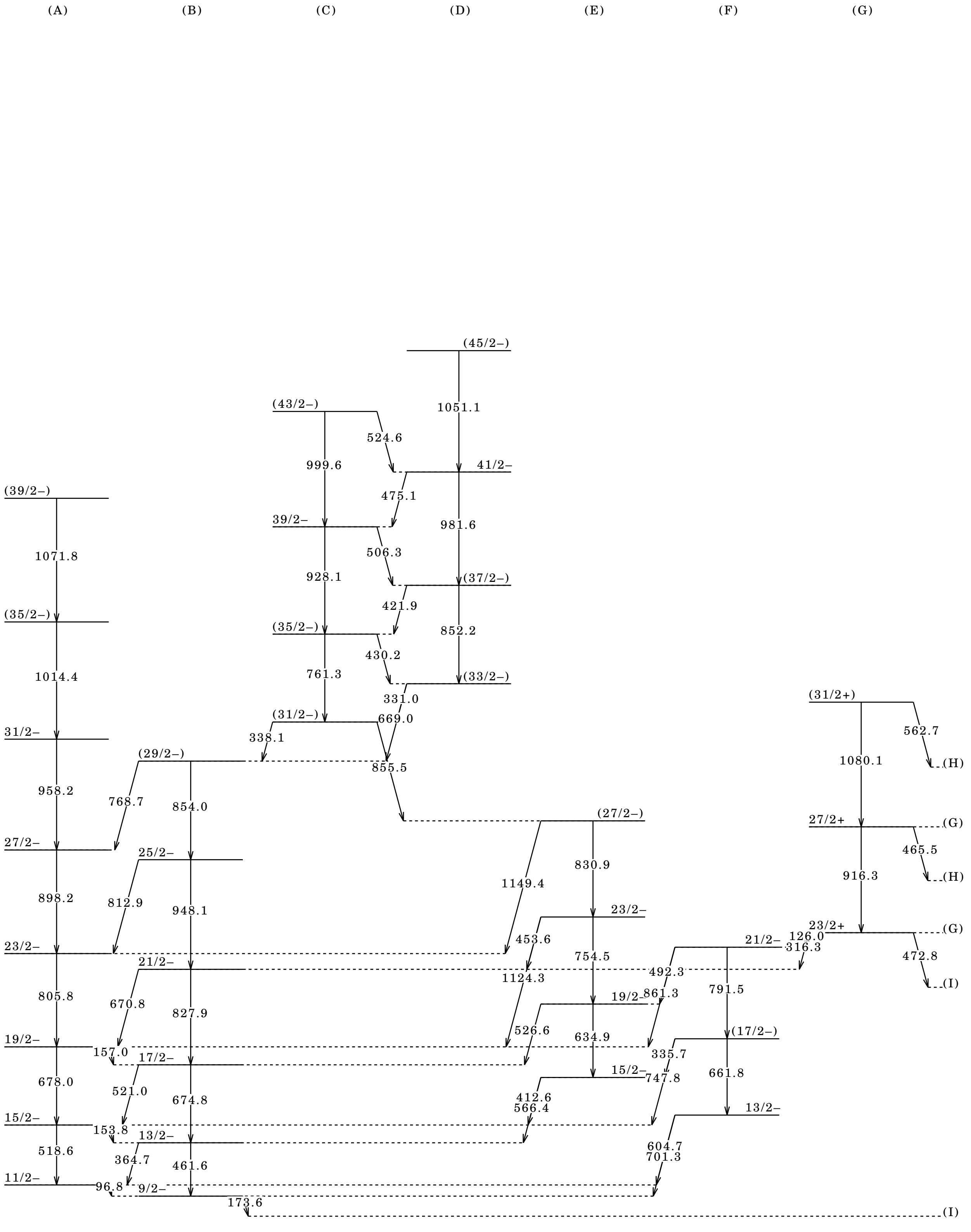
(M) ν(1/2[411]+1/2[400]), α=−1/2.

(N) ν(1/2[411]+1/2[400]), α=+1/2.



$^{120}\mathrm{Sn}(^{12}\mathrm{C},3\mathrm{n}\gamma),^{116}\mathrm{Cd}(^{18}\mathrm{O},5\mathrm{n}\gamma)$ 1992By03,1978Gi04,2013Ka27 (continued)

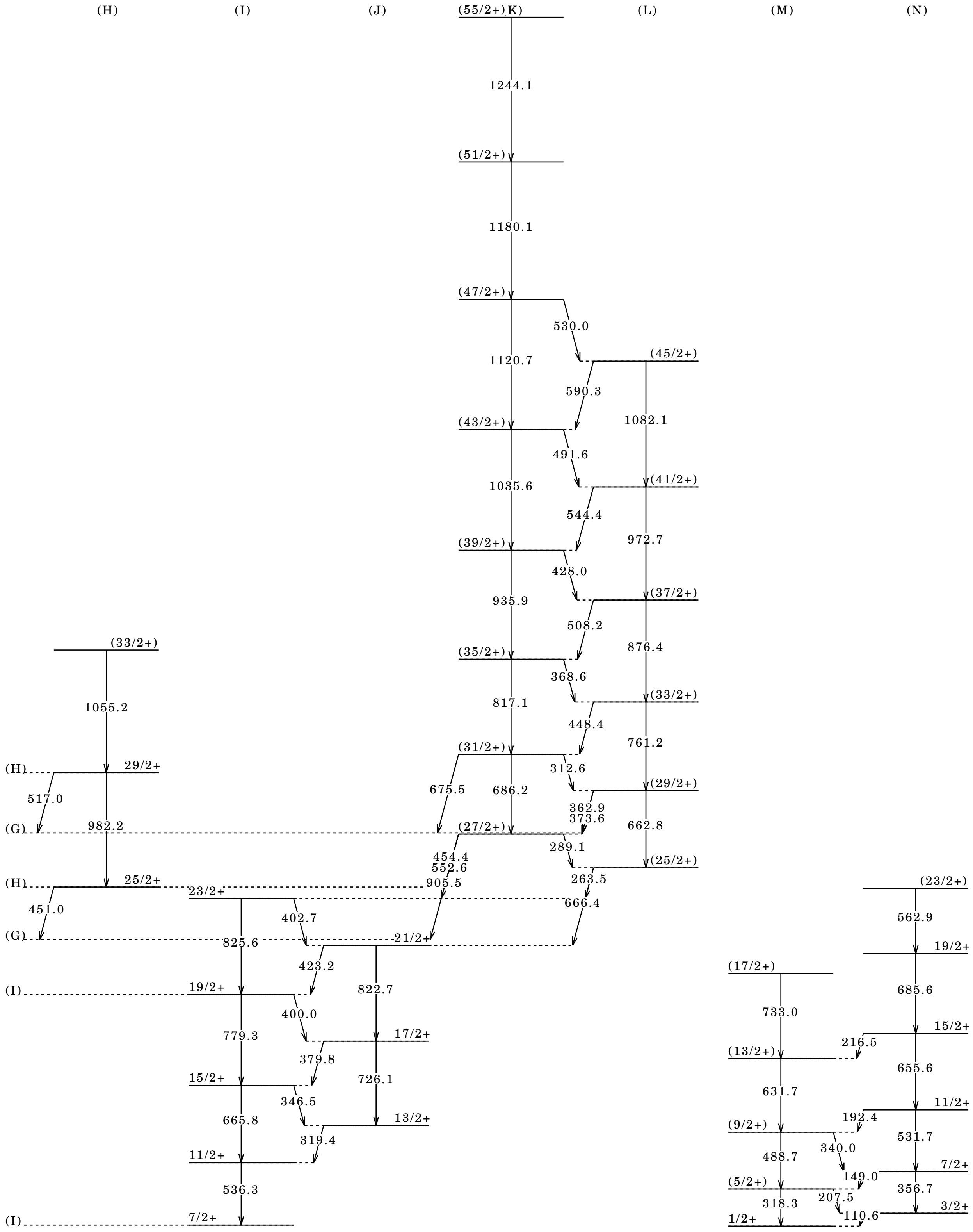
Bands for ^{129}Ba



$^{129}_{56}\mathrm{Ba}_{73}$

${}^{120}\mathrm{Sn}({}^{12}\mathrm{C},3\mathrm{n}\gamma),{}^{116}\mathrm{Cd}({}^{18}\mathrm{O},5\mathrm{n}\gamma)$ 1992By03,1978Gi04,2013Ka27 (continued)

Bands for ${}^{129}\mathrm{Ba}$



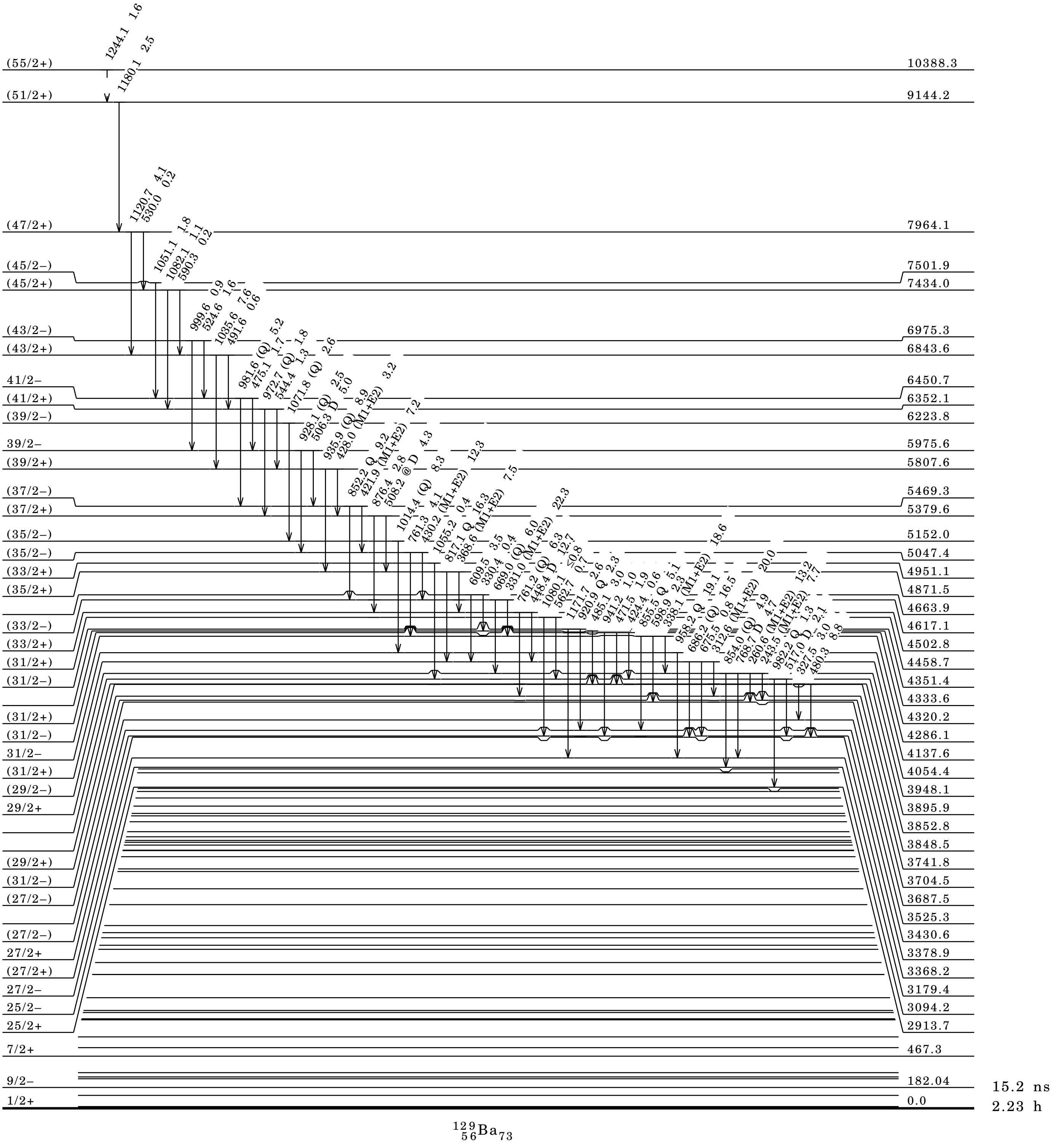
${}^{129}_{56}\mathrm{Ba}_{73}$

^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

Level Scheme

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided

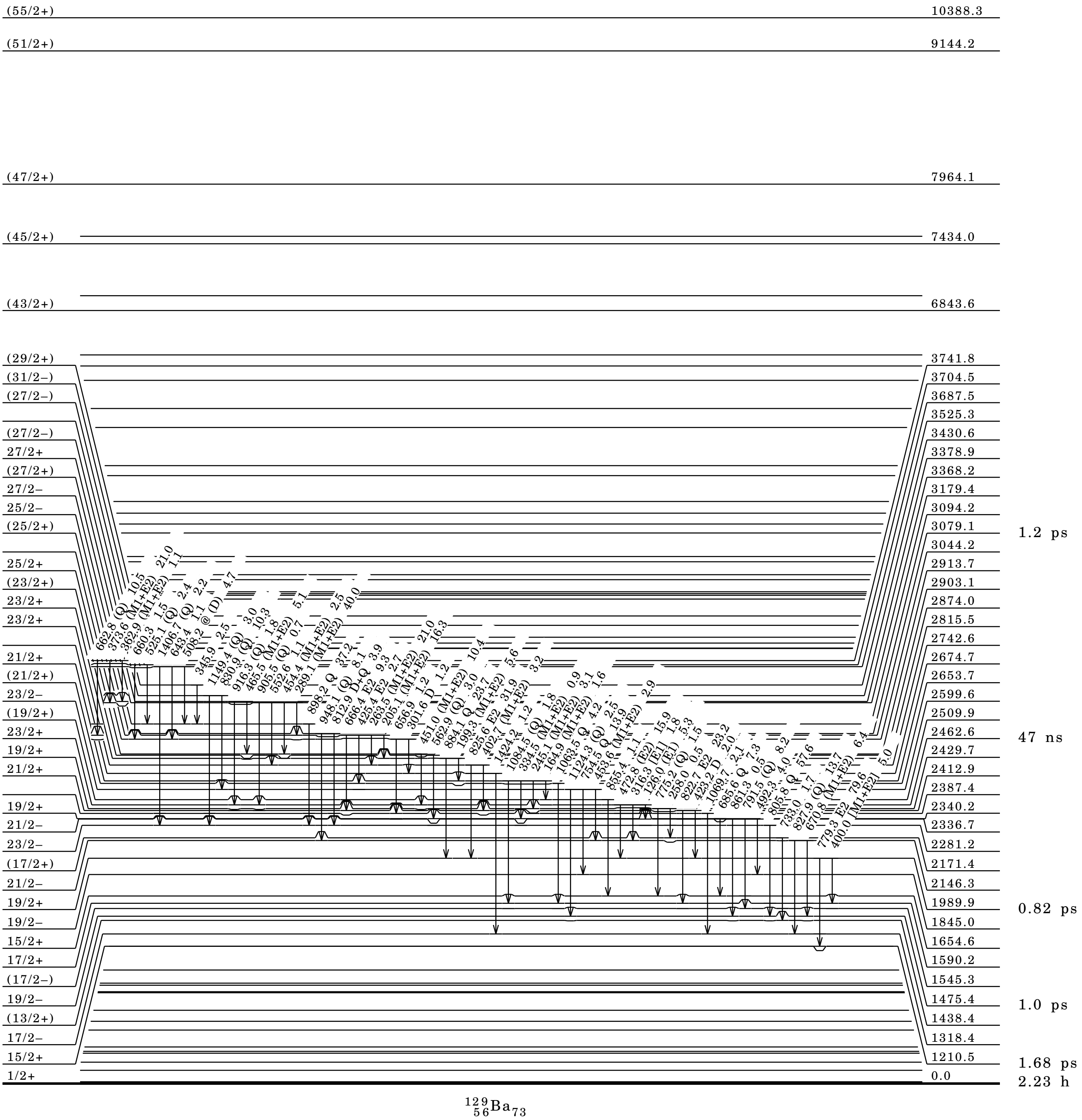


^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

Level Scheme (continued)

Intensities: relative Iγ

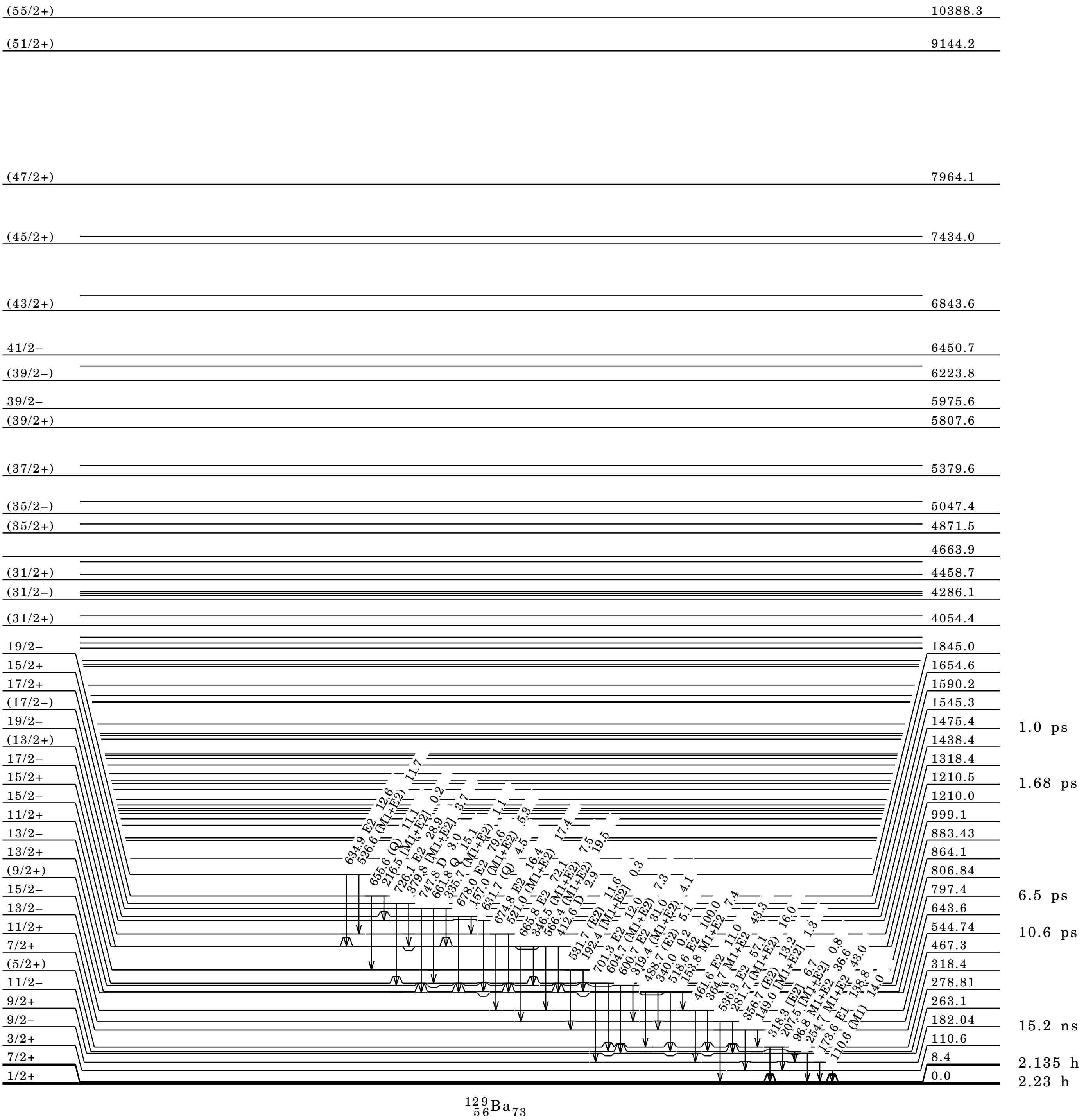
@ Multiply placed; intensity suitably divided



^{120}Sn(^{12}C,3nγ),^{116}Cd(^{18}O,5nγ) 1992By03,1978Gi04,2013Ka27 (continued)

Level Scheme (continued)

Intensities: relative Iγ
@ Multiply placed; intensity suitably divided



^{130}Ba(pol d,t),(d,t) 1998Bu05,1974Gr22

1998Bu05: E=25 MeV; polarized beam; magnetic spectrograph, FWHM=16–18 keV, θ=6°–35°; enriched target (14.4%). Measured σ(θ), vector analyzing powers.

1974Gr22: E=16 MeV; magnetic spectrograph, FWHM=16–18 keV, θ=20°–85°; enriched target (100%).

Data are from 1998Bu05 unless otherwise noted.

^{129}Ba Levels

Relative differential cross sections at 14.3°(c.m.) are listed under comments.

E(level)	Jπ[‡]	L	Glj[§]	Comments
0.0	1/2+	0	1.0	dσ/dΩ=590.
7.8 *16*	7/2+	4	1.38	dσ/dΩ=193.
110.4 *6*	3/2+	2	0.64	dσ/dΩ=1027.
181.4 *3*	9/2−	5	0.10	dσ/dΩ=3.
253.8 *5*	3/2+	2	0.067	dσ/dΩ=98.
279.2[†] *9*	1/2+	0	0.047	dσ/dΩ=90.
279.2[†] *9*	(11/2)−	5	1.83	
318.4 *10*	5/2+	2	0.40	dσ/dΩ=816.
458.7[†] *10*	3/2+	2	0.22	dσ/dΩ=864.
458.7[†] *10*	5/2+	2	0.27	
541.5 *27*	5/2+	2	0.67	dσ/dΩ=1320.
631.3 *13*	7/2−	3	0.31	L: L=2 was reported by 1974Gr22. dσ/dΩ=123.
659.5 *20*	5/2+	2	0.056	dσ/dΩ=105.
788.0 *4*		(1+5)	0.003,0.089	dσ/dΩ=7.
799.6 *50*	(3/2+,5/2+)			Level observed by 1974Gr22.
805.8 *16*		(1+5)	0.006,0.14	dσ/dΩ=14.
849.8 *26*	5/2+	2	0.024	dσ/dΩ=42.
892.1 *15*				dσ/dΩ=42.
906.7 *7*		1	0.044	dσ/dΩ=27.
928.6 *5*	1/2+	0	0.24	dσ/dΩ=158.
1012.4 *9*				dσ/dΩ=30.
1035.4 *15*		5	0.19	dσ/dΩ<9.
1063.1 *2*	3/2+	2	0.044	dσ/dΩ=64.
1097.8 *15*	1/2−	1	0.004	dσ/dΩ=5.
1119.5 *4*	1/2+	0	0.031	dσ/dΩ=17.
1204.1 *2*	7/2+	4	0.096	dσ/dΩ=5.
1219.3 *18*	(5/2)+	2	0.031	dσ/dΩ=58.
1282.5 *8*	5/2+	2	0.13	dσ/dΩ=244.
1303.8 *8*	(9/2)+	4	0.10	dσ/dΩ<20.
1324.7 *50*				
1338.9 *10*	9/2−	5	0.18	dσ/dΩ<7.
1384.7 *53*				
1401.0 *20*	5/2+	2	0.11	dσ/dΩ=200.
1436.9 *14*		2	0.07	dσ/dΩ=136.
1504.3 *5*	(5/2)+	2	0.013	dσ/dΩ=19.
1530.2 *30*				dσ/dΩ=10.
1536.9 *46*		4	0.27	dσ/dΩ=28.
1566.0 *17*		(2)	0.006	dσ/dΩ=13.
1611.4 *40*		(3)	0.038	dσ/dΩ=17.
1633.2 *48*	1/2+	0	0.038	dσ/dΩ=26.
1651.4 *24*		(5)	0.13	dσ/dΩ=15.
1692.3 *13*	11/2−	5	0.24	dσ/dΩ=17.
1712.9 *23*	1/2+	0	0.11	dσ/dΩ=78.
1768.2 *30*	1/2+	0	0.22	dσ/dΩ=132.
1782.8 *30*				
1805.4 *38*		2	0.013	dσ/dΩ=26.
1837.3 *30*				
1863.4 *60*		2	0.009	dσ/dΩ=10.
1906.1 *57*		2	0.02	dσ/dΩ=28.
1951.8 *55*		(0)	0.02	dσ/dΩ=10.
1976.3 *45*				
1989.9 *30*	1/2+	0	0.062	dσ/dΩ=46.
2008.1 *55*	3/2−	1	0.027	dσ/dΩ=18.

[†] Doublet.

[‡] From L–transfer and vector analyzing powers.

[§] Relative spectroscopic strength, normalized to the ground state.

Adopted Levels, Gammas

Q(β$^-$)=–5040 *40*; S(n)=10770 *60*; S(p)=3235 *22*; Q(α)=338 *23* 2012Wa38.
S(2n)=19570 *30*, S(2p)=9662 *22* (2012Wa38).
1963Pr02: ^{129}La produced and identified in bombardment of indium foils by ^{16}O beam followed by chemical separation and half–life measurement.
Later decay studies: 1963Ya05, 1963La03, 1979Br05, 1998Ko66.

^{129}La Levels

The band configurations are based on comparison with cranked–shell model analysis.

Cross Reference (XREF) Flags

A ^{129}La IT Decay (0.56 s)
B ^{129}Ce ε Decay (3.5 min)
C 51V(82SE,4NG),100MO(34S,P4NG) **EDIT ERROR**
D ^{119}Sn(^{14}N,4nγ)

E(level)[†]	Jπ[§]	XREF	T$_{1/2}$[#]	Comments
0.0[e]	(3/2+)	ABCD	11.6 min *2*	%ε+%β$^+$=100. Jπ: see comment under 172.3 level. T$_{1/2}$: from 1979Br05. Other: 10.0 min *5* (1963Ya05), 7.2 min *5* (1963Pr02), ≈20 m (1963La03).
68.18[f] *5*	(5/2+)	ABCD		Jπ: see comment for 172.3 level.
172.33[@] *20*	(11/2–)	A CD	0.56 s *5*	%IT=100. Jπ: observation of a decoupled band based on 172.3 level, E3–M1 γ cascade to g.s., available orbits for the odd proton; and systematics of structures based on h$_{11/2}$ proton orbital in this mass region give most probable assignment of 11/2– –> 5/2+ –> 3/2+ cascade for 172, 68 and g.s. Theoretical model calculations (2001Sh07, 1987La21, 1985Ha34) support these assignments. However, all the assignments are given in parentheses here since a direct measurement of any of these spins is not yet available. T$_{1/2}$: from γ decay curve (1969Al05).
216.30 *23*	(1/2+ to 9/2+)	B		Jπ: γ to (5/2+).
239.62 *8*	(5/2+)	B D		Jπ: M1 γ to (5/2+).
248.45[e] *8*	(7/2+)	BCD		Jπ: M1 γ to (5/2+) and (E2) γ to (3/2+) in strongly coupled band.
270.92 *13*	(1/2 to 7/2+)	B		Jπ: γ to 3/2+.
398.48 *9*	(3/2+,5/2+,7/2+)	B		Jπ: M1,E2 γ to (3/2+).
440.25 *11*	(7/2+)	B D		Jπ: M1 γ to (5/2+); population of the level in HI reaction favors 7/2 over the lower spins.
442.08[@] *18*	(15/2–)	CD	90 ps *4*	T$_{1/2}$: from Doppler–shift recoil–distance method in (HI,xnγ) (1975Bu08). Jπ: ΔJ=2, E2 in–band γ to (11/2–).
446.33[f] *11*	(9/2+)	BCD		Jπ: ΔJ=1, M1 γ to (7/2+) and ΔJ=2, Q γ to (5/2+) in–band transitions.
464.02 *12*	(5/2+,7/2+)	B		Jπ: ΔJ=1, M1(+E2) γ to (7/2+); M1,E2 γ to (5/2+); γ to (3/2+).
472.21 *14*	(1/2+ to 7/2+)	B		Jπ: gammas to (3/2+) and (5/2+).
556.00? *20*	(1/2 to 7/2+)	B		Jπ: γ to (3/2+).
587.64 *14*	(1/2+ to 7/2+)	B		Jπ: gammas to (3/2+) and (5/2+).
619.61 *13*	(3/2+ to 9/2+)	B		Jπ: gammas to (5/2+) and (7/2+).
645.53 *12*	(9/2+)	B D		Jπ: (M1+E2) γ to (9/2+); γ to (5/2+); population in heavy–ion reaction favors (9/2+) over (7/2+).
652.5 *3*	(1/2 to 9/2+)	B		
696.56[e] *15*	(11/2+)	CD		Jπ: in–band dipole γ to (9/2+) and γ to (7/2+).
706.43 *12*	(5/2+ to 9/2+)	B		
782.3 *3*	(5/2+ to 9/2+)	B		
796.21 *12*	(3/2+ to 7/2+)	B		
832.32 *15*	(3/2+ to 9/2+)	B		
916.64[@] *21*	(19/2–)	CD	6.0 ps *9*	T$_{1/2}$: from Doppler–shift recoil–distance method in (HI,xnγ) (1975Bu08). Jπ: ΔJ=2, E2 in–band γ to (15/2–).
928.93 *16*	(7/2+ to 11/2+)	B D		Jπ: gammas to (7/2+) and (11/2+).
934.93 *18*	(1/2 to 9/2+)	B		
966.34 *14*	(1/2 to 7/2+)	B		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}La Levels (continued)

E(level)[†]	Jπ[§]	XREF	$T_{1/2}$[#]	Comments
992.41 *16*	(11/2+)	D		Jπ: ΔJ=1, (M1+E2) to (9/2+); population in HI reaction favors (11/2+) over 7/2+.
1015.26 *15*	(1/2 to 7/2+)	B		
1021.79[f] *16*	(13/2+)	CD		Jπ: ΔJ=1, (M1+E2) in-band γ to (11/2+) and ΔJ=2, Q in-band γ to (9/2+).
1120.18[b] *20*	(13/2−)	D		Jπ: gammas to (11/2−) and (15/2−); γ from (17/2−) in probably E2.
1120.5? *3*		D		E(level): existence of this level is not discussed in 1995Ku29. Evaluators find it possible that the 1098.7 keV γ feeds the 1120.3 keV (13/2−) level, in which case this level may not exist.
1234.19 *21*	(13/2+)	D		Jπ: γ to (9/2+) and γ from (17/2+).
1275.09 *22*	(15/2 to 19/2−)	D		Jπ: γ to (15/2−).
1304.94[&] *23*	(17/2−)	D		Jπ: ΔJ=1, M1+E2 γ to (15/2−); ΔJ=1, d γ to (19/2−).
1315.78[e] *20*	(15/2+)	CD		Jπ: in-band ΔJ=2, Q γ to (11/2+).
1328.8 *4*	(15/2 to 19/2−)	D		Jπ: γ to (15/2−).
1524.31 *22*	(11/2+ to 15/2+)	D		Jπ: gammas to (13/2+) and (7/2+:11/2+).
1558.03[@] *23*	(23/2−)	CD	≥1.2 ps	Jπ: in-band ΔJ=2, (E2) γ to (19/2−).
1586.62[b] *23*	(17/2−)	D		Jπ: ΔJ=1, M1+E2 γ to (19/2−); γ to (15/2−).
1651.1 *4*	(15/2 to 19/2−)	D		Jπ: γ to (15/2−).
1654.17 *22*	(13/2+)	D		Jπ: ΔJ=1, D+Q γ to (11/2+); γ to (13/2+).
1724.96 *19*	(15/2+)	CD		Jπ: ΔJ=0, D+Q γ to (15/2−); γ to (11/2+).
1753.2? *4*		D		E(level): existence of this level is not discussed in 1995Ku29. The 1311.1γ may depopulate the 1753.4,17/2+ level, in which case this level may not exist.
1753.4 *3*	(17/2+)	D		Jπ: in-band ΔJ=2, Q γ to (13/2+).
1803.0 *3*		D		
1851.24[a] *23*	(19/2−)	D		Jπ: strong ΔJ=2, Q γ to (15/2−); ΔJ=(0),(D) γ to (19/2−).
1949.58[&] *23*	(21/2−)	CD		Jπ: ΔJ=1, M1+E2 γ to (19/2−); γ to (23/2−).
1951.5 *4*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
1956.5 *4*	(9/2+ to 17/2+)	D		
1972.2 *3*	(15/2−,17/2,19/2−)	D		Jπ: gammas to (15/2−) and (19/2−).
1985.0[c] *3*	(19/2+)	CD		Jπ: ΔJ=2,Q or ΔJ=0, d gammas to (15/2+) and (19/2−).
2003.8 *4*	(15/2 to 19/2−)	D		Jπ: γ to (15/2−).
2069.9[e] *3*	(19/2+)	CD		Jπ: in-band ΔJ=2, Q γ to (15/2+).
2118.2 *4*	(15/2− to 23/2−)	D		Jπ: γ to (15/2−).
2169.8 *3*	(19/2)	D		Jπ: ΔJ=1, d γ to (17/2−).
2206.4 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2218.90 *18*	(15/2+)	CD		Jπ: ΔJ=1, M1+E2 γ to (13/2+); γ to (15/2−).
2221.5[b] *3*	(21/2−)	D		Jπ: ΔJ=1, M1+E2 γ to (23/2−); γ to (17/2−).
2242.7 *2*	(17/2+)	CD		Jπ: ΔJ=1, M1+E2 γ to (15/2+); Q γ to (13/2+).
2242.7+x[g] *10*	(17/2+)	CD		Jπ: no definite decay path from this level to the known-energy levels could be identified. It populates mainly (15/2−), (15/2+) and (17/2+) levels. Positive parity derived from the assumed configuration based on no signature splitting.
2277.9 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2290.9 *3*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2297.6+x[h] *3*	(19/2+)	CD		Jπ: in-band γ to (17/2+).
2298.1 *3*	(15/2 to 19/2−)	D		Jπ: γ to (15/2−).
2343.2[@] *3*	(27/2−)	CD	0.82 ps *20*	Jπ: in-band ΔJ=2, E2 γ to (23/2−).
2351.8[i] *3*	(19/2+)	CD		Jπ: ΔJ=0, d γ to (19/2−); parity from the band configuration.
2408.3+x[g] *4*	(21/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (19/2+).
2431.2[c] *3*	(23/2+)	CD		Jπ: ΔJ=2, Q or ΔJ=0, d gammas to (19/2+) and (23/2−).
2452.8 *3*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2453.7 *4*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
2462.6 *5*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2474.76[a] *24*	(23/2−)	D		Jπ: in-band ΔJ=2, Q γ to (19/2−).
2478.0[d] *3*	(21/2+)	CD		Jπ: gammas to (17/2+) and (23/2−); member of positive-parity band.
2490.0 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2520.3 *3*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
2568.4[j] *3*	(21/2+)	CD		Jπ: in-band ΔJ=1, (M1+E2) γ to (19/2+).
2572.7+x[h] *5*	(23/2+)	CD		Jπ: in-band ΔJ=1, (M1+E2) γ to (21/2+).

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Adopted Levels, Gammas (continued)

^{129}La Levels (continued)

E(level)[†]	Jπ[§]	XREF	$T_{1/2}$[#]	Comments
2598.8 *3*	(17/2 to 21/2+)	D		Jπ: γ to (17/2+).
2681.3 *3*	(17/2 to 21/2+)	D		Jπ: γ to (17/2+).
2705.1 *3*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
2729.5 *3*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
2767.6 *4*	(17/2 to 21/2+)	D		Jπ: γ to (17/2+).
2783.8 *3*	(23/2,25/2)	D		Jπ: gammas to (23/2−) and (23/2+).
2789.7 *3*	(23/2+)	D		Jπ: ΔJ=1, (M1+E2) γ from (25/2+); γ to (21/2−).
2794.1+x[g] *5*	(25/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (23/2+); in-band γ to (21/2+).
2803.0 *3*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2822.6[i] *3*	(23/2+)	CD		Jπ: in-band ΔJ=1, (M1+E2) γ to (21/2+).
2841.0[e] *3*	(23/2+)	CD		Jπ: in-band ΔJ=2 γ to (19/2+).
2864.1 *4*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
2909.7[d] *3*	(25/2+)	CD		Jπ: ΔJ=1, M1+E2 γ to (23/2+); γ to (27/2−).
2911.1 *3*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
2943.1 *4*	(19/2 to 23/2+)	D		Jπ: γ to (19/2+).
2955.2[b] *4*	(25/2−)	D		Jπ: γ to (21/2−); band member.
2955.7? *3*		D		The 612.5 keV γ may depopulate the 2955.4 keV (25/2−) level, in which case 2955.7 level may not exist.
3017.7[c] *3*	(27/2+)	CD		Jπ: ΔJ=2, Q or ΔJ=0, d gammas to 23/2+ and 27/2−; positive-parity band member.
3043.8 *4*	(23/2 to 27/2−)	D		Jπ: γ to (23/2−).
3071.0+x[h] *5*	(27/2+)	CD		Jπ: in-band (M1+E2) γ to (25/2+); in-band γ to (23/2+).
3096.0[j] *3*	(25/2+)	CD		Jπ: in-band (M1+E2) γ to (23/2+).
3124.4 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
3215.3[a] *3*	(27/2−)	D		Jπ: ΔJ=2, Q γ to (23/2−); band member.
3253.5[@] *4*	(31/2−)	CD	0.40 ps *8*	Jπ: ΔJ=2, E2 γ to (27/2−); band member.
3286.8 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
3309.8 *4*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3375.9 *3*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3382.8 *3*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3394.0+x[g] *5*	(29/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (27/2+); in-band γ to (25/2+).
3411.2 *3*	(25/2 to 29/2+)	D		Jπ: γ to (25/2+).
3420.6[i] *4*	(27/2+)	CD		Jπ: ΔJ=1, (M1+E2) in-band γ to (25/2+).
3474.7[‡] *3*	(23/2−,25/2,27/2+)	D		Jπ: gammas to (23/2+) and (27/2−).
3476.8[d] *3*	(29/2+)	CD		Jπ: ΔJ=1, d γ to (27/2+); γ to 25/2+; band member.
3482.3 *3*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3523.1 *3*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3531.2 *4*	(19/2 to 23/2−)	D		Jπ: γ to (19/2−).
3636.6 *4*	(23/2− to 31/2−)	D		Jπ: γ to (27/2−).
3694.9 *3*	(23/2−,25/2,27/2+)	D		Jπ: gammas to (27/2−) and (23/2+).
3697.1 *4*	(23/2 to 27/2+)	D		Jπ: γ to (23/2+).
3712.1 *4*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3731.7[c] *4*	(31/2+)	D		Jπ: in-band ΔJ=2, Q γ to (27/2+).
3759.4+x[h] *5*	(31/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (29/2+); γ to (27/2+).
3760.2[b] *5*	(29/2−)	D		Jπ: γ to (25/2−); band member.
3783.5[j] *4*	(29/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (27/2+); in-band γ to (25/2+).
3857.8 *4*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3952.0 *4*	(27/2 to 31/2−)	D		Jπ: γ to (27/2−).
3998.1 *5*	(31/2,33/2,35/2−)	D		Jπ: γ to (31/2−).
4000.3[‡] *4*	(27/2−,29/2,31/2−)	D		Jπ: gammas to (27/2−) and (31/2−).
4042.7[‡][a] *3*	(31/2−)	D		Jπ: γ to (27/2−) in ΔJ=2 band.
4159.1+x[g] *6*	(33/2+)	CD		Jπ: in-band ΔJ=1, (M1+E2) γ to (31/2+); γ to (29/2+).
4176.7[i] *4*	(31/2+)	CD		Jπ: in-band ΔJ=1, M1+E2 γ to (29/2+).
4198.8[d] *4*	(33/2+)	CD		Jπ: in-band ΔJ=2, Q γ to (29/2+); ΔJ=1, (M1+E2) γ to (31/2+).
4266.8[@] *5*	(35/2−)	CD	0.50 ps *12*	Jπ: ΔJ=2, E2 γ to (31/2−); band member.
4296.9 *5*	(31/2 to 35/2−)	D		Jπ: γ to (31/2−).
4555.0[c] *5*	(35/2+)	CD		Jπ: ΔJ=2, Q γ to (31/2+); band member.
4598.3+x[h] *6*	(35/2+)	CD		Jπ: in-band gammas to (33/2+) and (31/2+).
4602.3[j] *4*	(33/2+)	CD		Jπ: in-band gammas to (31/2+) and (29/2+).
4907.1[a] *4*	(35/2−)	D		Jπ: γ to (31/2−); band member.
5046.6[i] *6*	(35/2+)	C		Jπ: in-band gammas to (33/2+) and (31/2+).
5060.9+x[g] *6*	(37/2+)	CD		Jπ: in-band gammas to (35/2+) and (33/2+).
5081.9[d] *7*	(37/2+)	CD		Jπ: ΔJ=2, Q γ to (33/2+); band member.

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Adopted Levels, Gammas (continued)

^{129}La Levels (continued)

E(level)[†]	Jπ[§]	XREF	$T_{1/2}$[#]	Comments
5360.8[@] *8*	(39/2−)	CD	0.37 ps *10*	Jπ: ΔJ=2, E2 γ to (35/2−); band member.
5476.7[c] *6*	(39/2+)	CD		Jπ: ΔJ=2, Q γ to (35/2+); band member.
5507.0[j] *6*	(37/2+)	C		Jπ: in–band gammas to (35/2+) and (33/2+).
5564.2+x[h] *7*	(39/2+)	C		Jπ: in–band gammas to (37/2+) and (35/2+).
5934.2[i] *7*	(39/2+)	C		Jπ: in–band gammas to (37/2+) and (39/2+).
6064.9[d] *12*	(41/2+)	C		Jπ: in–band γ to 37/2+; band member.
6092.5+x[g] *8*	(41/2+)	C		Jπ: in–band gammas to (39/2+) and (37/2+).
6338.2?[j] *8*	(41/2+)	C		Jπ: in–band gammas to (39/2+) and (37/2+).
6488.0[c] *8*	(43/2+)	C		Jπ: in–band ΔJ=2, Q γ to (39/2+).
6515.5[@] *10*	(43/2−)	C		Jπ: in–band ΔJ=2, Q γ to (39/2−).
6638.5+x[h] *9*	(43/2+)	C		Jπ: in–band gammas to (41/2+) and (39/2+).
6757.2?[i] *8*	(43/2+)	C		Jπ: in–band gammas to (41/2+) and (39/2+).
7133.9[d] *16*	(45/2+)	C		Jπ: in–band γ to (41/2+); band member.
7565.4[c] *9*	(47/2+)	C		Jπ: in–band ΔJ=2, Q γ to (43/2+).
7674.5[@] *14*	(47/2−)	C		Jπ: γ to (43/2−); band member.
8242.9[d] *19*	(49/2+)	C		Jπ: γ to (45/2+); band member.
8657.7[c] *10*	(51/2+)	C		Jπ: in–band ΔJ=2, Q γ to (47/2+).
8856.5[@] *17*	(51/2−)	C		Jπ: γ to (47/2−); band member.
9425.9[d] *19*	(53/2+)	C		Jπ: γ to (49/2+); band member.
9772.9[c] *13*	(55/2+)	C		Jπ: γ to 51/2+; band member.
10085.5[@] *20*	(55/2−)	C		Jπ: γ to (51/2−); band member.
10952.9[c] *16*	(59/2+)	C		Jπ: γ to (55/2+); band member.
11380.5[@] *22*	(59/2−)	C		Jπ: γ to (55/2−); band member.
12196.9[c] *19*	(63/2+)	C		Jπ: γ to (59/2+); band member.
13502.9[c] *21*	(67/2+)	C		Jπ: γ to (63/2+); band member.
14920.9[c] *24*	(71/2+)	C		Jπ: γ to (67/2+); band member.
16478[c] *3*	(75/2+)	C		Jπ: γ to (71/2+); band member.

[†] From least–squares fit to adopted Eγ values.

[‡] In 1995Ku29 two different levels are assumed to be depopulated by the two γ rays from this level probably by mistake. They are within the experimental uncertainties, thus evaluators adopt only one level.

[§] from γ decay to levels with known Jπ assuming E1, M1 or E2 transitions unless otherwise noted. For the first three levels 3/2+, 5/2+ and 11/2− spin–parity values are adopted on the basis of the measured M1 and E3 multipolarities of the linking γ rays (1969Al05) in agreement with the level systematics and the theoretical expectations. The spin–parities of the higher–lying levels are determined relative to these spin–parities. For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

[#] from DSAM (2008Sa36) unless otherwise noted.

[@] (A): π1/2[550],α=−1/2.

[&] (B): π1/2[550],α=+1/2.

[a] (C): π3/2[541],α=−1/2.

[b] (D): π3/2[541],α=+1/2.

[c] (E): π3/2[422]⊗π$h_{11/2}{}^2$,α=−1/2.

[d] (F): π3/2[422]⊗π$h_{11/2}{}^2$,α=+1/2.

[e] (G): π(3/2[422]+1/2[420]),α=−1/2. Strongly coupled one–quasiproton band with admixture of of 3/2[422] and 1/2[420] proton configurations.

[f] (H): π(3/2[422]+1/2[420]),α=+1/2. Strongly coupled one–quasiproton band with admixture of of 3/2[422] and 1/2[420] proton configurations.

[g] (I): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

[h] (J): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

[i] (K): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

[j] (L): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

γ(^{129}La)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	δ	α[@]	Comments
68.18	68.20 *6*	100	M1[§]		3.25	α(K)=2.78 *4*; α(L)=0.378 *6*; α(M)=0.0786 *12*. α(N)=0.01728 *25*; α(O)=0.00281 *4*; α(P)=0.000217 *3*. Mult.: also from α(L)exp in 1969Al05.

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Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	δ	α[@]	Comments
172.33	104.0 *3*	100	E3		20.8 *5*	α(K)=5.24 *9*; α(L)=12.1 *3*; α(M)=2.79 *6*. α(N)=0.591 *13*; α(O)=0.0817 *18*; α(P)=0.000262 *5*. Eγ: from 1973Le09. ΔEγ estimated by the evaluators. Mult.: from α(L)exp (1969Al05). B(E3)(W.u.)=0.76 *8*.
216.30	148.2 *3*	100				
239.62	171.5 *1*	100.0 *7*	M1[§]		0.238	α(K)=0.203 *3*; α(L)=0.0273 *4*; α(M)=0.00567 *8*. α(N)=0.001247 *18*; α(O)=0.000203 *3*; α(P)=1.582×10^{-5} *23*.
	239.5 *2*	6.9 *3*				
248.45	180.4 *1*	100.0 *20*	M1[§]		0.207	α(K)=0.1771 *25*; α(L)=0.0237 *4*; α(M)=0.00493 *7*. α(N)=0.001084 *16*; α(O)=0.0001764 *25*; α(P)=1.376×10^{-5} *20*.
	248.5 *2*	17 *3*	(E2)[§]		0.0862	α(K)=0.0683 *10*; α(L)=0.01415 *21*; α(M)=0.00303 *5*. α(N)=0.000653 *10*; α(O)=9.88×10^{-5} *15*; α(P)=4.42×10^{-6} *7*.
270.92	271.0 *2*	100				
398.48	127.6 *3*	7.0 *23*				
	158.9 *1*	51.2 *23*	M1,E2[§]		0.34 *5*	α(K)=0.269 *18*; α(L)=0.058 *25*; α(M)=0.013 *6*. α(N)=0.0027 *12*; α(O)=0.00041 *16*; α(P)=1.83×10^{-5} *13*.
	330.3 *2*	100 *5*	M1,E2[§]		0.038 *4*	α(K)=0.032 *4*; α(L)=0.00485 *23*; α(M)=0.00102 *6*. α(N)=0.000222 *11*; α(O)=3.52×10^{-5} *9*; α(P)=2.3×10^{-6} *4*.
	398.5 *2*	84 *5*	M1,E2[§]		0.023 *3*	α(K)=0.019 *3*; α(L)=0.00277 *9*; α(M)=0.000580 *14*. α(N)=0.000127 *4*; α(O)=2.02×10^{-5} *10*; α(P)=1.4×10^{-6} *3*.
440.25	191.8 *2*	2.8 *14*				
	201.0 *5*	11.0 *20*				
	372.2 *2*	100 *8*	M1[§]		0.0302	α(K)=0.0259 *4*; α(L)=0.00340 *5*; α(M)=0.000704 *10*. α(N)=0.0001549 *22*; α(O)=2.53×10^{-5} *4*; α(P)=1.99×10^{-6} *3*.
	440.1 *2*	61 *3*	(E2)[§]		0.0147	α(K)=0.01226 *18*; α(L)=0.00196 *3*; α(M)=0.000413 *6*. α(N)=8.98×10^{-5} *13*; α(O)=1.408×10^{-5} *20*; α(P)=8.60×10^{-7} *12*.
442.08	269.7 *3*	100	E2		0.0660	α(K)=0.0528 *8*; α(L)=0.01044 *16*; α(M)=0.00223 *4*. α(N)=0.000481 *7*; α(O)=7.32×10^{-5} *11*; α(P)=3.47×10^{-6} *5*. B(E2)(W.u.)=107 *5*.
446.33	197.9 *2*	69 *3*	M1[§]		0.1608	α(K)=0.1376 *20*; α(L)=0.0184 *3*; α(M)=0.00382 *6*. α(N)=0.000840 *12*; α(O)=0.0001367 *20*; α(P)=1.068×10^{-5} *16*. Mult.: also DCO (1972He03).
	378.1 *2*	100 *12*	Q			Mult.: from DCO (1972He03).
464.02	215.6 *2*	24 *6*	M1(+E2)[§]		0.133 *6*	α(K)=0.1082 *18*; α(L)=0.019 *5*; α(M)=0.0041 *12*. α(N)=0.00089 *23*; α(O)=0.00014 *3*; α(P)=7.6×10^{-6} *9*.
	395.8 *2*	100 *3*	M1,E2[§]		0.023 *3*	α(K)=0.019 *3*; α(L)=0.00283 *9*; α(M)=0.000591 *13*. α(N)=0.000129 *4*; α(O)=2.06×10^{-5} *10*; α(P)=1.4×10^{-6} *3*.
	464.0 *2*	21 *3*				
472.21	256.0 *3*	100 *15*				

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Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	δ	α@	Comments
472.21	404.0 *2*	62 *8*				
	472.2 *2*	77 *8*				
556.00?	556.0 *2*	100				
587.64	519.5 *2*	100 *4*				
	587.6 *2*	92 *8*				
619.61	179.1 *4*	66 *31*				
	221.5 *3*	47 *13*				
	348.5 *3*	34 *6*				
	370.7 *5*	19 *9*				
	380.1 *2*	59 *13*				
	551.3 *3*	100 *19*				
645.53	199.5 *3*	21 *7*	(M1+E2)		0.168 *12*	α(K)=0.136 *3*; α(L)=0.025 *8*; α(M)=0.0054 *17*. α(N)=0.0012 *4*; α(O)=0.00018 *5*; α(P)=9.5×10^{-6} *10*.
	397.3 *3*	73 *13*				
	405.7 *2*	100 *9*				
	577.3 *2*	88 *10*				
652.5	254.0 *5*	100 *25*				
	414 *1*	25 *13*				
	584.0 *5*	75 *25*				
696.56	250.2 *3*	32 *6*	D#			
	448.2 *3*	100 *9*				
706.43	242.5 *5*	28 *7*				
	260.0 *2*	7.0 *23*				
	308.1 *3*	37 *12*				
	458.5 *5*	23 *7*				
	466.7 *2*	100 *5*				
	638.3 *2*	14.0 *23*				
782.3	318.0 *5*	100 *22*				
	336.0 *5*	100 *22*				
	342 *1*	22 *11*				
	543.1 *5*	33 *11*				
796.21	548.0 *2*	17 *6*				
	728.0 *2*	94 *11*				
	796.0 *2*	100 *11*				
832.32	584.0 *2*	100 *6*				
	764.0 *2*	63 *19*				
916.64	474.3 *3*	100	E2		0.01193	B(E2)(W.u.)=100 *15*. α(K)=0.00997 *14*; α(L)=0.001556 *22*; α(M)=0.000327 *5*. α(N)=7.12×10^{-5} *10*; α(O)=1.120×10^{-5} *16*; α(P)=7.04×10^{-7} *10*.
928.93	232.4 *3*	23 *4*				
	482.6 *2*	75 *13*				
	680.5 *3*	100 *50*				
934.93	536.6 *3*	100 *30*				
	664.0 *3*	24 *6*				
	866.6 *3*	24 *12*				
966.34	897.9 *2*	100 *22*				
	966.6 *2*	100 *11*				
992.41	546.1 *3*	100 *9*	(M1+E2)			α=0.0098 *17*; α(K)=0.0084 *16*; α(L)=0.00115 *13*; α(M)=0.00024 *3*. α(N)=5.2×10^{-5} *6*; α(O)=8.5×10^{-6} *11*; α(P)=6.2×10^{-7} *14*.
	552.4 *3*	71 *14*				
	743.9 *3*	27 *10*				
1015.26	616.7 *2*	100 *23*				
	744.5 *2*	54 *8*				
	1015.1 *3*	15 *8*				
1021.79	325.3 *3*	16 *4*	(M1+E2)		0.0422 *6*	
	575.4 *3*	100 *10*	Q			
1120.18	678.2 *3*	100 *10*				
	947.8 *2*	30 *8*				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	E$\gamma^{\dagger}$	I$\gamma^{\dagger}$	Mult.‡	δ	$\alpha^{@}$	Comments
1120.5?	678.4$^{\&}$ *2*	100				
1234.19	537.7 *3*	9 *4*				
	588.6 *3*	100 *10*				
1275.09	833.0 *2*					
1304.94	388.4 *2*	22 *5*	D			
	862.9 *3*	100 *10*	M1+E2	−0.91 *+8−9*		
1315.78	294.1 *3*	6.5 *15*				
	619.0 *3*	100 *9*	Q			
1328.8	886.7 *3*					
1524.31	502.5 *3*	29 *9*				
	595.4 *3*	100 *11*				
1558.03	641.4 *3*	100	(E2)			B(E2)(W.u.)<110.
1586.62	466.5 *3*	12 *3*				
	670.1 *3*	100 *9*	M1+E2	+0.5 *+2−1*		
	1144.5 *3*	14 *3*				
1651.1	1209.0 *3*					
1654.17	632.4 *2*	55 *13*				
	661.7 *3*	100 *11*	D+Q	+0.3 *2*		
1724.96	703.1 *2*	10 *3*				
	732.7 *3*	23 *5*				
	1282.8 *3*	100 *10*	D+Q	+0.3 *2*		
1753.2?	1311.1 *3*					
1753.4	731.6 *3*		Q			
1803.0	810.7 *3*					
1851.24	264.8 *3*	22 *5*				
	546.4 *3*	78 *19*				
	934.5 *3*	79 *18*	(D)			
	1409.2 *3*	100 *12*	Q			
1949.58	391.5 *3*	21 *8*				
	644.7 *3*	41 *13*				
	1033.0 *2*	100 *12*	M1+E2	−0.7 *+2−8*		
1951.5	393.5 *3*					
1956.5	722.3 *3*					
1972.2	667.3 *3*					
	1055.5 *3*					
	1530.2 *3*					
1985.0	669.0 *5*	46 *12*				
	1067.8 *5*	100 *16*				
2003.8	1561.7 *3*					
2069.9	754.0 *3*	100	Q$^{\#}$			
2118.2	1201.6 *3*	100				
2169.8	864.9 *3*	100	D			
2206.4	1289.8 *3*	100				
2218.90	903.2 *3*					
	1098.7 *2*					
	1197.0 *3*	100 *18*	M1+E2	+0.21 *+7−4*		
	1522.4 *2*	45 *18*				
	1776.7 *3*	40 *18*				
2221.5	370.3 *3*	21 *5*				
	634.8 *3*	100 *10*				
	663.4 *3*	58 *12*	M1+E2	+0.8 *+12−4*		
	1304.8 *5*					
2242.7	439.8 *3*					
	517.7 *3*					
	718.4 *3*					
	926.9 *3*		M1+E2	−0.3 *+2−3*		
	967.6 *2*					
	1008.5 *3*					
	1221.0 *3*		Q			
	1326.0 *3*					
	1800.5 *3*					
2277.9	1361.3 *3*	100				
2290.9	1374.3 *2*					

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[@]	Comments
2297.6+x	55.9 *3*	100			
2298.1	544.4 *3*				
	1856.2 *3*				
2343.2	785.3 *3*	100	E2		B(E2)(W.u.)=60 *15*.
2351.8	1435.2 *3*	100	(D)		
2408.3+x	110.7 *3*	100	M1+E2[#]	0.857 *15*	
2431.2	445.8 *3*	62 *8*	(Q)[#]		
	873.1 *3*	100 *12*	(D)[#]		
2452.8	1536.2 *2*	100			
2453.7	895.7 *3*	100			
2462.6	1546.0 *4*				
2474.76	525.2 *2*	54 *12*			
	623.7 *3*	100 *10*			
	916.9 *2*	29 *8*			
	1557.8 *3*	81 *18*	Q		
2478.0	493.1 *3*	28 *6*			
	724.8 *3*				
	919.7 *3*	100 *9*			
2490.0	1573.4 *3*	100			
2520.3	962.3 *2*	100			
2568.4	216.6 *3*	100	(M1+E2)[#]	0.127 *2*	
	398.7 *3*				
2572.7+x	164.5 *3*	100	(M1+E2)[#]	0.273 *5*	
2598.8	845.4 *2*				
2681.3	927.9 *2*	100			
2705.1	1147.1 *2*	100			
2729.5	1171.5 *2*	100			
2767.6	1014.2 *3*	100			
2783.8	352.5 *3*	93 *20*			
	1225.9 *3*	100 *12*			
2789.7	840.2 *3*	97 *25*			
	1231.4 *3*	100 *13*			
2794.1+x	221.5 *3*	100 *7*	M1+E2[#]	0.119 *2*	
	385.7 *3*	5.0 *10*			
2803.0	1886.3 *2*				
2822.6	254.3 *3*	100 *10*	(M1+E2)[#]	0.0817 *12*	
	1264.6 *3*	62 *15*			
2841.0	771.0 *3*	100	Q[#]		
2864.1	1306.1 *3*				
2909.7	431.7 *3*	26 *5*			
	478.3 *3*	100 *9*	M1+E2[#]	0.0154	
	566.5 *2*				
2911.1	1994.4 *2*				
2943.1	873.2 *3*	100			
2955.2	733.7 *3*	100			
2955.7?	612.5 *2*	100			Eγ: from level scheme figure of 1995Ku29. E=611.9 *2* in table.
3017.7	586.2 *3*	100 *9*	Q		
	674.5 *3*	25 *5*	(D)		
3043.8	1485.8 *3*				
3071.0+x	277.0 *3*	100 *9*	(M1+E2)[#]	0.0648 *10*	
	498.3 *3*	12.1 *14*			
3096.0	273.5 *3*	74 *16*	(M1+E2)[#]	0.0671 *10*	
	306.2 *3*	100 *16*	(M1+E2)[#]	0.0496 *7*	
3124.4	2207.7 *3*	100			
3215.3	740.9 *3*	100 *11*			
	1657.3 *3*	47 *12*	Q		
3253.5	910.5 *3*	100	E2[#]		B(E2)(W.u.)=58 *12*.
3286.8	2370.1 *3*	100			
3309.8	966.6 *3*	100			
3375.9	1032.7 *2*	100			
3382.8	1039.6 *2*	100			
3394.0+x	323.0 *3*	100 *7*	M1+E2[#]	0.0431 *7*	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	α[@]	Comments
3394.0+x	599.8 *3*	27 *4*			
3411.2	501.5 *2*				
	627.5 *3*				
3420.6	325.1 *3*	100	(M1+E2)[#]	0.0423 *6*	α(K)=0.033 *4*; α(L)=0.0051 *3*; α(M)=0.00107 *7*. α(N)=0.000233 *13*; α(O)=3.69×10^{-5} *11*; α(P)=2.4×10^{-6} *5*.
3474.7	633.8 *3*				
	1131.4 *2*				
3476.8	459.0 *3*	100 *19*	D[#]		
	566.9 *3*	85 *22*			
3482.3	1139.1 *2*	100			
3523.1	1179.9 *2*	100			
3531.2	2614.5 *3*	100			
3636.6	1293.4 *3*	100			
3694.9	853.8 *2*				
	1351.9 *3*				
3697.1	856.1 *3*				
3712.1	1368.9 *3*	100			
3731.7	714.0 *3*	100	Q[#]		
3759.4+x	365.5 *3*	100 *7*	M1+E2[#]	0.0311 *5*	
	688.4 *3*	44 *5*			
3760.2	805.0 *3*				
3783.5	362.5 *3*	100 *18*	M1+E2[#]	0.0318 *5*	
	687.3 *2*	96 *18*			
3857.8	1514.6 *3*				
3952.0	1608.8 *3*				
3998.1	744.5 *3*				
4000.3	746.9 *3*				
	1656.9 *3*				
4042.7	565.8 *2*				
	827.7 *3*				
4159.1+x	399.9 *3*	100 *8*	(M1+E2)[#]	0.0247 *4*	
	765.2 *3*	59 *8*			
4176.7	392.5 *3*	100 *16*	M1+E2[#]	0.0259 *4*	
	756.4 *2*	76 *16*			
4198.8	467.0 *3*	33 *8*	(M1+E2)[#]	0.0166 *3*	
	722.1 *3*	100 *17*	Q[#]		
4266.8	1013.2 *3*	100	E2[#]		B(E2)(W.u.)=27 *7*.
4296.9	1043.3 *3*				
4555.0	823.3 *3*	100	Q		
4598.3+x	439.4 *3*	100 *9*			
	838.6 *3*	72 *11*			
4602.3	425.7 *2*	100 *23*			
	818.7 *3*	89 *17*			
4907.1	864.4 *3*	100			
5046.6	444.6 *6*	100 *19*			
	869.5 *8*	100 *19*			
5060.9+x	462.5 *4*	79 *9*			
	901.6 *5*	100 *15*			
5081.9	883.1 *6*	100	Q[#]		
5360.8	1094.0 *6*	100	E2[#]		B(E2)(W.u.)=25 *7*.
5476.7	921.7 *3*	100	Q[#]		
5507.0	460.6 *6*	78 *17*			
	904.5 *7*	100 *23*			
5564.2+x	502.9 *5*	69 *12*			
	966.1 *4*	100 *20*			
5934.2	427.4 *6*	87 *20*			
	887.5 *7*	100 *20*			
6064.9	983	100			
6092.5+x	528.0 *6*	100 *23*			
	1032.1 *7*	80 *30*			
6338.2?	404.0 *6*	100 *17*			
	831[&]				
6488.0	1011.3 *5*	100	Q[#]		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}La) (continued)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]
6515.5	1154.7 *6*	100	Q[#]
6638.5+x	546.1 *6*	100 *25*	
	1074.1 *9*	90 *40*	
6757.2?	418.9 *6*	100 *17*	
	823.0[&] *3*		
7133.9	1069		
7565.4	1077.4 *5*	100	Q[#]
7674.5	1159		
8242.9	1109		
8657.7	1092.2 *5*	100	Q[#]
8856.5	1182	100	
9425.9	1183		
9772.9	1115.2 *7*	100	
10085.5	1229		
10952.9	1180		
11380.5	1295		
12196.9	1244		
13502.9	1306		
14920.9	1418		
16478	1557		

[†] From weighted averages of available values in 1997Gi08, 2001Xi01 and 1995Ku29 wherever available. In other cases, values are taken from 1992He03 or 2000Wa28.

[‡] From γ(θ) and γγ(θ) data in high–spin experiments (1995Ku29), unless otherwise stated. For levels of known half–lives, RUL used to distinguish between E2, M2 and higher multipolarity transitions.

[§] From EKC, ELC and/or K/L ratios (1997Gi08).

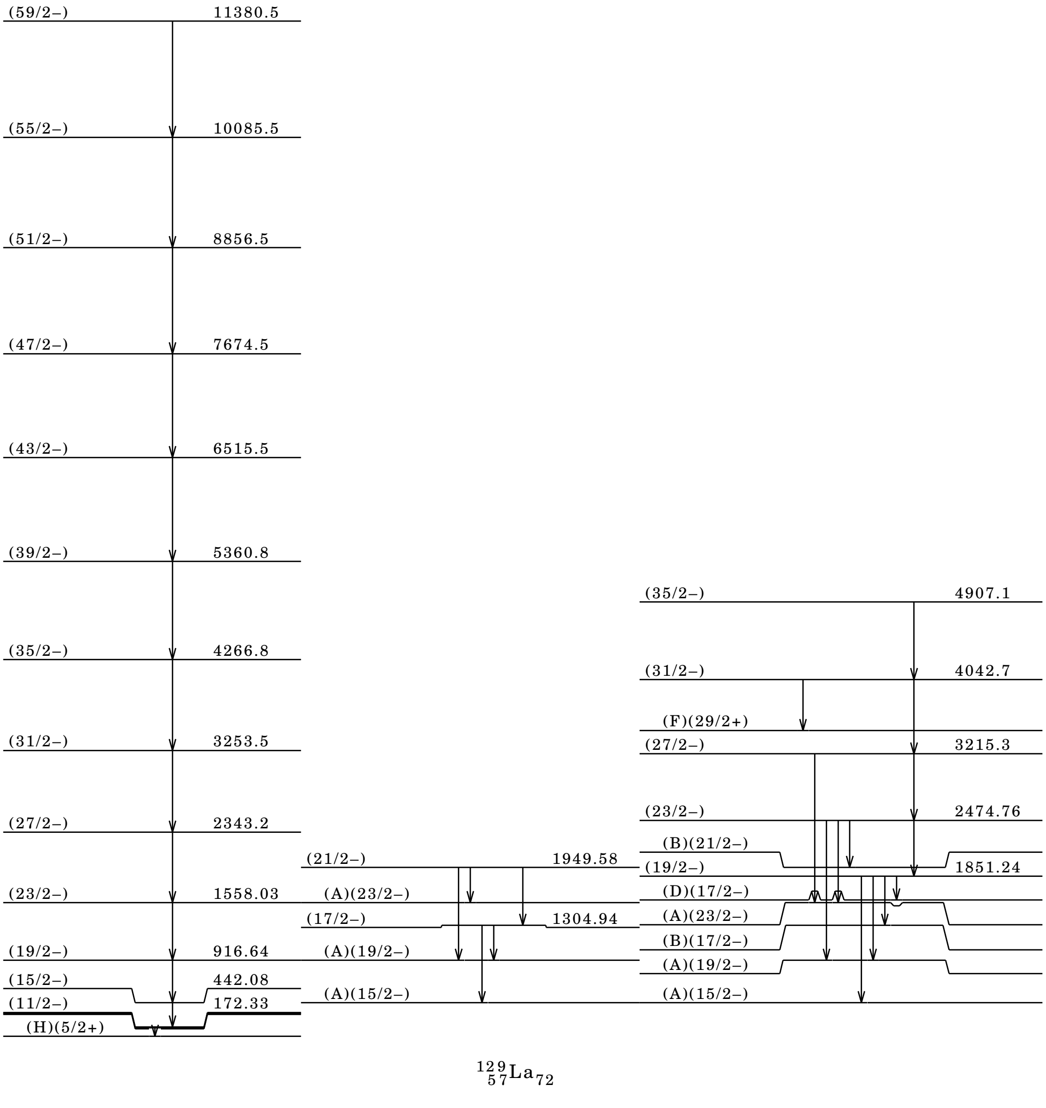
[#] From DCO ratio in 1992He03 and RUL for E2 and M2 transitions.

[@] δ(E2/M1)=0.3 assumed when not given for transitions from high–spin (J>13/2) levels.

[&] Placement of transition in the level scheme is uncertain.

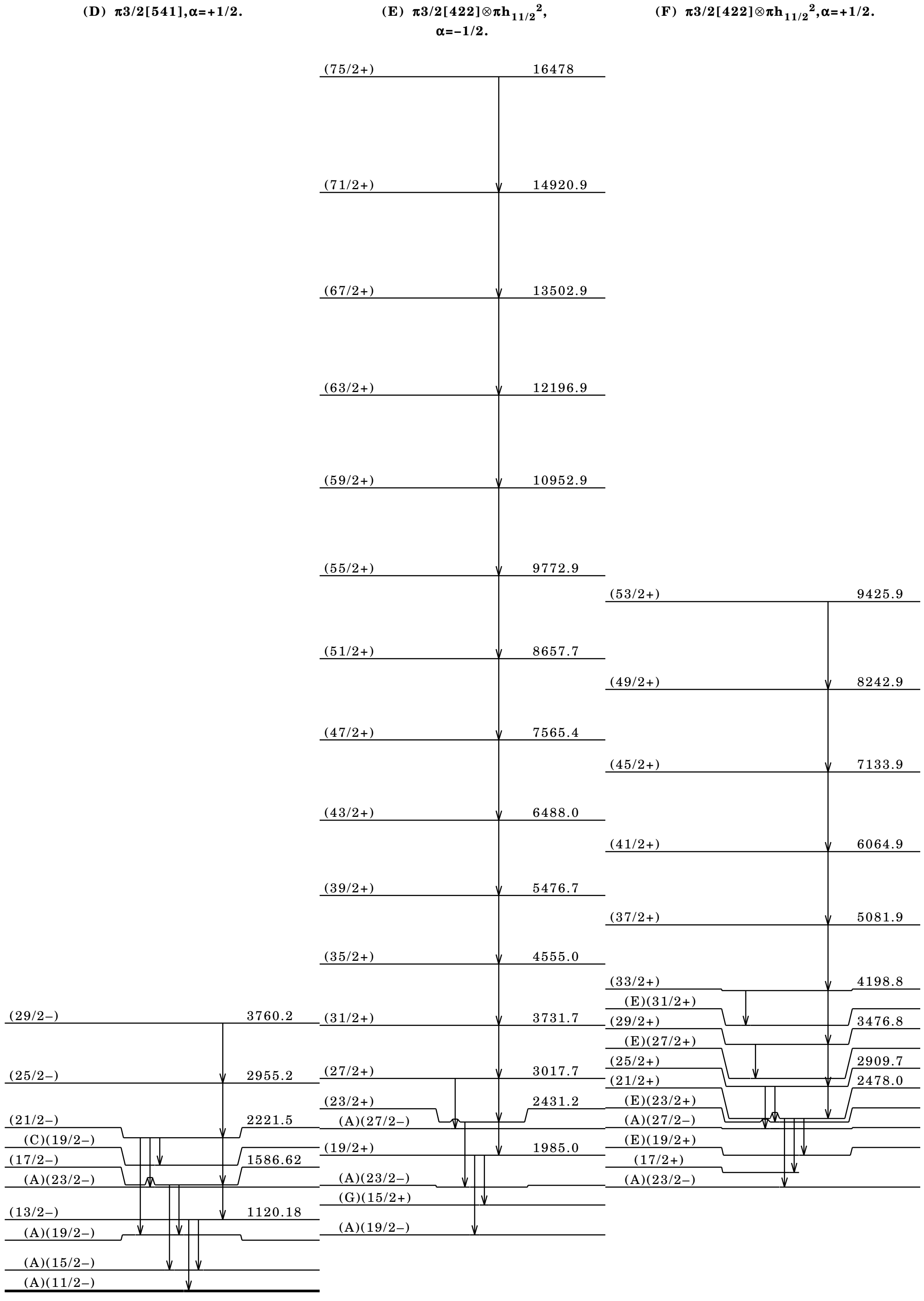
Adopted Levels, Gammas (continued)

(A) π1/2[550],α=–1/2. **(B) π1/2[550],α=+1/2.** **(C) π3/2[541],α=–1/2.**



From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)



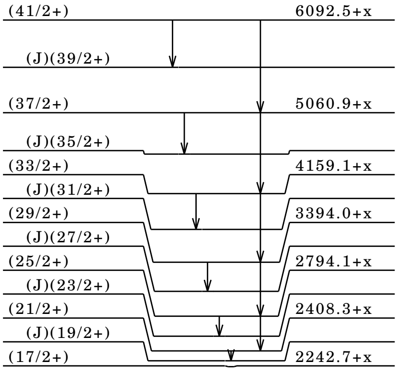
$^{129}_{57}La_{72}$

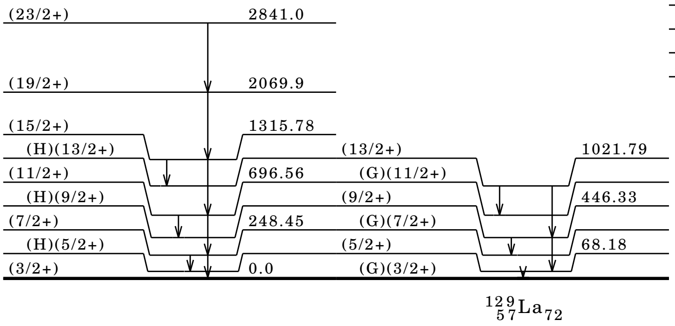
Adopted Levels, Gammas (continued)

(G) π(3/2[422]+1/2[420]),
α=−1/2.

(H) π(3/2[422]+1/2[420]),
α=+1/2.

(I)
π1/2[550]⊗ν7/2[523]⊗ν5/2[402],
α=−1/2.





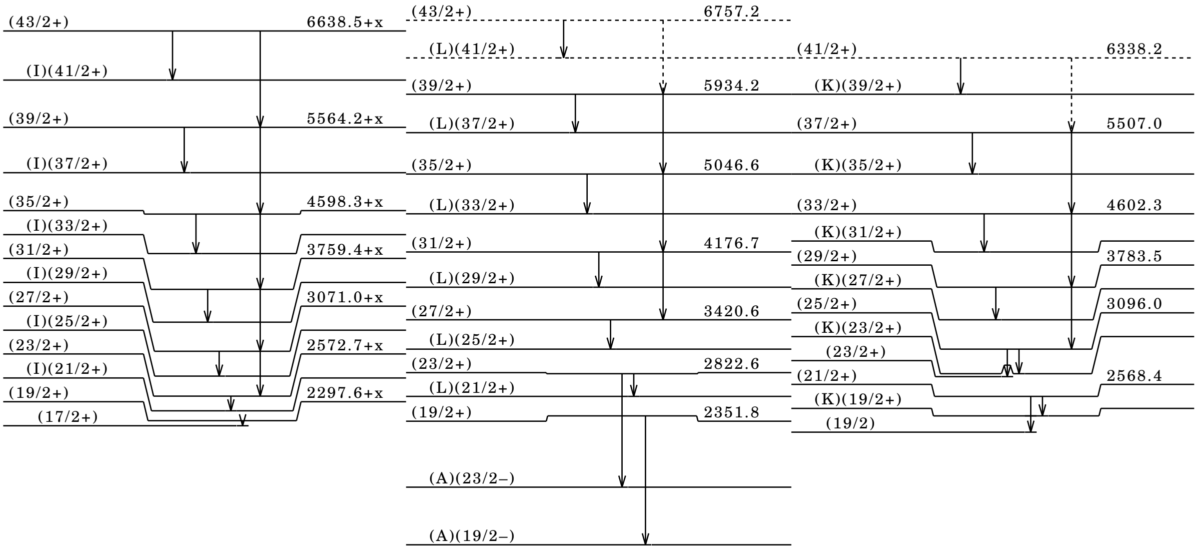
From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(J)
π1/2[550]⊗ν7/2[523]⊗ν5/2[402],
α=+1/2.

(K)
π1/2[550]⊗ν7/2[523]⊗ν5/2[402],
α=−1/2.

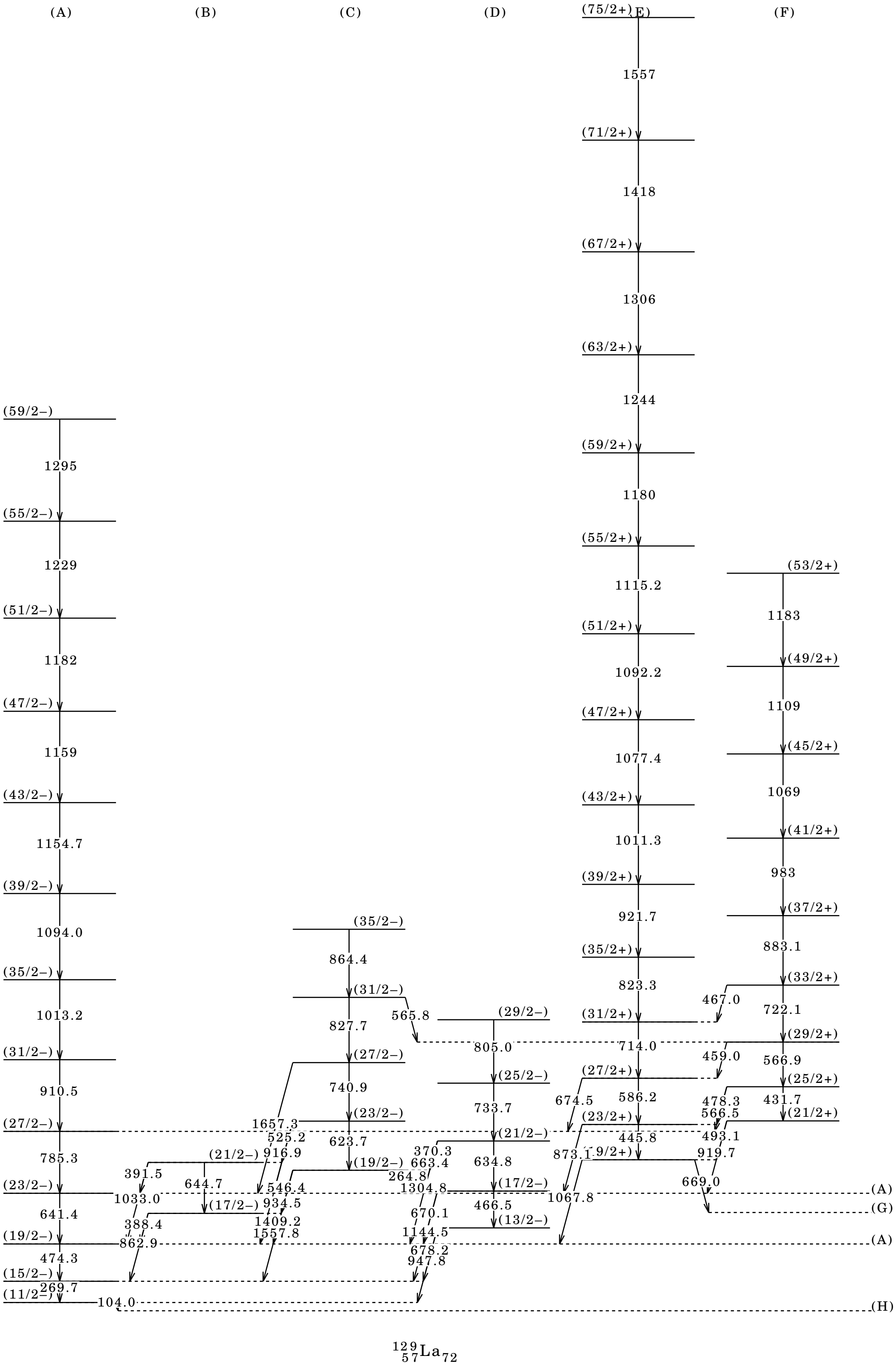
(L)
π1/2[550]⊗ν7/2[523]⊗ν5/2[402],
α=+1/2.



$^{129}_{57}$La$_{72}$

Adopted Levels, Gammas (continued)

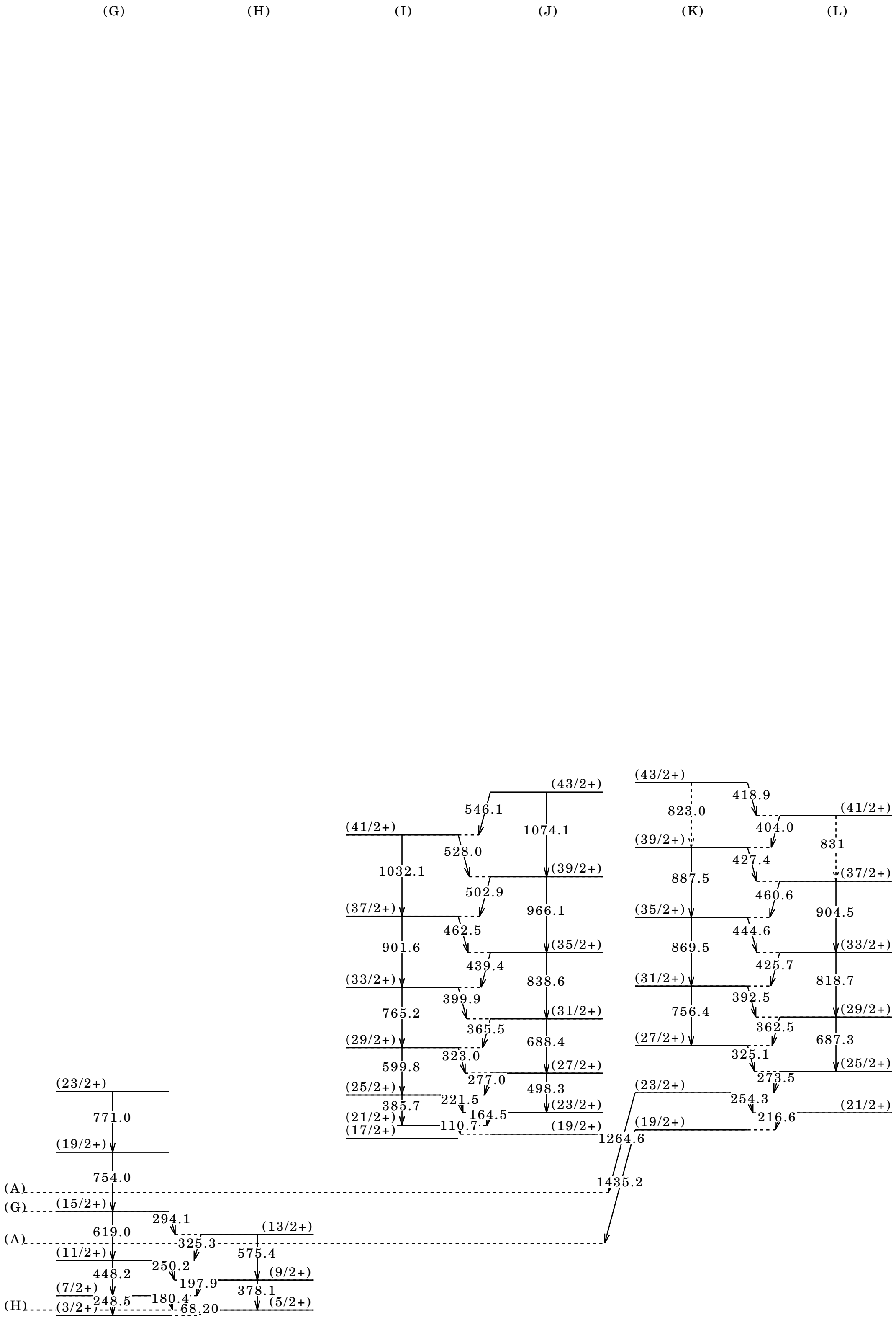
Bands for ^{129}La



$^{129}_{57}$La$_{72}$

Adopted Levels, Gammas (continued)

Bands for ^{129}La



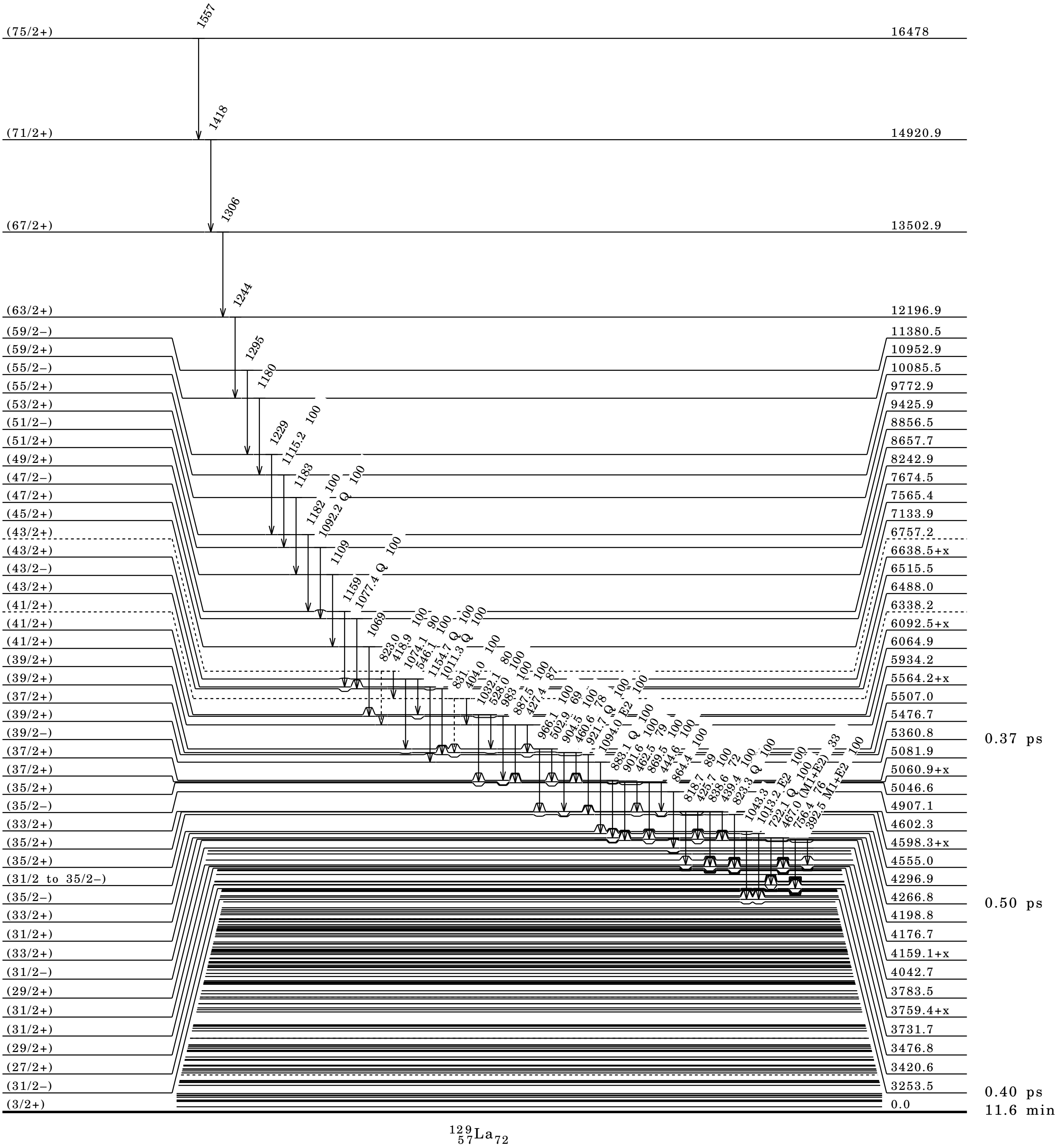
$^{129}_{57}$La$_{72}$

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

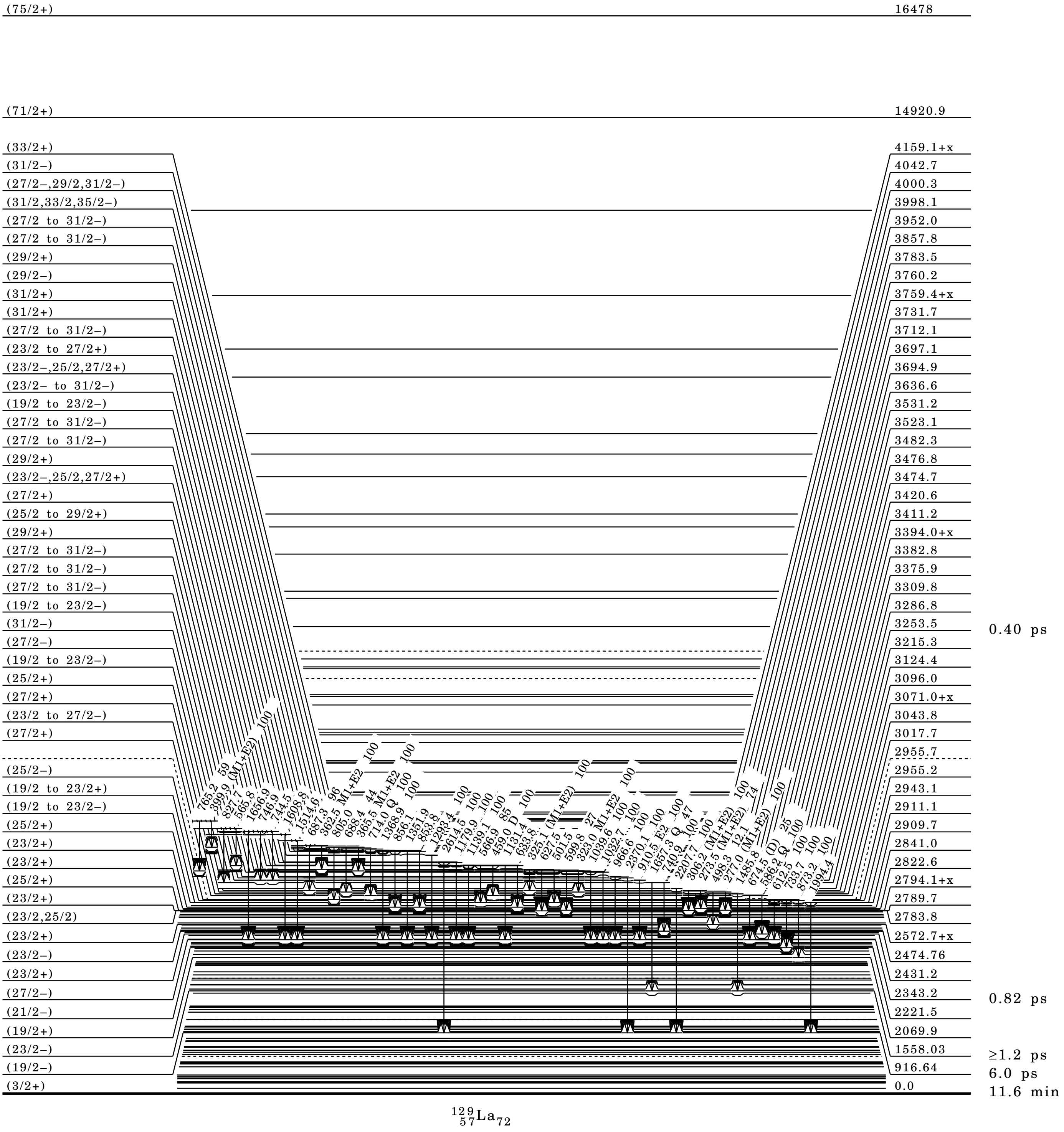
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

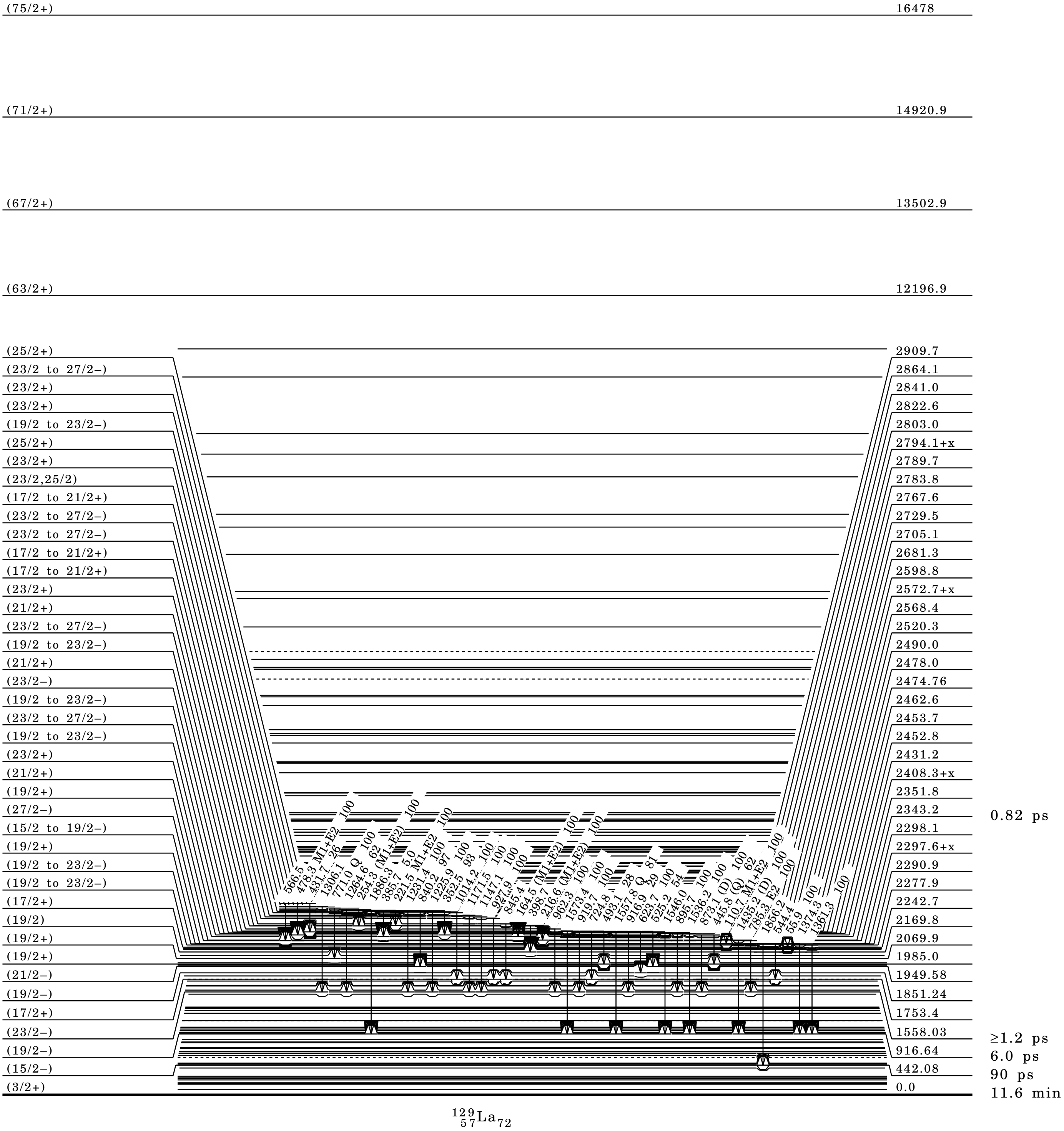
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level

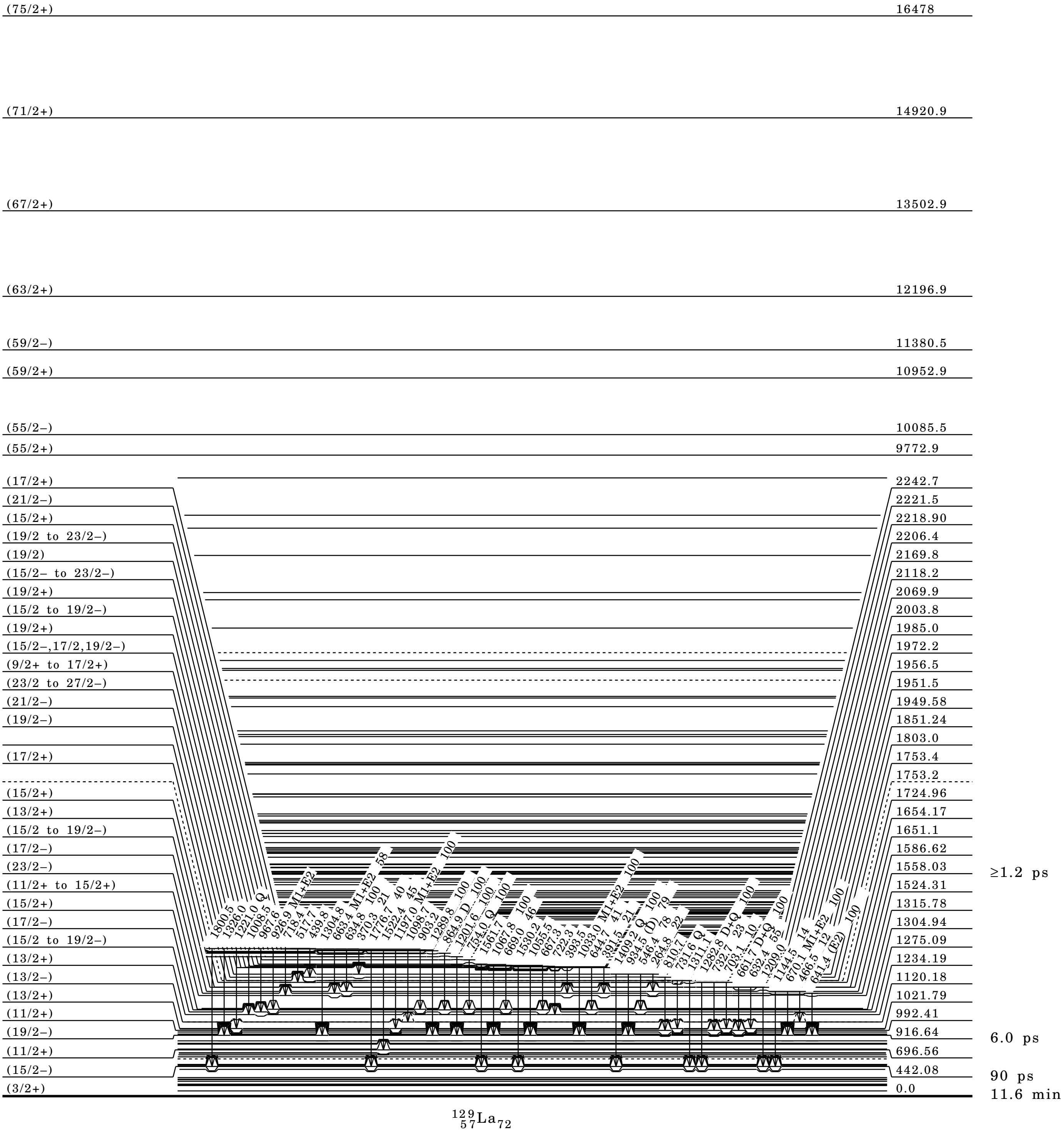


From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



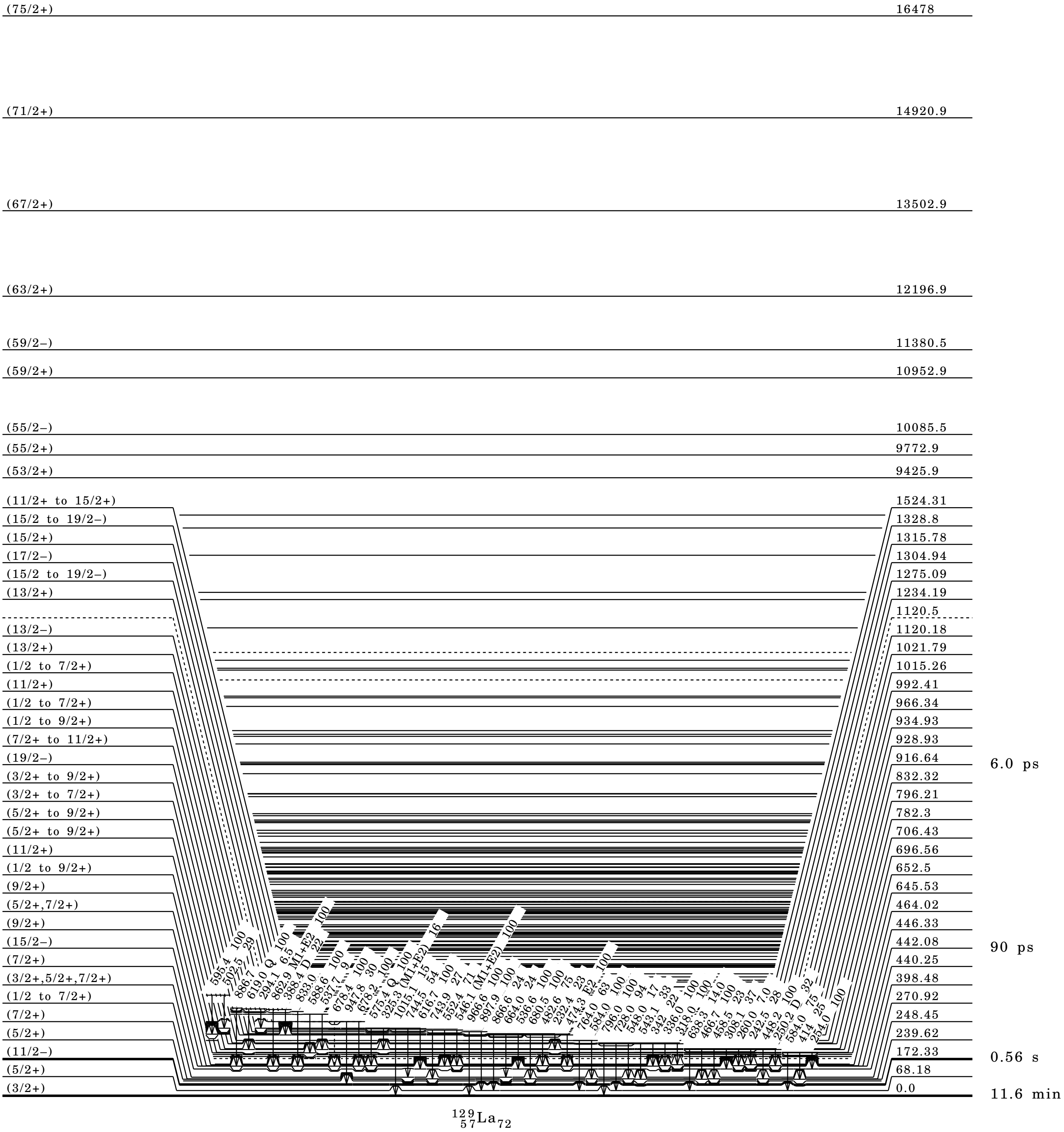
$^{129}_{57}La_{72}$

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

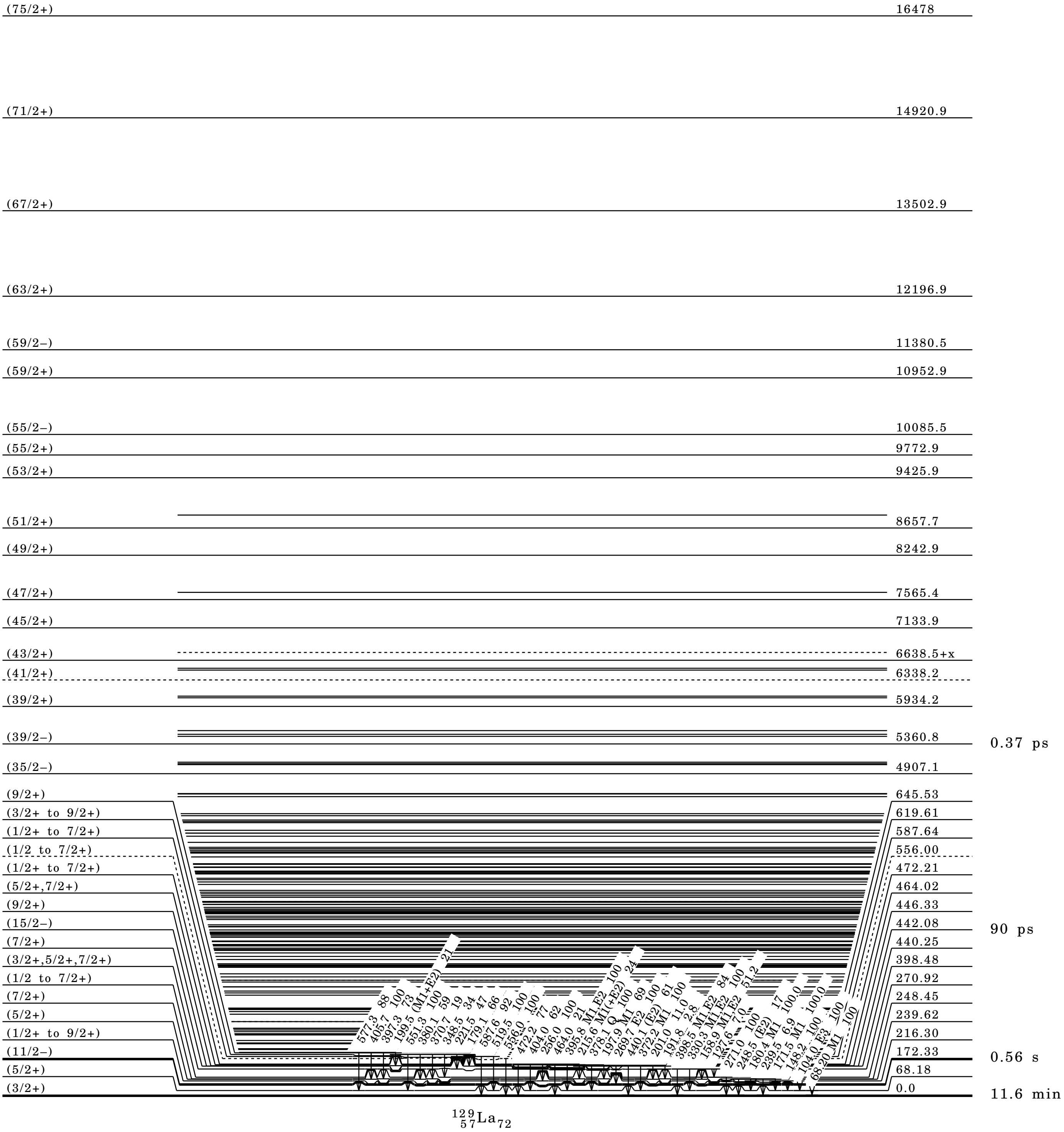
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



From NNDC(BNL)
program ENSDAT

^{129}La IT Decay (0.56 s) 1969Al05

Parent ^{129}La: E=172.33 *20*; Jπ=(11/2−); $T_{1/2}$=0.56 s *5*; %IT decay=100.

1969Al05: ^{121}Sb(^{12}C,4n), ^{118,119,120}Sn(^{14}N,xn), ^{115}In(^{18}O,4n), E=50–110 MeV; excitation function, semi γ, scin γ, semi ce, HI−γ(t), HI−ce(t).

Others: 1970Co05, 1973Le09, 1992He03.

^{129}La Levels

E(level)[†]	Jπ[†]	$T_{1/2}$[†]	Comments
0.0	(3/2+)	11.6 min *2*	
68.18 *5*	(5/2+)		
172.33 *20*	(11/2−)	0.56 s *5*	%IT=100. $T_{1/2}$: from 1969Al05. Other: 0.56 s *6* (1973Le09).

[†] From Adopted Levels.

γ(^{129}La)

Eγ[†]	E(level)	Iγ[‡]	Mult.	α	Comments
68.20 *6*	68.18	100	M1	3.25	Mult.: from α(L)exp=0.44 *20* (1969Al05). α(K)=2.78 *4*; α(L)=0.378 *6*; α(M)=0.0786 *12*. α(N)=0.01728 *25*; α(O)=0.00281 *4*; α(P)=0.000217 *3*.
104.0 *3*	172.33	18 *5*	E3	20.8 *5*	Mult.: from α(K)exp=5.7 *19*, K:L:M+N=51 *11*:100:26 *8* (1969Al05). α(K)=5.24 *9*; α(L)=12.1 *3*; α(M)=2.79 *6*. α(N)=0.591 *13*; α(O)=0.0817 *18*; α(P)=0.000262 *5*.

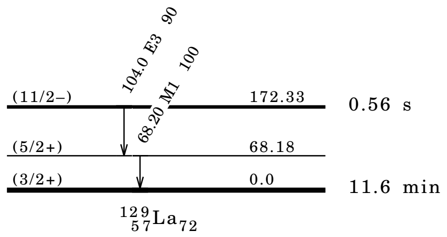
[†] From Adopted Gammas; 54.4–keV γ reported by 1970Co05 belongs to the ^{73}Ge IT decay ($T_{1/2}$=0.54 s) (1973Le09).

[‡] For absolute intensity per 100 decays, multiply by 0.238 *6*.

CITATION:
Nuclear Data Sheets (1996)

^{129}La IT Decay (0.56 s) 1969Al05 (continued)

Decay Scheme



^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01

Parent ^{129}Ce: E=0.0; Jπ=(5/2+); T$_{1/2}$=3.5 min *3*; Q(g.s.)=5040 *40*; %ε+%β$^+$ decay=100.

^{129}Ce–Q(ε): From 2012Wa38.

^{129}Ce–J,T$_{1/2}$: From ^{129}Ce Adopted Levels. For Jπ assignment of (5/2+) rather than 7/2+ as proposed in 1998Io01 based on 9/2− for 107.6–keV isomer, see discussion in Jπ comments for the 107.6–keV isomer and ground state in ^{129}Ce Adopted Levels.

1997Gi08: ^{129}Ce from ^{94}Mo(^{40}Ca,n4p),E=225 MeV; He–jet, Ge G, semi for ce. Measured Eγ, Iγ, γγ, βγ coin, xγ coin, (ce)γ coin, half–life. Deduced conversion coefficients, levels, J, π.

2001Xi01 (also 1997Xi01): ^{129}Ce from ^{117}Sn(^{16}O,4n),E=102 MeV; He–jet, chemical separation, Ge G . Measured Eγ, Iγ, γγ, βγ coin, xγ coin. Deduced levels, log *ft* values.

Both studies deduced level feeding intensities. There are disagreements between the two studies.

Others: 1993Al03, 1969ArZZ, 1963La03.

Experimental conversion coefficients are taken from 1997Gi08.

^{129}La Levels

E(level)[#]	Jπ[†]	T$_{1/2}$[†]
0.0	(3/2+)	11.6 min *2*
68.18 *5*	(5/2+)	
216.29[§] *23*	(1/2+ to 9/2+)	
239.61 *8*	(5/2+)	
248.45 *8*	(7/2+)	
270.91[§] *13*	(1/2 to 7/2+)	
398.47 *9*	(3/2+,5/2+,7/2+)	
440.26 *13*	(7/2+)	
446.34 *12*	(9/2+)	
464.02 *12*	(5/2+,7/2+)	
472.21[§] *14*	(1/2+ to 7/2+)	
556.00?[§] *20*	(1/2 to 7/2+)	
587.64[§] *14*	(1/2+ to 7/2+)	
619.60 *13*	(3/2+ to 9/2+)	
645.39 *15*	(9/2+)	
652.5[‡] *3*	(1/2 to 9/2+)	
706.46 *12*	(5/2+ to 9/2+)	
782.3[‡] *3*	(5/2+ to 9/2+)	
796.21[§] *12*	(3/2+ to 7/2+)	
832.31[§] *15*	(3/2+ to 9/2+)	
928.87[§] *19*	(7/2+ to 11/2+)	
934.92[§] *18*	(1/2 to 9/2+)	
966.34[§] *14*	(1/2 to 7/2+)	
1015.26[§] *15*	(1/2 to 7/2+)	

[†] From Adopted Levels.

[‡] Reported only in 1997Gi08.

[§] Reported only in 2001Xi01.

[#] From least–squares fit to Eγ data.

β$^+$,ε Data

Eε	E(level)	Iβ$^+$[§]	Iε[§]	Log *ft*[‡]	I(ε+β$^+$)[†][§]	Comments
(4020 *40*)	1015.26	0.70 *14*	0.30 *6*	6.8	1.0 *2*	av Eβ=1360 *19*; εK=0.252 *8*; εL=0.0344 *10*; εM+=0.0097 *3*.
(4070 *40*)	966.34	0.6 *1*	0.2 *1*	6.9	0.8 *2*	av Eβ=1383 *19*; εK=0.244 *7*; εL=0.0333 *10*; εM+=0.0093 *3*.
(4110 *40*)	934.92	0.86 *22*	0.34 *8*	6.7	1.2 *3*	av Eβ=1398 *19*; εK=0.238 *7*; εL=0.0326 *10*; εM+=0.0091 *3*.

Continued on next page (footnotes at end of table)

^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01 (continued)

β^+,ε Data (continued)

Eε	E(level)	Iβ$^+$§	Iε§	Log *ft*‡	I(ε+β$^+$)†§	Comments
(4110 *40*)	928.87	0.5 *1*	0.2 *1*	7.0	0.7 *2*	av Eβ=1401 *19*; εK=0.237 *7*; εL=0.0324 *10*; εM+=0.0091 *3*.
(4210 *40*)	832.31	0.89 *15*	0.31 *5*	6.8	1.2 *2*	av Eβ=1445 *19*; εK=0.222 *7*; εL=0.0303 *9*; εM+=0.00850 *24*.
(4240 *40*)	796.21	1.3 *1*	0.46 *5*	6.6	1.8 *2*	av Eβ=1462 *19*; εK=0.216 *6*; εL=0.0295 *9*; εM+=0.00829 *24*.
(4260 *40*)	782.3	2.4 *4*	0.81 *15*	6.4	3.2 *6*	av Eβ=1469 *19*; εK=0.214 *6*; εL=0.0293 *9*; εM+=0.00821 *24*.
(4330 *40*)	706.46	3.3 *5*	1.0 *1*	6.3	4.3 *6*	av Eβ=1504 *19*; εK=0.203 *6*; εL=0.0278 *8*; εM+=0.00779 *22*.
(4390 *40*)	652.5	1.8 *4*	0.53 *12*	6.6	2.3 *5*	av Eβ=1529 *19*; εK=0.196 *6*; εL=0.0268 *8*; εM+=0.00751 *21*.
(4390 *40*)	645.39	1.5 *2*	0.46 *7*	6.7	2.0 *3*	av Eβ=1533 *19*; εK=0.195 *6*; εL=0.0266 *8*; εM+=0.00747 *21*.
(4420 *40*)	619.60	4.0 *7*	1.1 *2*	6.3	5.1 *9*	av Eβ=1545 *19*; εK=0.192 *6*; εL=0.0262 *8*; εM+=0.00734 *21*.
(4450 *40*)	587.64	1.7 *2*	0.48 *7*	6.6	2.2 *3*	av Eβ=1560 *19*; εK=0.188 *6*; εL=0.0256 *7*; εM+=0.00718 *20*.
(4480# *40*)	556.00?	0.7 *1*	0.2 *1*	7.0	0.9 *1*	av Eβ=1574 *19*; εK=0.184 *5*; εL=0.0251 *7*; εM+=0.00703 *20*.
(4570 *40*)	472.21	1.2 *2*	0.31 *4*	6.9	1.5 *2*	av Eβ=1614 *19*; εK=0.174 *5*; εL=0.0237 *7*; εM+=0.00665 *18*.
(4580 *40*)	464.02	2.0 *4*	0.51 *10*	6.6	2.5 *5*	av Eβ=1617 *19*; εK=0.173 *5*; εL=0.0236 *7*; εM+=0.00661 *18*.
(4590# *40*)	446.34	1.3 *3*	0.32 *8*	6.8	1.6 *4*	av Eβ=1626 *19*; εK=0.171 *5*; εL=0.0233 *7*; εM+=0.00653 *18*. Log *ft*: value of 6.8 is too low to be realistic for 5/2+ to 9/2+ β transition.
(4600 *40*)	440.26	3.7 *7*	0.92 *18*	6.4	4.6 *9*	av Eβ=1629 *19*; εK=0.170 *5*; εL=0.0232 *7*; εM+=0.00650 *18*.
(4640 *40*)	398.47	1.0 *5*	0.25 *12*	7.0	1.3 *6*	av Eβ=1648 *19*; εK=0.165 *5*; εL=0.0226 *6*; εM+=0.00633 *17*.
(4770 *40*)	270.91	0.7 *2*	0.2 *1*	7.2	0.9 *2*	av Eβ=1708 *19*; εK=0.152 *4*; εL=0.0207 *6*; εM+=0.00582 *16*.
(4790 *40*)	248.45	3.4 *5*	0.72 *11*	6.5	4.1 *6*	av Eβ=1719 *19*; εK=0.150 *4*; εL=0.0204 *6*; εM+=0.00573 *16*.
(4800 *40*)	239.61	11 *2*	2.3 *4*	6.0	13 *2*	av Eβ=1723 *19*; εK=0.149 *4*; εL=0.0203 *6*; εM+=0.00570 *15*.
(4820# *40*)	216.29	<0.2	<0.05	>7.7	<0.3	av Eβ=1734 *19*; εK=0.147 *4*; εL=0.0200 *6*; εM+=0.00562 *15*.
(4970 *40*)	68.18	15 *3*	2.8 *5*	6.0	18 *3*	av Eβ=1803 *19*; εK=0.134 *4*; εL=0.0182 *5*; εM+=0.00511 *14*.
(5040 *40*)	0.0	22 *6*	3.9 *11*	5.84 *13*	26 *7*	av Eβ=1836 *19*; εK=0.128 *4*; εL=0.0175 *5*; εM+=0.00489 *13*. I(ε+β$^+$): estimated by 2001Xi01 from growth–decay curve for 278.6γ from ^{129}La decay.

† Values treated by the evaluators as approximate since there are several disagreements between the data from 1997Gi08 and 2001Xi01. The β feeding to ground–state in 2001Xi01 seems to be only an estimated value.

‡ Values are treated as only approximate and not used for Jπ assignments.

§ Absolute intensity per 100 decays.

\# Existence of this branch is questionable.

γ(^{129}La)

Eγ†	E(level)	Iγ‡&	Mult.	α	Comments
68.20 *6*	68.18	30.7	M1	3.25	α(L)exp=0.36 *3*. α(K)=2.78 *4*; α(L)=0.378 *6*; α(M)=0.0786 *12*. α(N)=0.01728 *25*; α(O)=0.00281 *4*; α(P)=0.000217 *3*. Iγ: calculated from I(γ+ce)=100 (2001Xi01) using α=3.25 from BrIcc code.

Continued on next page (footnotes at end of table)

^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01 (continued)

γ(^{129}La) (continued)

Eγ†	E(level)	Iγ$^{\ddagger\&}$	Mult.	α	Comments
127.6$^{\#}$ *3*	398.47	0.3 *1*	[D,E2]	0.48 *36*	
148.2$^{\#}$ *3*	216.29	1.3 *1*	[D,E2]	0.29 *21*	
158.9 *1*	398.47	2.2 *1*	M1,E2	0.34 *5*	α(K)=0.269 *18*; α(L)=0.058 *25*; α(M)=0.013 *6*. α(N)=0.0027 *12*; α(O)=0.00041 *16*; α(P)=1.83×10^{-5} *13*. α(K)exp=0.24 *5*; K/L=4.5 *6*.
171.5 *1*	239.61	30.3 *2*	M1	0.238	α(K)=0.203 *3*; α(L)=0.0273 *4*; α(M)=0.00567 *8*. α(N)=0.001247 *18*; α(O)=0.000203 *3*; α(P)=1.582×10^{-5} *23*. α(K)exp=0.176 *9*; K/L=6.5 *9*.
179.1§ *4*	619.60	2.1$^{@}$ *10*	[D,E2]	0.16 *11*	
180.4 *1*	248.45	13.9 *2*	M1	0.207	α(K)=0.1771 *25*; α(L)=0.0237 *4*; α(M)=0.00493 *7*. α(N)=0.001084 *16*; α(O)=0.0001764 *25*; α(P)=1.376×10^{-5} *20*. α(K)exp=0.147 *11*; K/L=7.1 *12*.
192.0 *3*	440.26	0.2 *1*	[M1,E2]	0.189 *16*	
197.9 *2*	446.34	2.6 *1*	M1,E2	0.173 *12*	α(K)=0.139 *3*; α(L)=0.026 *8*; α(M)=0.0056 *18*. α(N)=0.0012 *4*; α(O)=0.00019 *5*; α(P)=9.7×10^{-6} *10*. α(K)exp=0.15 *4*; K/L>5.
201.0§ *5*	440.26	0.76$^{@}$ *15*	[M1,E2]	0.165 *11*	
215.6 *2*	464.02	1.5 *4*	M1,E2	0.133 *6*	α(K)=0.1082 *18*; α(L)=0.019 *5*; α(M)=0.0041 *12*. α(N)=0.00089 *23*; α(O)=0.00014 *3*; α(P)=7.6×10^{-6} *9*. α(K)exp=0.11 *2*; K/L>4.
221.5$^{\#}$ *3*	619.60	1.5 *4*	[D,E2]	0.08 *5*	
239.5 *2*	239.61	2.1 *1*	[M1,E2]	0.097 *2*	
242.5§ *5*	706.46	1.2$^{@}$ *3*	[D,E2]	0.06 *4*	
248.5 *2*	248.45	2.5 *1*	(E2)	0.0862	α(K)=0.0683 *10*; α(L)=0.01415 *21*; α(M)=0.00303 *5*. α(N)=0.000653 *10*; α(O)=9.88×10^{-5} *15*; α(P)=4.42×10^{-6} *7*. α(K)exp=0.09 *3*; K/L≈4.
254.0§ *5*	652.5	2.4$^{@}$ *6*	[D,E2]	0.05 *3*	
256.0$^{\#}$ *3*	472.21	1.3 *2*	[D,E2]	0.05 *3*	
260.0$^{\#}$ *2*	706.46	0.3 *1*	[D,E2]	0.05 *3*	
271.0$^{\#}$ *2*	270.91	4.3 *1*	[D,E2]	0.043 *27*	
308.1 *3*	706.46	1.6 *5*			
318.0§ *5*	782.3	2.7$^{@}$ *6*			
330.3 *2*	398.47	4.3 *2*	M1,E2	0.038 *4*	α(K)exp=0.04 *2*. α(K)=0.032 *4*; α(L)=0.00485 *23*; α(M)=0.00102 *6*. α(N)=0.000222 *11*; α(O)=3.52×10^{-5} *9*; α(P)=2.3×10^{-6} *4*.
336.0§ *5*	782.3	2.7$^{@}$ *6*			
342§ *1*	782.3	0.6$^{@}$ *3*			
348.5$^{\#}$ *3*	619.60	1.1 *2*			
370.7 *5*	619.60	0.6$^{@}$ *3*			
372.2§ *3*	440.26	7.0$^{@}$ *7*	M1	0.0302	α(K)=0.0259 *4*; α(L)=0.00340 *5*; α(M)=0.000704 *10*. α(N)=0.0001549 *22*; α(O)=2.53×10^{-5} *4*; α(P)=1.99×10^{-6} *3*. α(K)exp=0.036 *13*; K/L>5. In 2001Xi01 the strong 371.7 keV γ is considered as a single γ, in 1997Gi08 it is resolved to 370.7 and 372.2 keV γ rays in γγ coin.
378.0 *2*	446.34	3.8 *4*	[E2]	0.0230	
380.1 *2*	619.60	1.9 *4*			
395.8 *2*	464.02	6.2 *2*	M1,E2	0.023 *3*	α(K)exp=0.023 *6*. α(K)=0.019 *3*; α(L)=0.00283 *9*; α(M)=0.000591 *13*. α(N)=0.000129 *4*; α(O)=2.06×10^{-5} *10*; α(P)=1.4×10^{-6} *3*.
397§ *1*	645.39	1.5$^{@}$ *3*			
398.5 *2*	398.47	3.6 *2*	M1,E2	0.023 *3*	α(K)exp=0.024 *8*. α(K)=0.019 *3*; α(L)=0.00277 *9*; α(M)=0.000580 *14*. α(N)=0.000127 *4*; α(O)=2.02×10^{-5} *10*; α(P)=1.4×10^{-6} *3*.
404.0$^{\#}$ *2*	472.21	0.8 *1*			
405.7 *2*	645.39	1.0 *1*			
414§ *1*	652.5	0.6$^{@}$ *3*			
440.0 *2*	440.26	4.4 *1*	(E2)	0.0147	Mult.: α(K)exp=0.019 *8* gives M1,E2, but ΔJπ=(2) requires E2. α(K)=0.01226 *18*; α(L)=0.00196 *3*; α(M)=0.000413 *6*. α(N)=8.98×10^{-5} *13*; α(O)=1.408×10^{-5} *20*; α(P)=8.60×10^{-7} *12*.
458.5§ *5*	706.46	1.0$^{@}$ *3*			
464.0 *2*	464.02	1.3 *2*			
466.7 *2*	706.46	4.3 *2*			

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^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01 (continued)

γ(^{129}La) (continued)

Eγ[†]	E(level)	Iγ[‡][&]	Comments
472.2[#] *2*	472.21	1.0 *1*	
482.5[#] *2*	928.87	0.6 *1*	
519.5[#] *2*	587.64	2.4 *1*	
536.6[#] *3*	934.92	1.7 *5*	
543.1[§] *5*	782.3	0.9[@] *3*	
548.0[#] *2*	796.21	0.3 *1*	
551.3 *3*	619.60	3.2 *6*	
556.0[#] *2*	556.00?	2.0 *1*	Evaluators consider the placement of the 556.0 keV γ tentative because of the lack of supporting γγ coin or other γ from the level.
577.3 *2*	645.39	1.8 *2*	
584.0[§] *5*	652.5	1.8[@] *6*	
584.0[#] *2*	832.31	1.6 *1*	
587.6[#] *2*	587.64	2.2 *2*	
616.7[#] *2*	1015.26	1.3 *3*	
638.4 *2*	706.46	0.6 *1*	
664.0[#] *3*	934.92	0.4 *1*	
680.5[#] *3*	928.87	0.8 *4*	
728.0[#] *2*	796.21	1.7 *2*	
744.5[#] *2*	1015.26	0.7 *1*	
764.0[#] *2*	832.31	1.0 *3*	
796.0[#] *2*	796.21	1.8 *2*	
866.6[#] *3*	934.92	0.4 *2*	
897.9[#] *2*	966.34	0.9 *2*	
966.6[#] *2*	966.34	0.9 *1*	
1015.1[#] *3*	1015.26	0.2 *1*	

[†] Weighted average of Eγ values from 1997Gi08 and 2001Xi01.

[‡] From 2001Xi01 unless if otherwise noted.

[§] Reported only in 1997Gi08.

[#] Reported only in 2001Xi01.

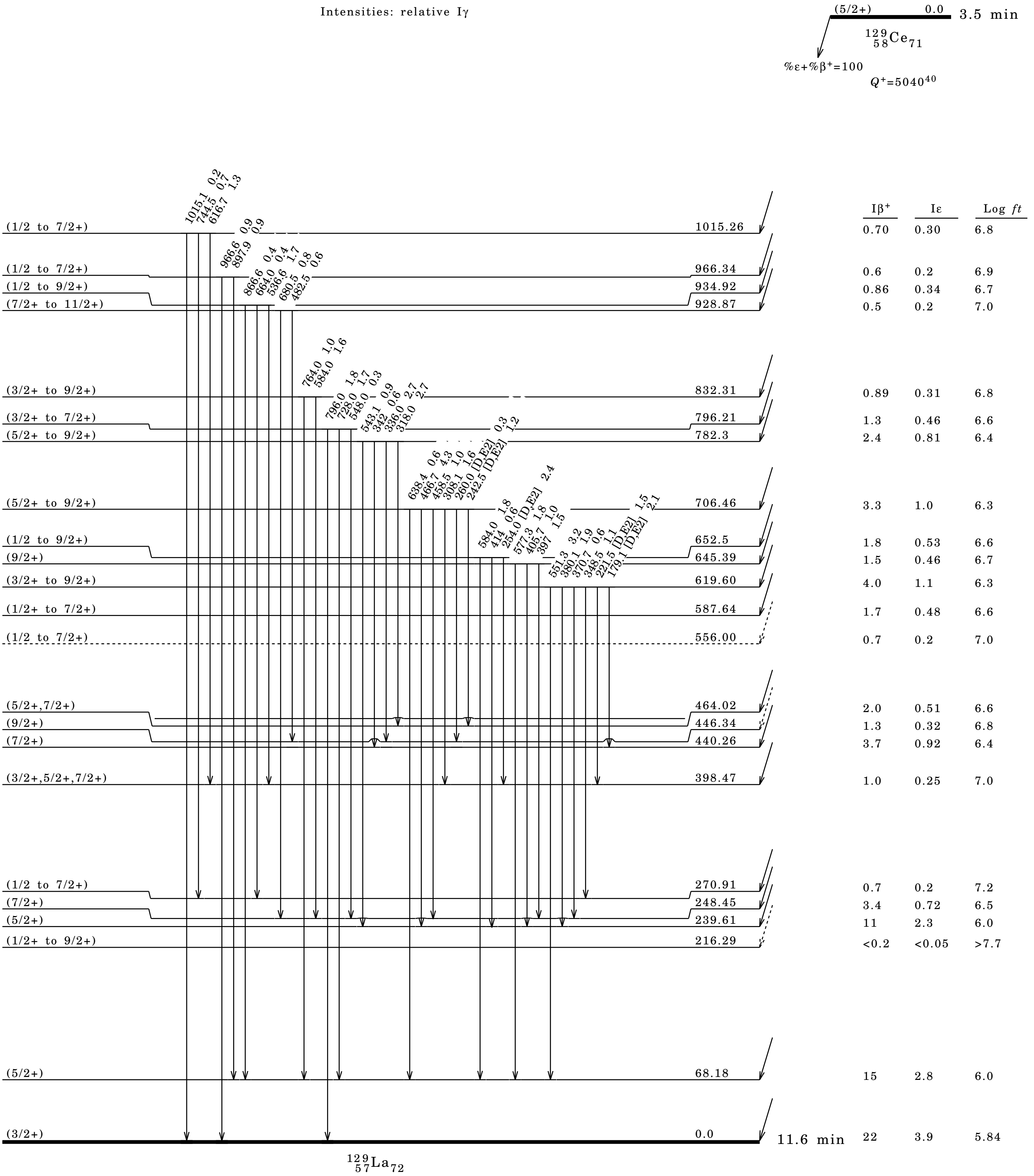
[@] From 1997Gi08, normalized to the 171.5 keV transition.

[&] For absolute intensity per 100 decays, multiply by 0.47 *5*.

^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01 (continued)

Decay Scheme

Intensities: relative Iγ

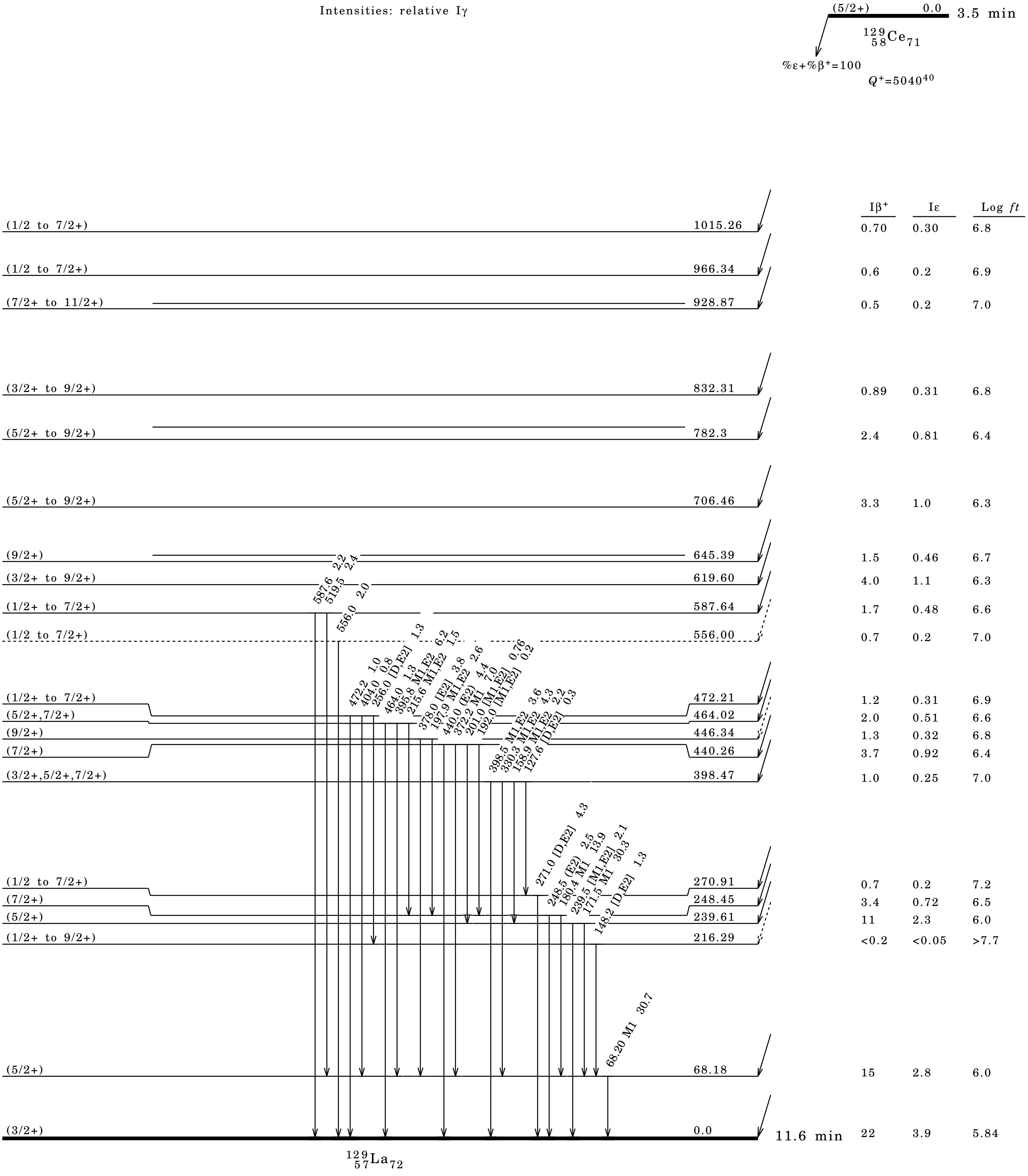


From NNDC(BNL)
program ENSDAT

^{129}Ce ε Decay (3.5 min) 1997Gi08,2001Xi01 (continued)

Decay Scheme (continued)

Intensities: relative Iγ



		Iβ+	Iε	Log *ft*
(1/2 to 7/2+)	1015.26	0.70	0.30	6.8
(1/2 to 7/2+)	966.34	0.6	0.2	6.9
(7/2+ to 11/2+)	928.87	0.5	0.2	7.0
(3/2+ to 9/2+)	832.31	0.89	0.31	6.8
(5/2+ to 9/2+)	782.3	2.4	0.81	6.4
(5/2+ to 9/2+)	706.46	3.3	1.0	6.3
(9/2+)	645.39	1.5	0.46	6.7
(3/2+ to 9/2+)	619.60	4.0	1.1	6.3
(1/2+ to 7/2+)	587.64	1.7	0.48	6.6
(1/2 to 7/2+)	556.00	0.7	0.2	7.0
(1/2+ to 7/2+)	472.21	1.2	0.31	6.9
(5/2+,7/2+)	464.02	2.0	0.51	6.6
(9/2+)	446.34	1.3	0.32	6.8
(7/2+)	440.26	3.7	0.92	6.4
(3/2+,5/2+,7/2+)	398.47	1.0	0.25	7.0
(1/2 to 7/2+)	270.91	0.7	0.2	7.2
(7/2+)	248.45	3.4	0.72	6.5
(5/2+)	239.61	11	2.3	6.0
(1/2+ to 9/2+)	216.29	<0.2	<0.05	>7.7
(5/2+)	68.18	15	2.8	6.0
(3/2+)	0.0	22	3.9	5.84

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28

1992He03: ^{51}V(^{82}Se,4nγ) E=67, 290 MeV; Ge γ, $\gamma\gamma$–coin, $\gamma\gamma(\theta)$.
2000Wa28: ^{100}Mo(^{34}S,p4ng), E=155 MeV. Measured Eγ and $\gamma\gamma$ using EUROBALL–2 spectrometer.
1985Sm07: ^{98}Mo(^{36}S,p4nγ) E=155 MeV; Ge, $\gamma\gamma$–coin, $\gamma\gamma(\theta)$.
1973Le09: ^{122}Te(^{11}B,4nγ) E=50, 56.5 MeV, ^{118}Sn(^{14}N,3nγ) E=53, 58, 62, 67, 76 MeV; excitation function, Ge γ, $\gamma\gamma$–coin, $\gamma(\theta)$.
1969Al05: ^{121}Sb(^{12}C,4n), ^{118,119,120}Sn(^{14}N,xn), ^{115}In(^{18}O,4n), E=50–110 MeV; excitation function, Ge, scin, Si ce, HI–γ(t), HI–ce(t).

^{129}La Levels

Level scheme is mainly from 1992He03. Jπ assignment on the basis of γ multipolarities deduced from DCO ratios. Configurations on the basis of CSM analysis, systematics of neighboring nuclei and Total Routhian Surface calculations.

E(level)[‡]	Jπ[†]	$T_{1/2}$	Comments
0.0[&]	3/2+		
67.5[a] *3*	5/2+		
172.1[§] *4*	11/2−	0.56 s *5*	$T_{1/2}$: from I(68.9,104.8 γ)(t)(1969Al05).
247.6[&] *3*	7/2+		
440.9[§] *4*	15/2−	90 ps *4*	$T_{1/2}$: from Doppler–shift recoil–distance method (1975Bu08).
445.1[a] *3*	9/2+		
694.7[&] *4*	11/2+		
915.0[§] *5*	19/2−	6.0 ps *9*	$T_{1/2}$: from Doppler–shift recoil–distance method (1975Bu08).
1019.8[a] *4*	13/2+		
1313.7[&] *4*	15/2+		
1556.0[§] *5*	23/2−		
1722.3 *7*			
1947.9 *10*			
1983.0[#] *5*	19/2+		
2068.1[&] *6*	19/2+		
2217.4[b] *5*	(13/2+)		
2239.3 *9*			
2239.3+x[b] *13*	(17/2+)		
2293.9+x[c] *14*	(19/2+)		
2340.8[§] *6*	27/2−		
2351.7[d] *9*	(19/2+)		
2404.0+x[b] *14*	(21/2+)		
2429.0[#] *5*	23/2+		
2476.0[@] *7*	21/2+		
2567.9[e] *9*	(21/2+)		
2567.9+x[c] *14*	(23/2+)		
2787.9 *9*	(23/2+)		
2788.9+x[b] *14*	(25/2+)		
2821.2[d] *9*	(23/2+)		
2839.0[&] *7*	23/2+		
2907.0[@] *6*	25/2+		
3014.8[#] *6*	27/2+		
3065.6+x[c] *14*	(27/2+)		
3093.7[e] *9*	(25/2+)		
3251.1[§] *6*	31/2−		
3388.3+x[b] *15*	(29/2+)		
3418.2[d] *10*	(27/2+)		
3473.3[@] *6*	29/2+		
3728.7[#] *6*	31/2+		
3753.5+x[c] *15*	(31/2+)		
3780.6[e] *10*	(29/2+)		
4153.1+x[b] *15*	(33/2+)		
4173.9[d] *10*	(31/2+)		
4195.0[@] *7*	33/2+		
4264.1[§] *8*	35/2−		
4551.7[#] *7*	35/2+		
4591.9+x[c] *15*	(35/2+)		
4599.0[e] *11*	(33/2+)		
5043.4[d] *12*	(35/2+)		
5054.5+x[b] *15*	(37/2+)		
5077.5[@] *9*	37/2+		
5358.1[§] *10*	39/2−		

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51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

^{129}La Levels (continued)

E(level)[‡]	Jπ[†]	E(level)[‡]	Jπ[†]	E(level)[‡]	Jπ[†]
5473.0[#] *8*	39/2+	6632.2+x[c] *16*	(43/2+)	9769.2[#] *14*	(55/2+)
5503.8[e] *12*	(37/2+)	6754.0?[d] *13*	(43/2+)	10082.8[§] *21*	55/2−
5557.9+x[c] *15*	(39/2+)	7129.5[@] *17*	45/2+	10949.2[#] *17*	59/2+
5931.0[d] *12*	(39/2+)	7561.7[#] *11*	47/2+	11377.8[§] *23*	59/2−
6060.5[@] *14*	41/2+	7671.8[§] *15*	47/2−	12193.2[#] *20*	63/2+
6086.1+x[b] *16*	(41/2+)	8238.5[@] *20*	49/2+	13499.2[#] *22*	67/2+
6335.0?[e] *13*	(41/2+)	8653.9[#] *12*	51/2+	14917.2[#] *24*	71/2+
6484.3[#] *9*	43/2+	8853.8[§] *18*	51/2−	16474[#] *3*	75/2+
6512.8[§] *11*	43/2−	9421.5[@] *22*	53/2+		

[†] As assigned in 2000Wa28 and 1992He03 based on γγ(θ) data and band structures. All assignments are given in parentheses in Adopted Levels since strong supporting arguments for the lower levels (or bandheads are lacking).

[‡] From least–squares fit to the EG data.

[§] (A): π1/2[550],α=−1/2.

[#] (B): π3/2[422]⊗$\pi h_{11/2}{}^{2}$,α=−1/2.

[@] (C): π3/2[422]⊗$\pi h_{11/2}{}^{2}$,α=+1/2.

[&] (D): π(3/2[422]+1/2[420]),α=−1/2. Strongly coupled one–quasiproton band with admixture of of 3/2[422] and 1/2[420] proton configurations.

[a] (E): π(3/2[422]+π1/2[420]),α=+1/2. Strongly coupled one–quasiproton band with admixture of of 3/2[422] and 1/2[420] proton configurations.

[b] (F): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

[c] (G): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

[d] (H): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

[e] (I): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

γ(^{129}La)

Eγ[†]	E(level)	Iγ	Mult.[‡]	α[#]	Comments
55.6 *3*	2293.9+x				
67.7 *3*	67.5		M1	3.32 *7*	α(L)exp=0.44 *20*. α(K)=2.84 *6*; α(L)=0.386 *8*; α(M)=0.0803 *16*. α(N)=0.0177 *4*; α(O)=0.00287 *6*; α(P)=0.000221 *5*.
104.8 *3*	172.1		E3	20.0 *4*	α(K)=5.12 *9*; α(L)=11.54 *25*; α(M)=2.67 *6*. α(N)=0.566 *13*; α(O)=0.0782 *17*; α(P)=0.000256 *5*. Eγ: from 1973Le09. ΔEγ estimated by the evaluators. α(L+M)exp=25 *15*; K/L=0.51 *11*.
110.1 *3*	2404.0+x	152[§] *10*	(M1+E2)	0.871 *15*	DCO=0.84 *8*.
163.9 *3*	2567.9+x	233[§] *16*	(M1+E2)	0.276 *5*	DCO=0.95 *5*.
179.9 *3*	247.6	106[§] *8*	(M1)	0.209	α(K)=0.178 *3*; α(L)=0.0239 *4*; α(M)=0.00497 *8*; α(N)=0.001092 *17*; α(O)=0.000178 *3*. α(P)=1.387×10^{-5} *21*. DCO=1.05 *4*.
197.4 *3*	445.1	50[§] *7*	(M1)	0.1619	α(K)=0.1385 *21*; α(L)=0.0185 *3*; α(M)=0.00385 *6*; α(N)=0.000846 *13*; α(O)=0.0001376 *21*. α(P)=1.075×10^{-5} *16*. DCO=1.01 *2*.
216.2 *4*	2567.9	9[§] *2*	(M1+E2)	0.127 *2*	DCO=0.84 *7*.
220.9 *3*	2788.9+x	251[§] *18*	(M1+E2)	0.120 *2*	DCO=0.82 *3*.
247.3 *4*	247.6	16[§] *4*			
249.5 *4*	694.7	29[§] *7*	D		DCO=1.03 *3*.
253.4 *4*	2821.2	9[§] *2*	(M1+E2)	0.0825 *12*	DCO=0.83 *4*.
269.0 *3*	440.9	973	E2	0.0666	α(K)=0.0532 *8*; α(L)=0.01054 *16*; α(M)=0.00225 *4*. α(N)=0.000486 *7*; α(O)=7.39×10^{-5} *11*; α(P)=3.49×10^{-6} *5*. DCO=1.31 *4*; A_2=+0.35 *3* (1975Wa07); A_2=+0.24 *3* (1973Le09).
272.4 *4*	3093.7	14[§] *3*	(M1+E2)	0.0678 *10*	DCO=0.92 *6*.
276.6 *3*	3065.6+x	215[§] *20*	(M1+E2)	0.0651 *10*	DCO=0.92 *3*.
293.8 *4*	1313.7	6[§] *2*			
305.8 *4*	3093.7	19 *3*	(M1+E2)	0.0498 *7*	DCO=0.88 *5*.
322.6 *4*	3388.3+x	186 *18*	(M1+E2)	0.0432 *7*	DCO=0.85 *5*.

Continued on next page (footnotes at end of table)

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

γ(^{129}La) (continued)

Eγ[†]	E(level)	Iγ	Mult.[‡]	α[#]	Comments
324.5 *5*	3418.2	43 *7*	(M1+E2)	0.0425 *6*	α(K)=0.033 *4*; α(L)=0.0051 *3*; α(M)=0.00108 *7*. α(N)=0.000235 *14*; α(O)=3.71×10^{-5} *12*; α(P)=2.4×10^{-6} *5*. DCO=0.87 *5*.
325.1 *4*	1019.8	12 *4*	(M1+E2)	0.0423 *6*	DCO=0.88 *5*.
362.3 *5*	3780.6	28 *5*	(M1+E2)	0.0319 *5*	DCO=0.70 *8*.
365.0 *3*	3753.5+x	122 *13*	(M1+E2)	0.0312 *5*	DCO=0.82 *5*.
377.6 *3*	445.1	68 *8*	(E2)		DCO=1.35 *2*.
385.0 *5*	2788.9+x	15 *3*			
393.2 *5*	4173.9	25 *4*	(M1+E2)	0.0258 *4*	DCO=0.69 *7*.
399.4 *3*	4153.1+x	87 *8*	(M1+E2)	0.0247 *4*	DCO=0.96 *5*.
404.0 *6*	6335.0?	12 *2*			
418.9 *6*	6754.0?	12 *2*			
425.2 *6*	4599.0	18 *4*			
427.4 *6*	5931.0	13 *3*			
430.9 *6*	2907.0	33 *7*			
438.7 *3*	4591.9+x	79 *7*			
444.6 *6*	5043.4	16 *3*			
445.8 *3*	2429.0	121 *15*	Q		DCO=1.49 *3*.
446.9 *4*	694.7	87 *14*			
458.4 *4*	3473.3	80 *15*	D		DCO=1.10 *4*.
460.6 *6*	5503.8	14 *3*			
462.5 *4*	5054.5+x	44 *5*			
466.3 *5*	4195.0	22 *5*	D		DCO=0.90 *3*.
474.3 *3*	915.0	828 *30*	E2	0.01193	α(K)=0.00997 *14*; α(L)=0.001556 *22*; α(M)=0.000327 *5*. α(N)=7.12×10^{-5} *10*; α(O)=1.120×10^{-5} *16*; α(P)=7.04×10^{-7} *10*. DCO=1.31 *4*; A_2=+0.32 *3* (1975Wa07); A_2=+0.29 *4* (1973Le09).
478.0 *5*	2907.0	52 *11*	(M1+E2)	0.0156	DCO=0.78 *3*.
492.9 *6*	2476.0	17 *5*			
498.0 *4*	3065.6+x	26 *3*			
502.9 *5*	5557.9+x	25 *4*			
517.0 *5*	2239.3	21 *4*			
528.0 *6*	6086.1+x	18 *4*			
546.1 *6*	6632.2+x	16 *4*			
566.3[@] *5*	2907.0	103[@] *22*			
	3473.3	68[@] *17*			
574.6 *3*	1019.8	91 *15*	Q		DCO=1.45 *4*.
585.8 *3*	3014.8	216 *25*	Q		DCO=1.47 *3*.
599.4 *4*	3388.3+x	47 *6*			
618.8 *4*	1313.7	83 *16*			DCO=1.28 *5*.
641.1 *3*	1556.0	717 *40*	Q		DCO=1.42 *7*; A_2=+0.35 *3* (1975Wa07); A_2=+0.22 *6* (1973Le09).
669.0 *5*	1983.0	33 *8*			DCO=1.15 *7*.
674.2 *5*	3014.8	51 *7*	D		DCO=1.60 *15*.
687.0 *7*	3780.6	27 *5*			
687.9 *3*	3753.5+x	51 *6*			
713.9 *3*	3728.7	190 *22*	Q		DCO=1.54 *5*.
721.7 *5*	4195.0	67 *11*	Q		DCO=1.38 *4*.
754.4 *4*	2068.1	37 *9*	Q		DCO=1.46 *7*.
755.8 *7*	4173.9	19 *4*			
764.9 *3*	4153.1+x	55 *7*			
770.9 *4*	2839.0	28 *7*	Q		DCO=1.65 *4*.
784.9 *3*	2340.8	453 *40*	Q		DCO=1.41 *7*; A_2=+0.31 *4* (1975Wa07); A_2=+0.21 *1* (1973Le09).
818.4 *8*	4599.0	16 *3*			
823.0 *3*	4551.7	154 *20*	Q		DCO=1.53 *5*.
	6754.0?				
831[&]	6335.0?				
838.4 *4*	4591.9+x	57 *8*			
840.0 *6*	2787.9	13 *3*			
869.5 *8*	5043.4	16 *3*			
873.1 *3*	2429.0	194 *22*	D		DCO=1.45 *5*.
882.5 *6*	5077.5	24 *8*	Q		DCO=1.38 *4*.
887.5 *7*	5931.0	15 *3*			
901.6 *5*	5054.5+x	56 *8*			
904.5 *7*	5503.8	18 *4*			

Continued on next page (footnotes at end of table)

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

γ(^{129}La) (continued)

Eγ[†]	E(level)	Iγ	Mult.[‡]	Comments
910.3 *3*	3251.1	268 *20*	Q	DCO=1.35 *10*; A_2=+0.26 *15* (1975Wa07).
921.3 *4*	5473.0	97 *13*	Q	DCO=1.55 *4*.
966.1 *4*	5557.9+x	36 *7*		
983	6060.5			
1011.3 *5*	6484.3	81 *11*	Q	DCO=1.42 *6*.
1013.0 *4*	4264.1	156 *14*	Q	DCO=1.34 *4*; A_2=+0.02 *30* (1975Wa07).
1032.1 *7*	6086.1+x	14 *5*		
1033.0 *15*	1947.9	13 *4*		
1067.8 *5*	1983.0	72 *11*	D	DCO=1.49 *8*.
1069	7129.5			
1074.1 *9*	6632.2+x	15 *5*		
1077.4 *5*	7561.7	49 *9*	Q	DCO=1.59 *6*.
1092.2 *5*	8653.9	29 *6*	Q	DCO=1.46 *8*.
1094.0 *6*	5358.1	84 *9*	Q	DCO=1.56 *6*.
1109	8238.5			
1115.2 *7*	9769.2	26 *6*		
1154.7 *6*	6512.8	55 *9*	Q	DCO=1.43 *7*.
1159	7671.8			
1180	10949.2			
1182	8853.8			
1183	9421.5			
1197.0 *6*	2217.4	58 *10*	D	DCO=1.06 *5*.
1229	10082.8			
1232.0 *15*	2787.9	5 *2*		
1244	12193.2			
1265 *1*	2821.2	5 *2*		
1281.4 *6*	1722.3	31 *5*		
1295[&]	11377.8			
1306	13499.2			
1418	14917.2			
1437.0 *15*	2351.7	11 *3*		
1557	16474			
1772.3 *9*	2217.4	26 *10*		
1777.4 *8*	2217.4	23 *10*		

[†] From 1992He03 unless otherwise noted.

[‡] From 1992He03 based on DCO ratios I(35–35)/I(90–35) gated by a known stretched E2 γ. Assigned to be stretched Q or nonstretched dipole for DCO–ratio>1.3 and stretched d for DCO–ratio<1.1. 1992He03 suggest possible M1+E2 mixing for much smaller DCO. Evaluators regard DCO–ratio<1.0 as (M1+E2).

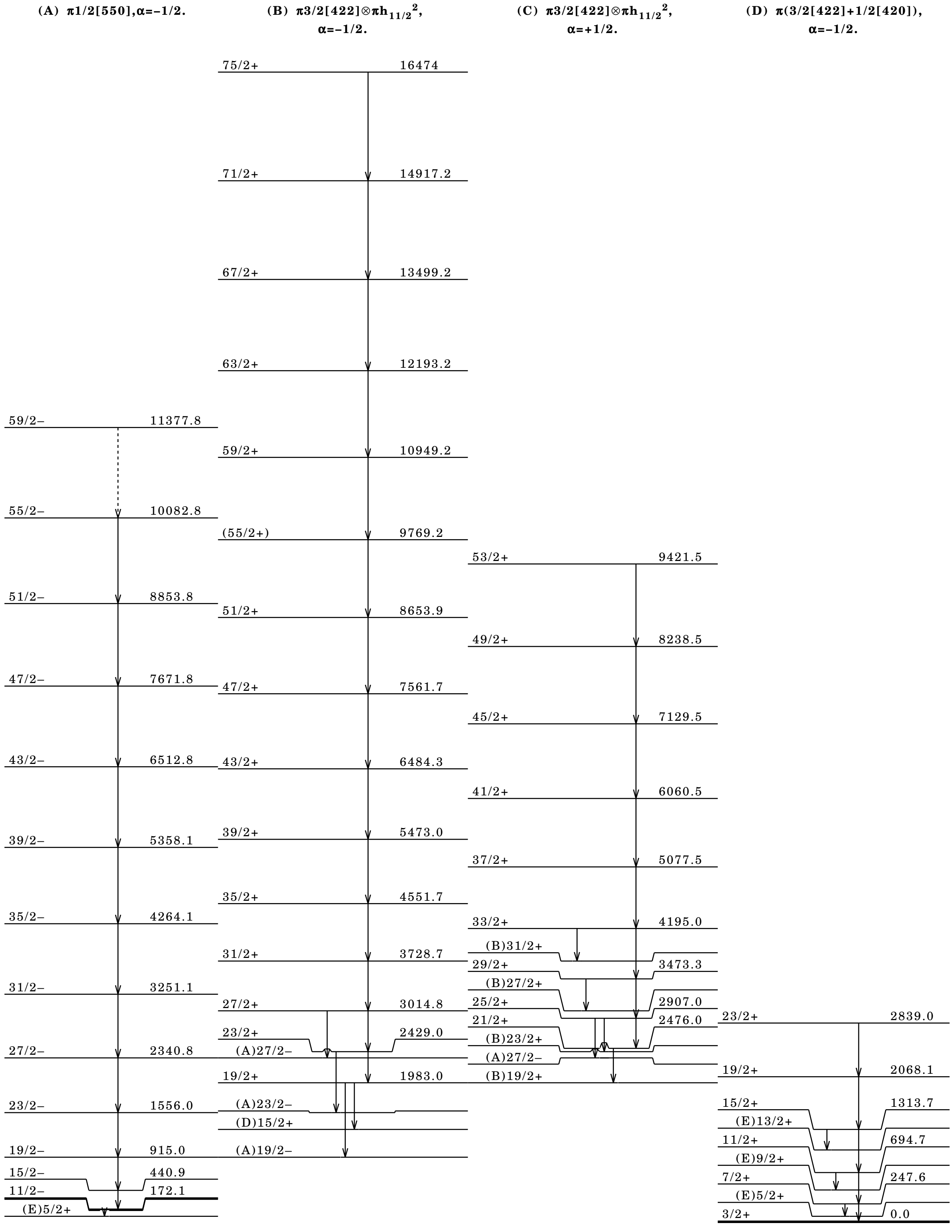
[§] Calculated by evaluators from I(γ+ce) given by 1992He03 under the authors' assumption that δ≈0 for mixed transitions. For γ rays with Eγ>300 keV, Iγ=I(γ+ce) is assumed.

[#] δ(E2/M1)=0.3 assumed when δ not listed.

[@] Multiply placed; intensity suitably divided.

[&] Placement of transition in the level scheme is uncertain.

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)



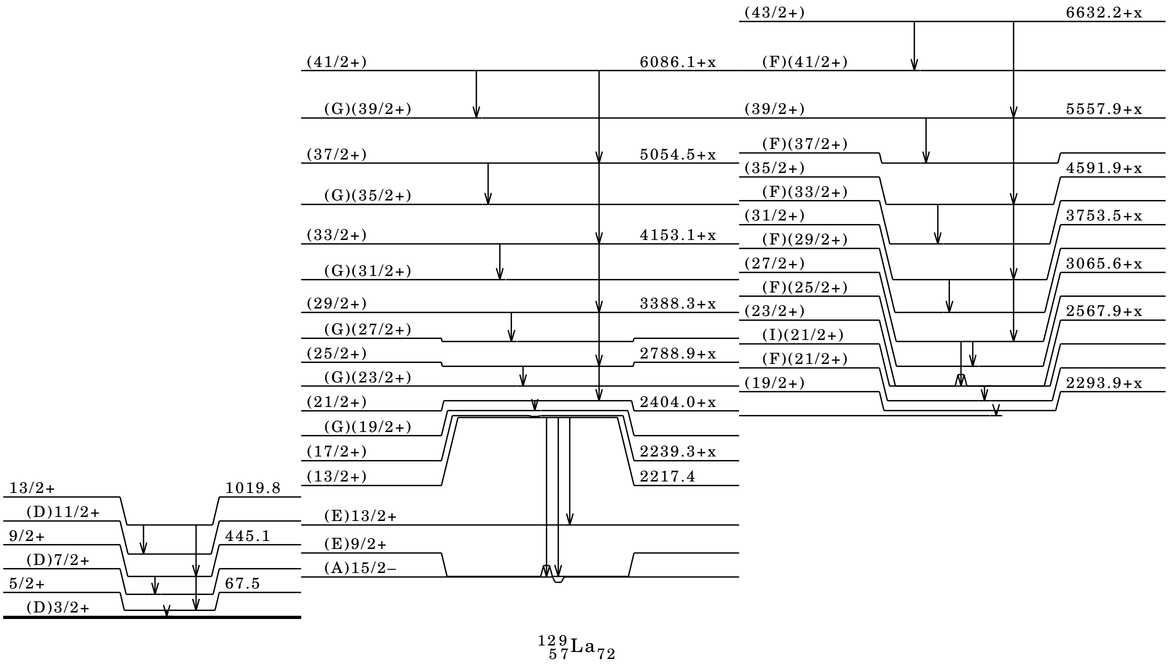
$^{129}_{57}La_{72}$

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

(E) π(3/2[422]+π1/2[420]) ,α=+1/2.

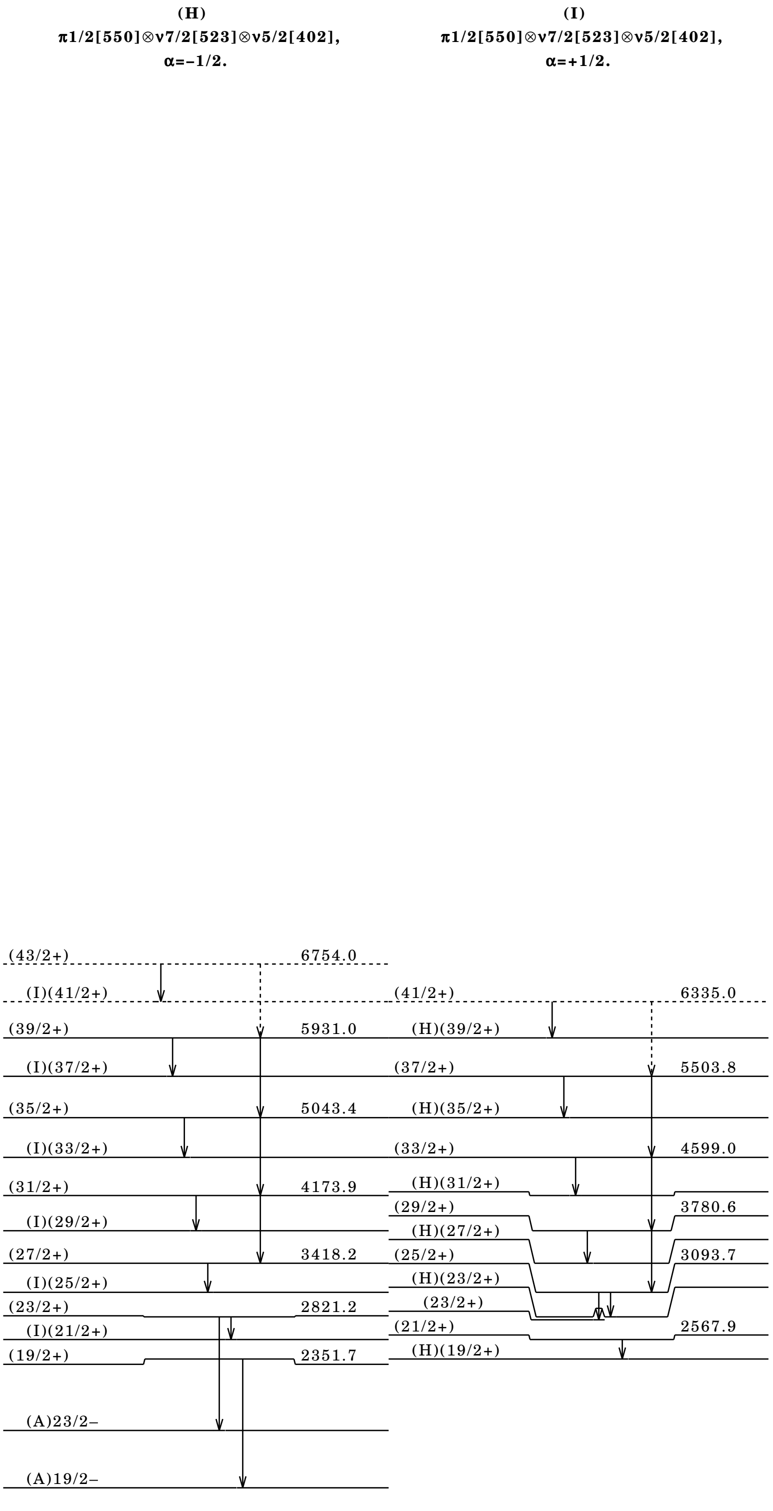
(F) π1/2[550]⊗ν7/2[523]⊗ν5/2[402], α=+1/2.

(G) π1/2[550]⊗ν7/2[523]⊗ν5/2[402], α=−1/2.



$^{129}_{57}$La$_{72}$

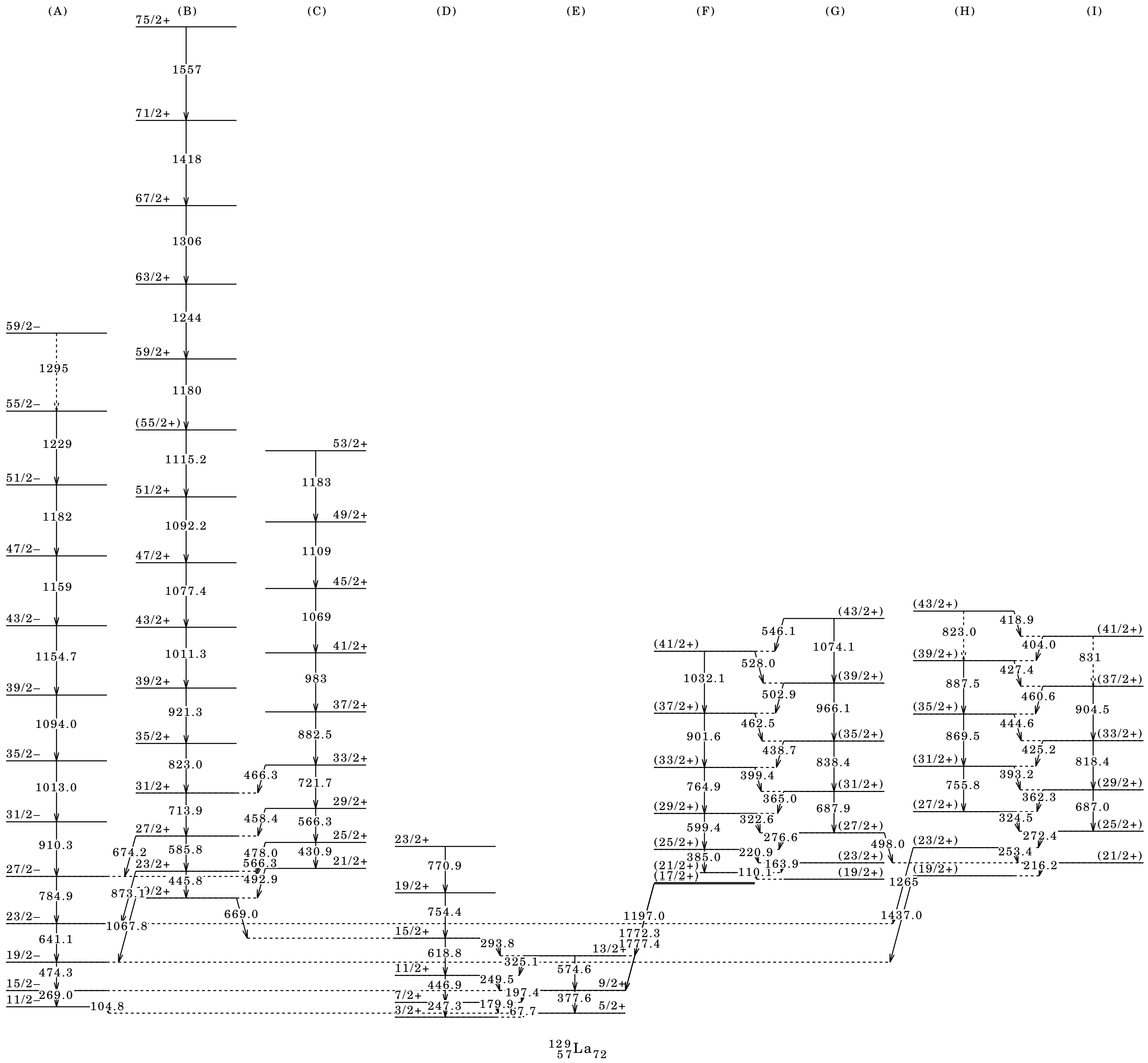
51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)



$^{129}_{57}$La$_{72}$

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

Bands for ^{129}La



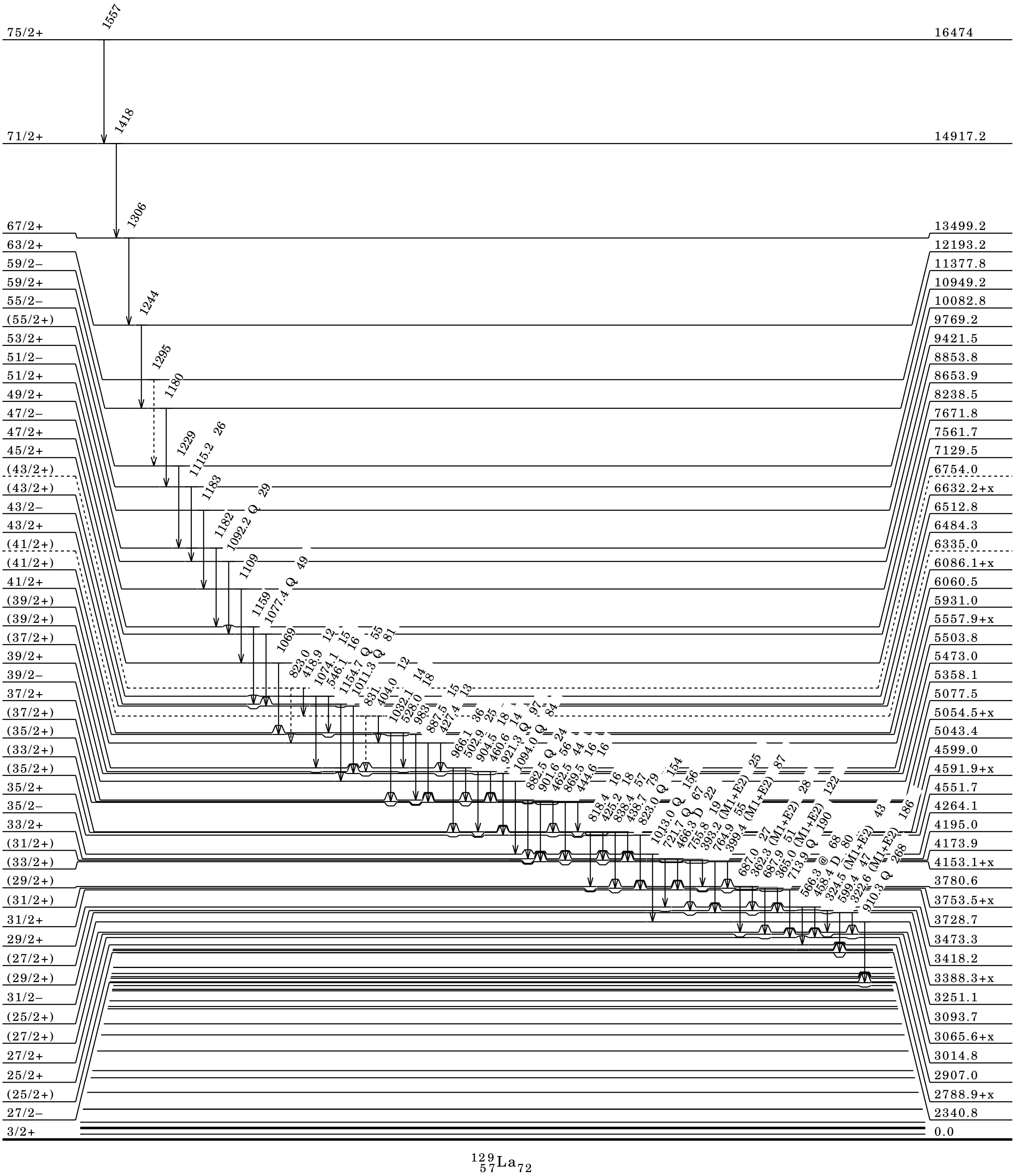
From NNDC(BNL)
program ENSDAT

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

Level Scheme

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided



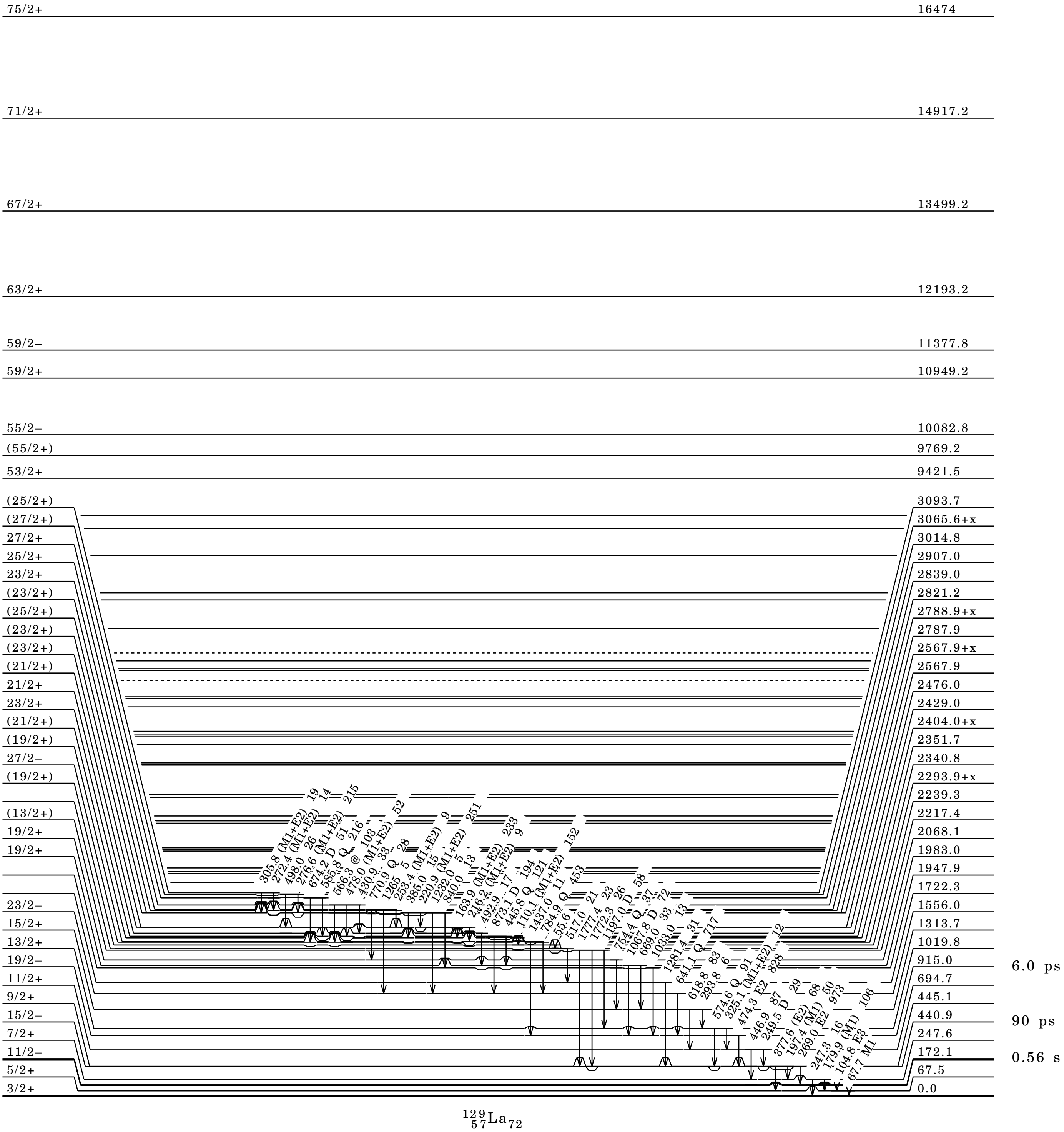
$^{129}_{57}La_{72}$

From NNDC(BNL)
program ENSDAT

51V(82SE,4NG),100MO(34S,P4NG) 1992He03,2000Wa28 (continued)

Level Scheme (continued)

Intensities: relative Iγ
@ Multiply placed; intensity suitably divided



$^{129}_{57}$La$_{72}$

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36

1995Ku29: ^{119}Sn(^{14}N,4nγ), E=59, 62, 65 MeV. Measured Eγ, Iγ, γγ, γ(θ), γγ(θ) using an array of six Ge detectors.
2008Sa36: ^{120}Sn(^{14}N,5nγ), E=77 MeV. Measured lifetimes by Doppler–shift attenuation method.
1975Wa07: ^{119}Sn(^{14}N,4nγ) E=67, 75 MeV; Ge γ, γγ–coin, γ(θ).
1975Bu08: ^{119}Sn(^{14}N,4nγ) E=67 MeV; Doppler–shift recoil–distance method.

^{129}La Levels

Level scheme is mainly from 1995Ku29. Jπ assignment on the basis of γ multipolarities deduced from angular correlation or from A_2 and A_4 values.

E(level)[†]	Jπ[‡]	$T_{1/2}$[§]	Comments
0.0[f]	3/2+		
68.18[g] *20*	5/2+		
172.4[c] *3*	11/2−	0.56 s *5*	$T_{1/2}$: from Adopted Levels.
239.8[l] *3*			
248.57[f] *19*	7/2+		
440.25[m] *20*	7/2+		
442.2[c] *3*	15/2−	90 ps *4*	$T_{1/2}$: from recoil–distance method (1975Bu08).
446.49[g] *23*	9/2+		
645.9[l] *3*	(9/2+)		
696.73[f] *24*	11/2+		
916.9[c] *3*	19/2−	6.0 ps *9*	$T_{1/2}$: from 1975Bu08.
929.1[k] *3*			
992.52[m] *23*	11/2+		
1021.95[g] *24*	13/2+		
1120.3[b] *3*	(13/2−)		
1120.5? *3*			The existence of this level is not discussed in 1995Ku29. Evaluators find it possible that the 1098.7 keV γ feeds the 1120.3 keV (13/2−) level, in which case this level may not exist.
1234.4[l] *3*	13/2+		
1275.2 *3*			
1305.1[&] *3*	17/2−		
1315.9[f] *3*	15/2+		
1328.9 *4*			
1524.5[k] *3*			
1558.3[c] *3*	23/2−	≥1.2 ps	
1586.8[b] *3*	17/2−		
1651.2 *4*			
1654.3 *3*	13/2+		
1725.1 *3*	(15/2+)		
1753.3? *4*			The existence of this level is not discussed in 1995Ku29. Evaluators find it possible that the 1311.1 keV γ depopulates the 1753.6 keV 17/2+ level, in which case this level may not exist.
1753.6[g] *3*	17/2+		
1803.1 *3*			
1851.4[a] *3*	19/2−		
1949.8[&] *3*	21/2−		
1951.8 *4*			
1956.7 *4*			
1972.4 *3*			
1985.3[d] *3*	19/2+		
2003.9 *4*			
2070.1[f] *4*	19/2+		
2118.5 *4*			
2170.0 *4*	19/2		
2206.7 *4*			
2219.1 *3*	15/2+		
2221.7[b] *3*	21/2−		
2242.9[k] *3*	17/2+		
2278.2 *4*			
2291.2 *3*			
2298.2 *3*			
2343.5[c] *3*	27/2−	0.82 ps *20*	
2352.1[@] *4*	(19/2+)		
2431.9[d] *3*	23/2+		
2453.1 *3*			
2454.0 *4*			

Continued on next page (footnotes at end of table)

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

^{129}La Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[§]	Comments
2462.9 *5*			
2475.0[a] *3*	23/2−		
2478.3[e] *3*	21/2+		
2490.3 *4*			
2520.6 *4*			
2568.6[#] *4*	(21/2+)		
2599.0 *4*			
2681.5 *4*			
2705.4 *4*			
2729.8 *4*			
2767.8 *4*			
2784.2[j] *3*			
2789.9 *3*	(23/2+)		
2803.2 *3*			
2822.9[@] *4*	(23/2+)		In level–scheme table of 1995Ku29 two separate levels are shown, one at 2822.9 decaying through 254.3γ and 1264.6γ; the other at 2822.6 decaying through 1264.4γ. But in the figure only one level is shown by 1995Ku29.
2841.3[f] *4*	23/2+		
2864.4 *4*			
2910.1[e] *3*	25/2+		
2911.3 *3*			
2943.3 *5*			
2955.4[b] *4*	(25/2−)		
2956.0? *4*			Evaluators find it possible that the 612.5 keV γ depopulates the 2955.4 keV (25/2−) level, in which case the level may not exist.
3018.0[d] *4*	27/2+		
3044.1 *4*			
3096.3[#] *4*	(25/2+)		
3124.6 *4*			
3215.8[a] *4*	27/2−		
3254.0[c] *4*	31/2−	0.40 ps *8*	
3287.0 *4*			
3310.1 *4*			
3376.2 *4*			
3383.1 *4*			
3411.6[j] *4*			
3420.9[@] *4*	(27/2+)		
3474.9 *4*			
3475.1 *5*			
3477.0[e] *4*	29/2+		
3482.6 *4*			
3523.4 *4*			
3531.4 *4*			
3636.9 *4*			
3695.2 *4*			
3697.4 *5*			
3712.4 *4*			
3732.1[d] *4*	31/2+		
3760.4[b] *5*	(29/2−)		
3783.8[#] *4*	(29/2+)		
3858.1 *4*			
3952.3 *4*			
3998.5 *5*			
4000.4 *4*			
4000.9 *5*			
4042.8 *4*			
4043.5[a] *5*	(31/2−)		
4176.9[@] *4*	(31/2+)		
4199.1[e] *4*	33/2+		
4267.2[c] *5*	35/2−	0.50 ps *12*	
4297.3 *5*			
4362.0?	(31/2+)		No decaying gammas shown by 1995Ku29. See comment for 5200.9 level.
4555.4[d] *5*	35/2+		

Continued on next page (footnotes at end of table)

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

^{129}La Levels (continued)

E(level)[†]	Jπ[‡]	T$_{1/2}$[§]	Comments
4602.6[#] *5*	(33/2+)		
4761.8?	(33/2+)		No decaying gammas shown by 1995Ku29. See comment for 5200.9 level.
4907.9[a] *6*	(35/2−)		
5082.2[e] *5*	37/2+		
5200.80? *21*	(35/2+)		This level is shown in the level–scheme table only by 1995Ku29 decaying through 439.4γ (to a 4761.8, (33/2+) level) and 838.6γ (to a 4362.0, (31/2+) level). The decay of the final levels at 4761.8 and 4362.0 is shown neither in the figure nor in the table. This sequence of three levels and connecting γ rays matches exactly with the level sequence of x+2356.6, x+1917.4, x+1517.7 and the γ rays between them. Thus the level sequence of 5200.8, 4761.8, 4362.0 very probably does not exist.
5361.1[c] *6*	(39/2−)	0.37 ps *10*	
5477.1[d] *6*	39/2+		
0+x[i]	(17/2+)		
55.9+x[h] *3*	(19/2+)		
166.6+x[i] *4*	(21/2+)		
331.0+x[h] *5*	(23/2+)		
552.4+x[i] *5*	(25/2+)		
829.3+x[h] *5*	(27/2+)		
1152.2+x[i] *5*	(29/2+)		
1517.7+x[h] *5*	(31/2+)		
1917.4+x[i] *6*	(33/2+)		
2356.6+x[h] *6*	(35/2+)		
2820.4+x[i] *7*	(37/2+)		

[†] From least–squares fit to Eγ data, assuming Δ(Eγ)=0.3 keV when not stated.

[‡] As assigned in 1995Ku29 based on γ(θ) and γγ(θ) data combined with band structures. All assignments are given in parentheses in Adopted Levels since strong supporting arguments for the lower levels (or bandheads are lacking).

[§] From DSAM in 2008Sa36 unless otherwise noted.

[#] (A): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2. Three–quasiparticle band with one signature of ν7/2[523].

[@] (B): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

[&] (C): π1/2[550],α=+1/2.

[a] (D): π3/2[541],α=−1/2.

[b] (E): π3/2[541],α=+1/2.

[c] (F): π1/2[550],α=−1/2.

[d] (G): π3/2[422]⊗$\pi h_{11/2}^{2}$,α=−1/2.

[e] (H): π3/2[422]⊗$\pi h_{11/2}^{2}$,α=+1/2.

[f] (I): π(3/2[422]+1/2[420]),α=−1/2. Strongly coupled one–quasiproton.

[g] (J): π(3/2[422]+1/2[420]),α=+1/2.

[h] (K): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2. Three–quasiparticle band with the other signature of ν7/2[523].

[i] (L): π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

[j] (M): γ cascade #1.

[k] (N): γ cascade #2.

[l] (O): γ cascade #3.

[m] (P): γ cascade #4.

γ(^{129}La)

E(level)	Eγ	Iγ	Mult.	δ[†]	α	Comments
68.18	68.3 *3*					
172.4	104.0 *3*		E3		20.8	Mult.: from Adopted Gammas.
239.8	171.7 *3*					
248.57	180.5 *3*	100 *11*				
	248.5 *3*	17 *4*				
440.25	191.7 *2*	4 *1*				
	372.2 *3*	100 *8*				
	440.2 *3*	50 *9*				
442.2	269.7 *3*		E2		0.0660	α(K)=0.0528 *8*; α(L)=0.01044 *16*; α(M)=0.00223 *4*. α(N)=0.000481 *7*; α(O)=7.32×10^{-5} *11*; α(P)=3.47×10^{-6} *5*. A$_2$=+0.292 *1*; A$_4$=−0.074 *1*.
446.49	198.0 *3*	69 *13*				

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^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

γ(^{129}La) (continued)

E(level)	Eγ	Iγ	Mult.	δ†	α	Comments
446.49	378.3 *3*	100				
645.9	199.5 *3*	21 *7*	(M1+E2)	−1.6 *+5−8*	0.173 *5*	α(K)=0.1368 *21*; α(L)=0.029 *3*; α(M)=0.0062 *6*. α(N)=0.00133 *13*; α(O)=0.000201 *17*; α(P)=9.1×10^{-6} *4*. DCO=0.69 *6*.
	397.3 *3*	73 *13*				
	406.2 *3*	100 *9*				
696.73	250.2 *3*	32 *6*				
	448.2 *3*	100 *9*				
916.9	474.8 *3*		E2			A_2=+0.325 *1*; A_4=−0.092 *1*; DCO=1.129 *5*. δ(O/Q)=−0.14 *4*.
929.1	232.4 *3*	30 *7*				
	482.7 *3*	100				
992.52	546.1 *3*	100 *9*	(M1+E2)	+0.11 *+10−7*		DCO=0.74 *6*. δ: or δ(Q/D)=−8 *+8−3*.
	552.4 *3*	71 *14*				
	743.9 *3*	27 *10*				
1021.95	325.3 *3*	18 *4*				
	575.4 *3*	100 *10*	Q			DCO=1.06 *3*. δ(O/Q)=−0.14 *7*.
1120.3	678.2 *3*	100 *10*				
	947.8 *2*	30 *8*				
1120.5?	678.4‡ *2*					
1234.4	537.7 *3*	9 *4*				
	588.6 *3*	100 *10*				
1275.2	833.0 *2*					
1305.1	388.4 *2*	22 *5*	D			A_2=+0.011 *5*; A_4=+0.022 *6*; DCO=0.62 *5*. δ(Q/D)=+0.1 *+2−1* or +8 *+7−4*.
	862.9 *3*	100 *10*	(M1+E2)	−0.91 *+8−9*		A_2=−0.97 *1*; A_4=+0.12 *1*; DCO=0.46 *2*.
1315.9	294.1 *3*	6 *2*				
	619.0 *3*	100 *9*	Q			DCO=1.03 *3*. δ(O/Q)=0.02 *+3−2*.
1328.9	886.7 *3*					
1524.5	502.5 *3*	29 *9*				
	595.4 *3*	100 *11*				
1558.3	641.4 *3*		Q			A_2=+0.310 *2*; A_4=0.099 *2*; DCO=1.044 *7*. δ(O/Q)=−0.05 *+4−4*.
1586.8	466.5 *3*	12 *3*				
	670.1 *3*	100 *9*	(M1+E2)	+0.5 *+2−1*		A_2=−0.476 *5*; A_4=+0.046 *6*; DCO=0.55 *3*. δ: or +2.1 *+4−5*.
	1144.5 *3*	14 *3*				
1651.2	1209.0 *3*					
1654.3	632.4 *2*	55 *13*				
	661.7 *3*	100 *11*	(M1+E2)	+0.3 *2*		DCO=0.8 *1*.
1725.1	703.1 *2*	10 *3*				
	732.7 *3*	23 *5*				
	1282.8 *3*	100 *10*	D+Q	+0.3 *2*		DCO=1.13 *6*.
1753.3?	1311.1 *3*					
1753.6	731.6 *3*		Q			DCO=0.98 *7*. δ(O/Q)=−0.1 *2*.
1803.1	810.7 *3*					
1851.4	264.8 *3*	22 *5*				
	546.4 *3*	78 *19*				
	934.5 *3*	79 *18*	(D)			DCO=0.6 *2*. δ(Q/D)=−1 *+1−2*.
	1409.2 *3*	100 *12*	Q			A_2=+0.28 *3*; A_4=−0.09 *3*; DCO=1.1 *2*. δ(O/Q)=−0.2 *+3−2*.
1949.8	391.5 *3*	21 *8*				
	644.7 *3*	41 *13*				
	1033.0 *2*	100 *12*	(M1+E2)	−0.7 *+2−8*		DCO=0.47 *2*.
1951.8	393.5 *3*					
1956.7	722.3 *3*					
1972.4	667.3 *3*					
	1055.5 *3*					

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^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

γ(^{129}La) (continued)

E(level)	Eγ	Iγ	Mult.	δ†	Comments
1972.4	1530.2 *3*				
1985.3	669.6 *3*	22 *5*			
	1068.3 *3*	100 *9*	(D)		A_2=+0.221 *9*; A_4=+0.018 *9*; DCO=0.94 *3*. δ(Q/D)=0.0 *2*.
2003.9	1561.7 *3*				
2070.1	754.0 *3*				
2118.5	1201.6 *3*				
2170.0	864.9 *3*		D		A_2=−0.28 *1*; A_4=+0.08 *2*.
2206.7	1289.8 *3*				
2219.1	903.2 *3*				
	1098.7 *2*				
	1197.0 *3*		M1+E2	+0.21 *+7−4*	DCO=0.75 *5*. or δ(Q/D)=+4.4 *+8−11*.
	1522.4 *2*				
	1776.7 *3*		(D)		DCO=1.14 *7*. δ(Q/D)=−0.2 *2*.
2221.7	370.3 *3*	21 *5*			
	634.8 *3*	100 *10*			
	663.4 *3*	58 *12*	M1+E2	+0.8 *+12−4*	DCO=0.62 *6*. or δ(Q/D)=+0.9 *+11−5*.
	1304.8 *5*				
2242.9	439.8 *3*				
	517.7 *3*				
	718.4 *3*				
	926.9 *3*		(M1+E2)	−0.3 *+2−3*	DCO=0.4 *1*. or δ(Q/D)=−4 *+2−7*.
	967.6 *2*				
	1008.5 *3*				
	1221.0 *3*		Q		DCO=1.1 *2*. δ(O/Q)=−0.3 *+2−3*.
	1326.0 *3*				
	1800.5 *3*				
2278.2	1361.3 *3*				
2291.2	1374.3 *2*				
2298.2	544.4 *3*				
	1856.2 *3*				
2343.5	785.3 *3*		E2		A_2=+0.253 *3*; A_4=−0.098 *3*; DCO=0.99 *2*. δ(O/Q)=−0.05 *+7−3*.
2352.1	1435.2 *3*		(D)		A_2=+0.38 *5*; A_4=+0.07 *5*.
2431.9	446.7 *3*	46 *8*			
	873.7 *3*	100 *9*	(D)		DCO=0.96 *3*. δ(Q/D)=0.0 *2*.
2453.1	1536.2 *2*				
2454.0	895.7 *3*				
2462.9	1546.0 *4*				
2475.0	525.2 *2*	54 *12*			
	623.7 *3*	100 *10*			
	916.9 *2*	29 *8*			
	1557.8 *3*	81 *18*	Q		A_2=+0.37 *3*; A_4=−0.08 *4*; DCO=1.0 *1*. δ(O/Q)=−0.0 *2*.
2478.3	493.1 *3*	28 *6*			
	724.8 *3*				
	919.7 *3*	100 *9*			
2490.3	1573.4 *3*				
2520.6	962.3 *2*				
2568.6	216.6 *3*				
	398.7 *3*				
2599.0	845.4 *2*				
2681.5	927.9 *2*				
2705.4	1147.1 *2*				
2729.8	1171.5 *2*				
2767.8	1014.2 *3*				
2784.2	352.5 *3*	93 *20*			

Continued on next page (footnotes at end of table)

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

γ(^{129}La) (continued)

E(level)	Eγ	Iγ	Mult.	Comments
2784.2	1225.9 *3*	100 *12*		
2789.9	840.2 *3*	97 *25*		
	1231.4 *3*	100 *13*		
2803.2	1886.3 *2*			
2822.9	254.3 *3*	100 *10*		
	1264.6 *3*	65 *15*		
2841.3	771.0 *3*			
2864.4	1306.1 *3*			
2910.1	431.7 *3*	26 *5*		
	478.3 *3*	100 *9*		
	566.5 *2*			
2911.3	1994.4 *2*			
2943.3	873.2 *3*			
2955.4	733.7 *3*			
2956.0?	612.5 *2*			Eγ: from level scheme figure of 1995Ku29. E=611.9 *2* in table.
3018.0	586.2 *3*	100 *9*	Q	A_2=+0.333 *6*; A_4=−0.105 *8*.
	674.5 *3*	25 *5*	(D)	DCO=0.87 *8*. δ(Q/D)=−0.5 *+5−4*.
3044.1	1485.8 *3*			
3096.3	273.5 *3*			
	306.2 *3*			
3124.6	2207.7 *3*			
3215.8	740.9 *3*	100 *11*		
	1657.3 *3*	47 *12*	Q	DCO=1.05 *3*. δ(O/Q)=−0.05 *+7−10*.
3254.0	910.5 *3*			A_2=+0.26 *5* (1975Wa07).
3287.0	2370.1 *3*			
3310.1	966.6 *3*			
3376.2	1032.7 *2*			
3383.1	1039.6 *2*			
3411.6	501.5 *2*			
	627.5 *3*			
3420.9	325.1 *3*			
3474.9	1131.4 *2*			
3475.1	633.8 *3*			
3477.0	459.0 *3*			
	566.9 *3*			
3482.6	1139.1 *2*			
3523.4	1179.9 *2*			
3531.4	2614.5 *3*			
3636.9	1293.4 *3*			
3695.2	853.8 *2*			
	1351.9 *3*			
3697.4	856.1 *3*			
3712.4	1368.9 *3*			
3732.1	714.0 *3*			
3760.4	805.0 *3*			
3783.8	362.5 *3*			
	687.3 *2*			
3858.1	1514.6 *3*			
3952.3	1608.8 *3*			
3998.5	744.5 *3*			
4000.4	1656.9 *3*			
4000.9	746.9 *3*			
4042.8	565.8 *2*			
4043.5	827.7 *3*			
4176.9	392.5 *3*			
	756.4 *2*			
4199.1	467.0 *3*			
	722.1 *3*			
4267.2	1013.2 *3*			
4297.3	1043.3 *3*			
4555.4	823.3 *3*			

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^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

γ(^{129}La) (continued)

E(level)	Eγ	Iγ
4602.6	425.7 *2*	
	818.7 *3*	
4907.9	864.4 *3*	
5082.2	883.1 *3*	
5200.80?	439.4 *3*	
	838.6 *3*	
5361.1	1093.9 *3*	
5477.1	921.7 *3*	
55.9+x	55.9 *3*	
166.6+x	110.7 *3*	
331.0+x	164.5 *3*	
552.4+x	221.5 *3*	100 *10*
	385.7 *3*	4 *1*
829.3+x	277.0 *3*	100 *8*
	498.3 *3*	13 *2*
1152.2+x	323.0 *3*	100 *7*
1152.2+x	599.8 *3*	29 *5*
1517.7+x	365.5 *3*	100 *7*
	688.4 *3*	49 *9*
1917.4+x	399.9 *3*	100 *8*
	765.2 *3*	53 *10*
2356.6+x	439.4 *3*	
	838.6 *3*	
2820.4+x	463.8 *3*	

† From γγ(θ) in 1995Ku29.

‡ Placement of transition in the level scheme is uncertain.

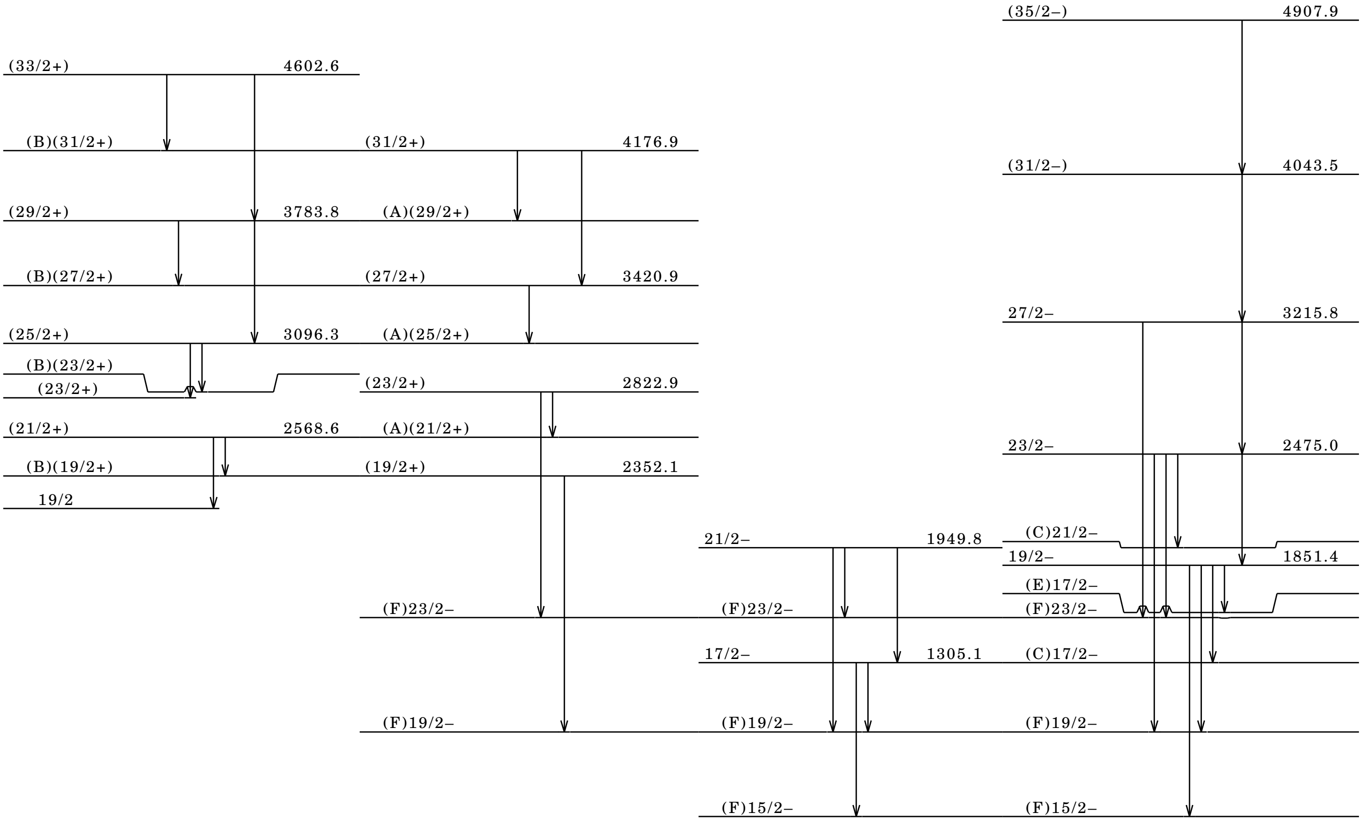
^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

(A) π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=+1/2.

(B) π1/2[550]⊗ν7/2[523]⊗ν5/2[402],α=−1/2.

(C) π1/2[550],α=+1/2.

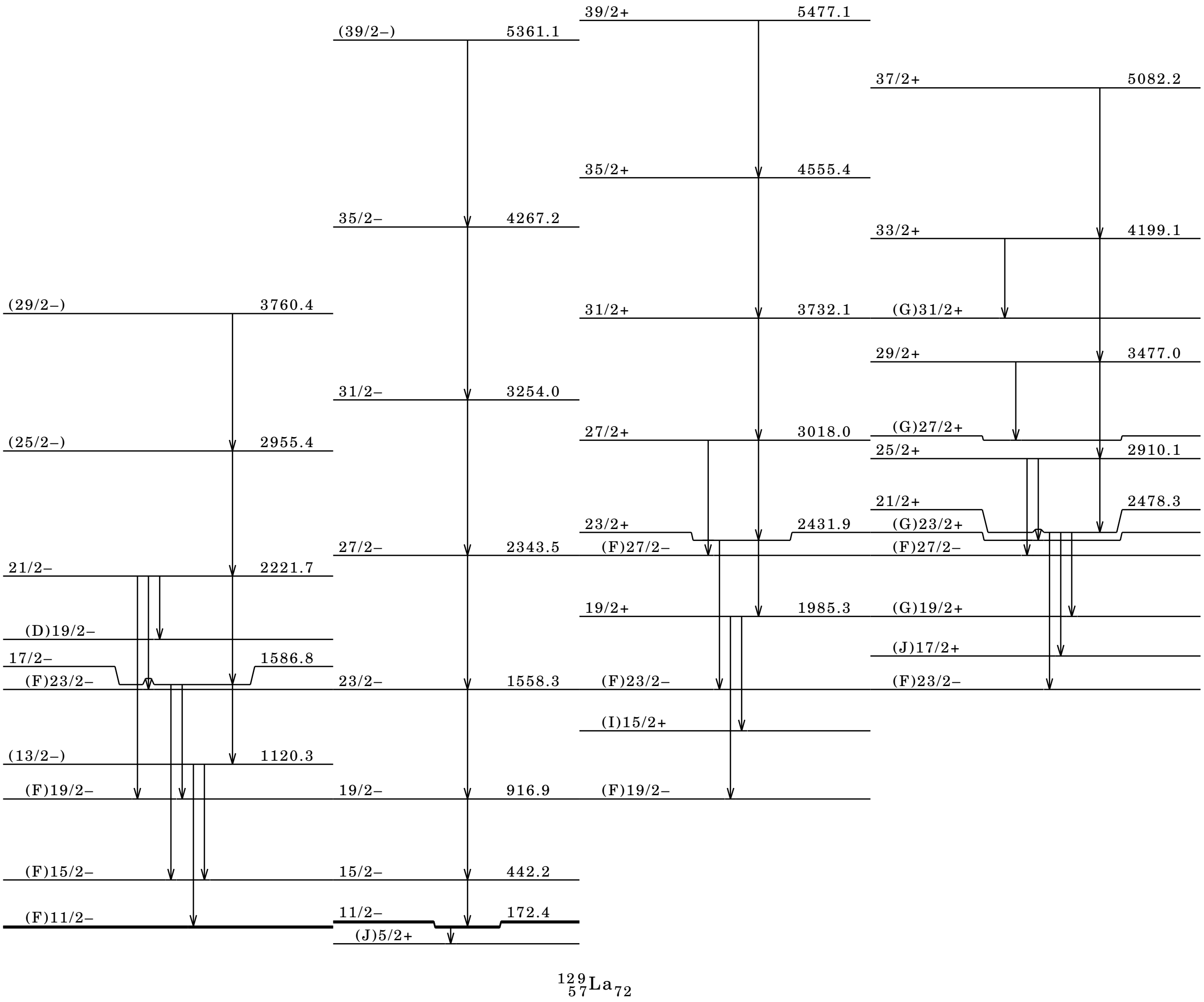
(D) π3/2[541],α=−1/2.



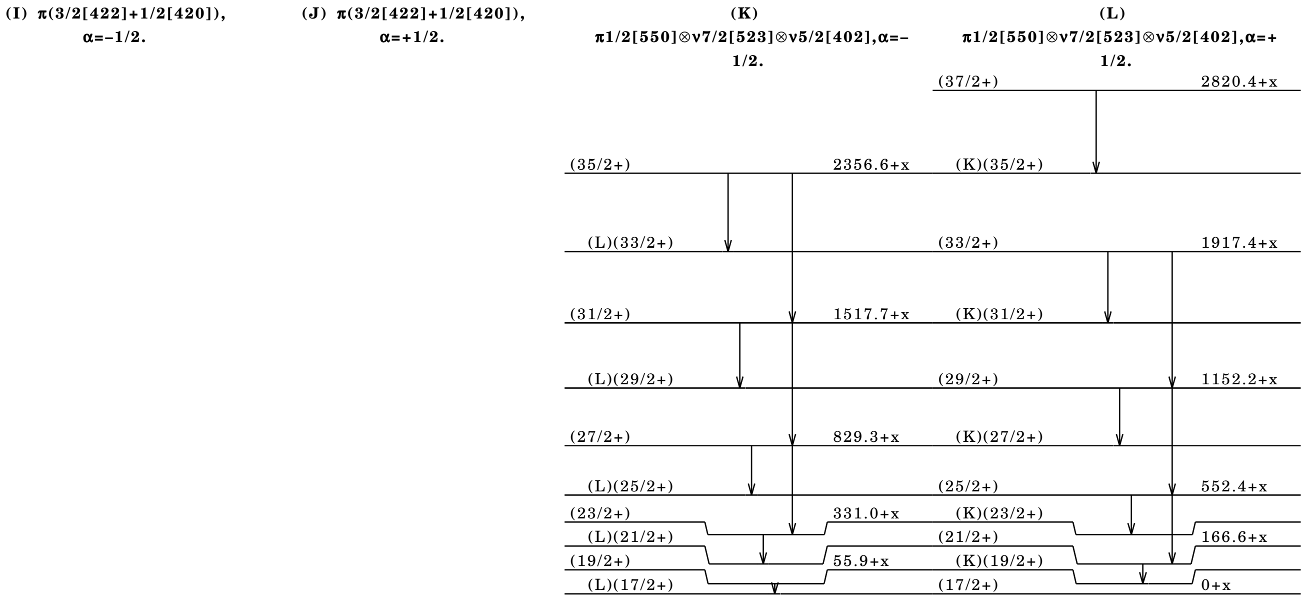
$^{129}_{57}$La$_{72}$

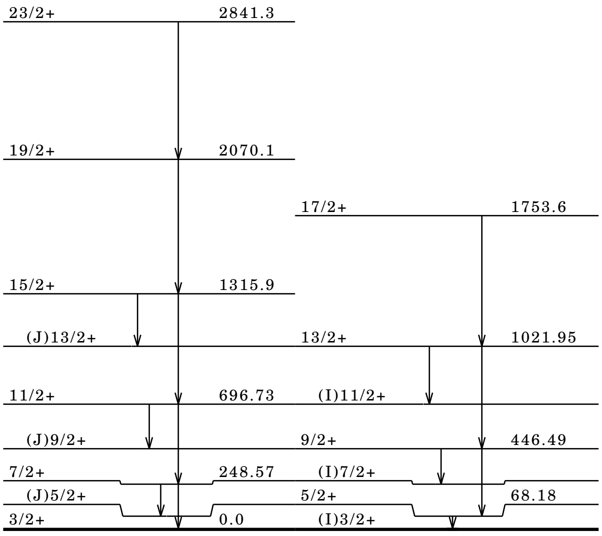
^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

(E) π3/2[541],α=+1/2. **(F) π1/2[550],α=−1/2.** **(G) π3/2[422]⊗π$h_{11/2}{}^2$, α=−1/2.** **(H) π3/2[422]⊗π$h_{11/2}{}^2$, α=+1/2.**



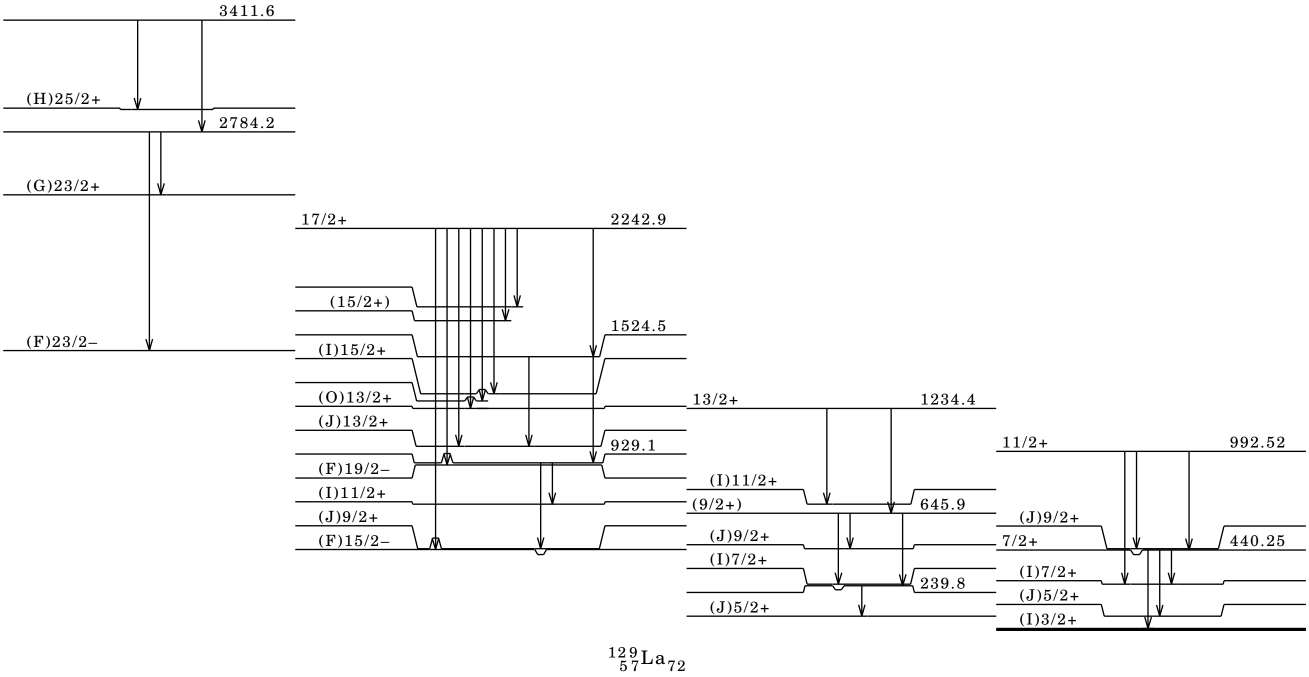
^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)





$^{129}_{57}$La$_{72}$

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)



(M) γ cascade #1.

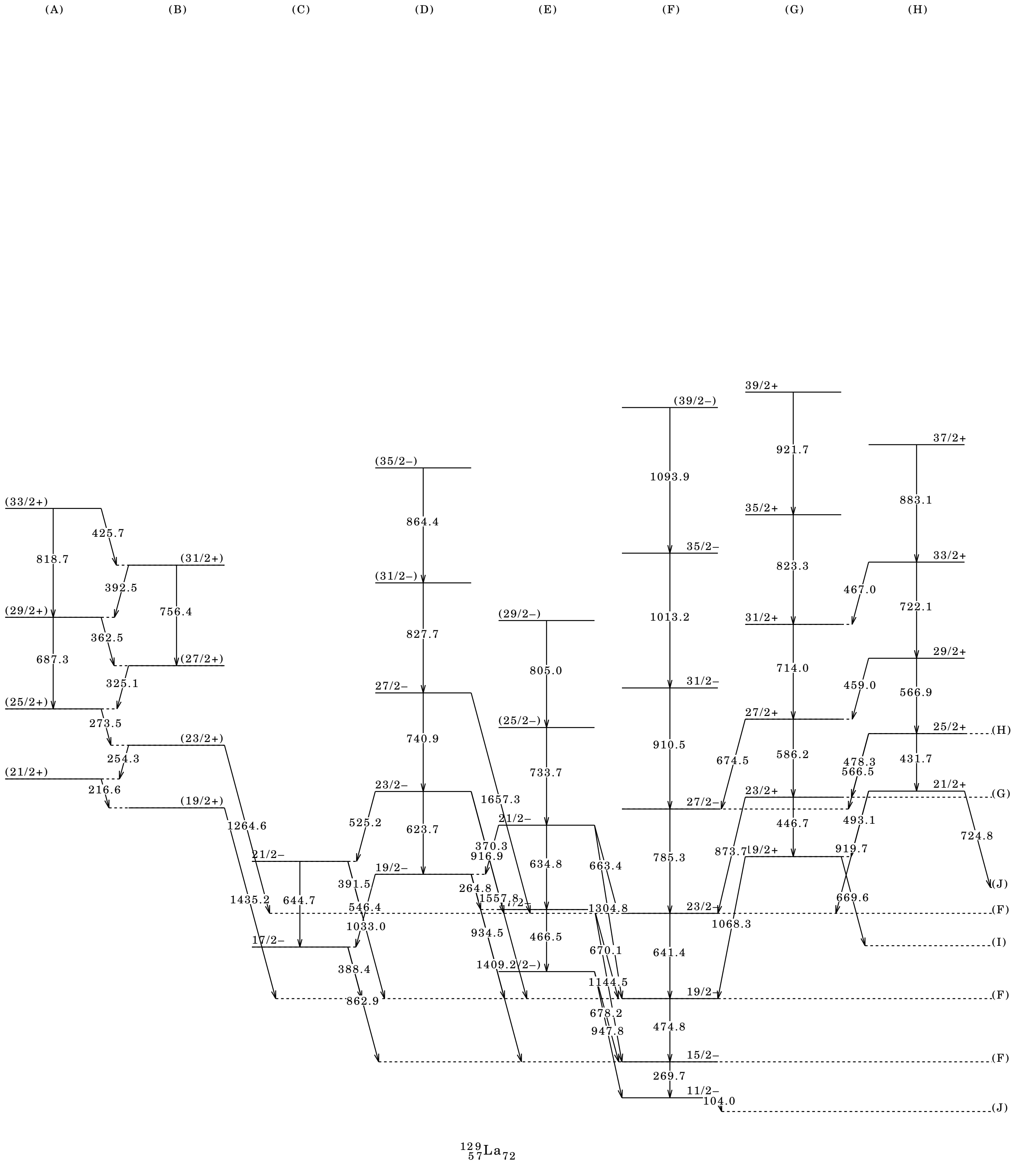
(N) γ cascade #2.

(O) γ cascade #3.

(P) γ cascade #4.

$^{119}Sn(^{14}N,4n\gamma)$ 1995Ku29,2008Sa36 (continued)

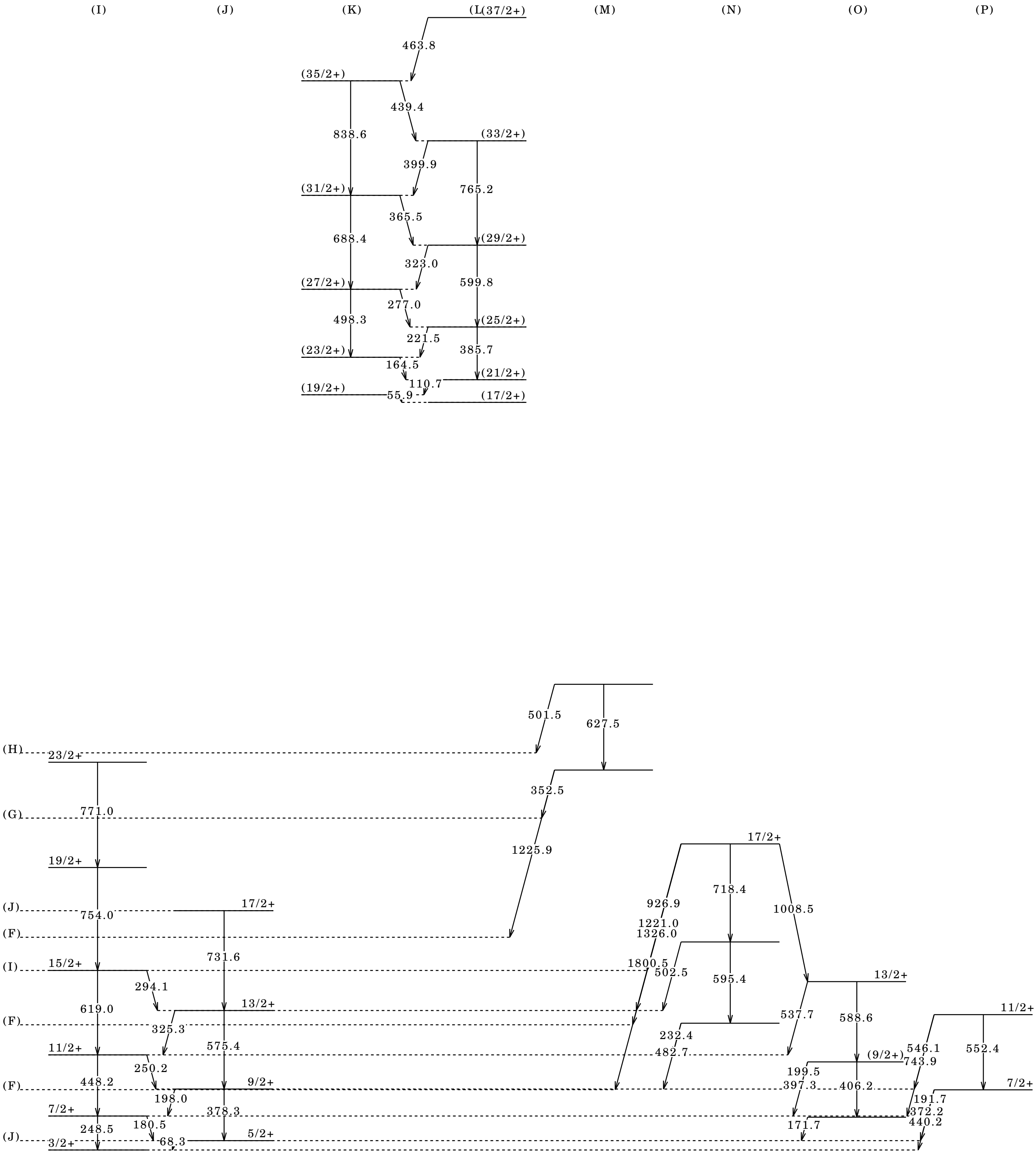
Bands for ^{129}La



$^{129}_{57}La_{72}$

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

Bands for ^{129}La

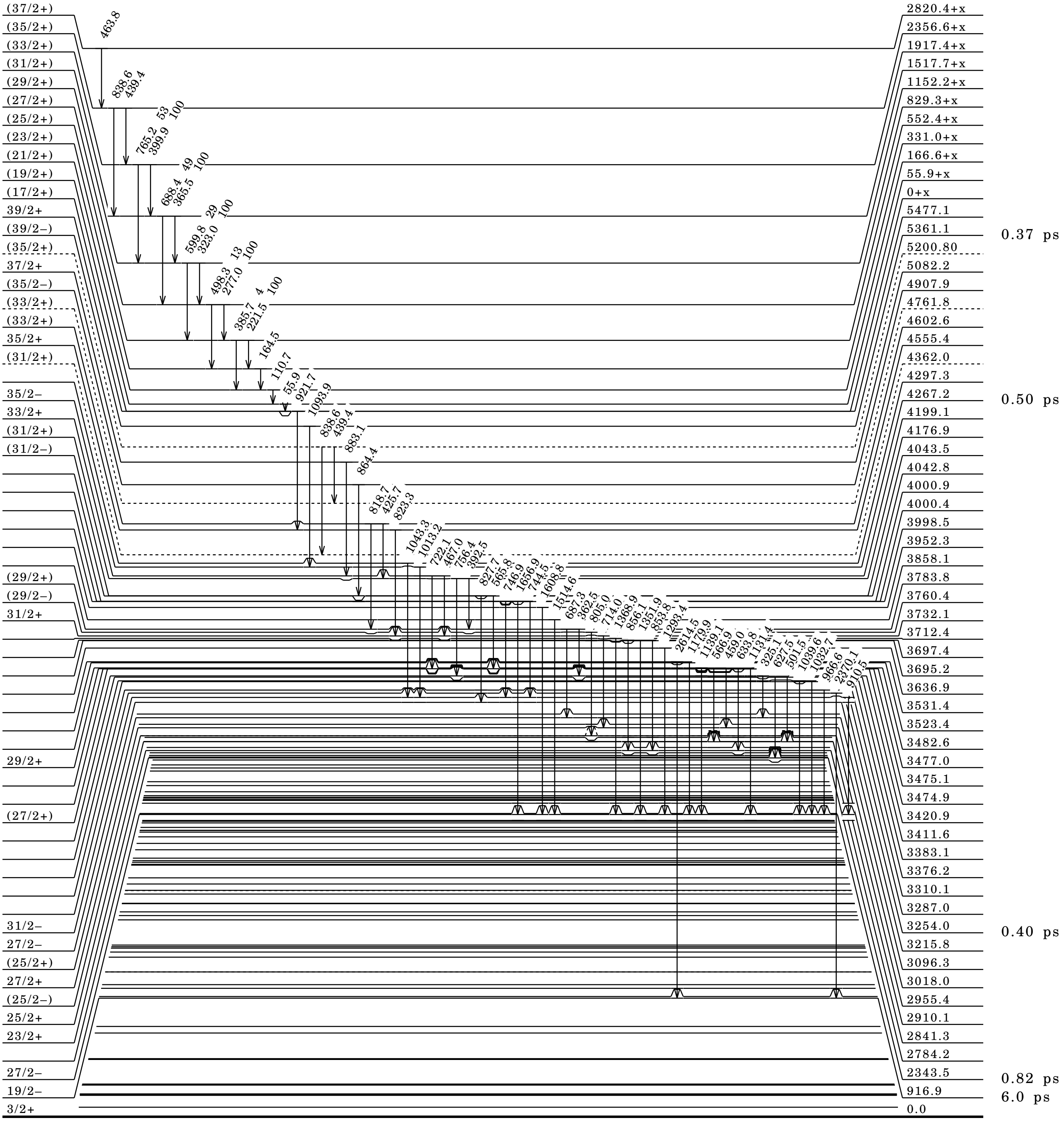


$^{129}_{57}$La$_{72}$

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

Level Scheme

Intensities: relative photon branching from each level

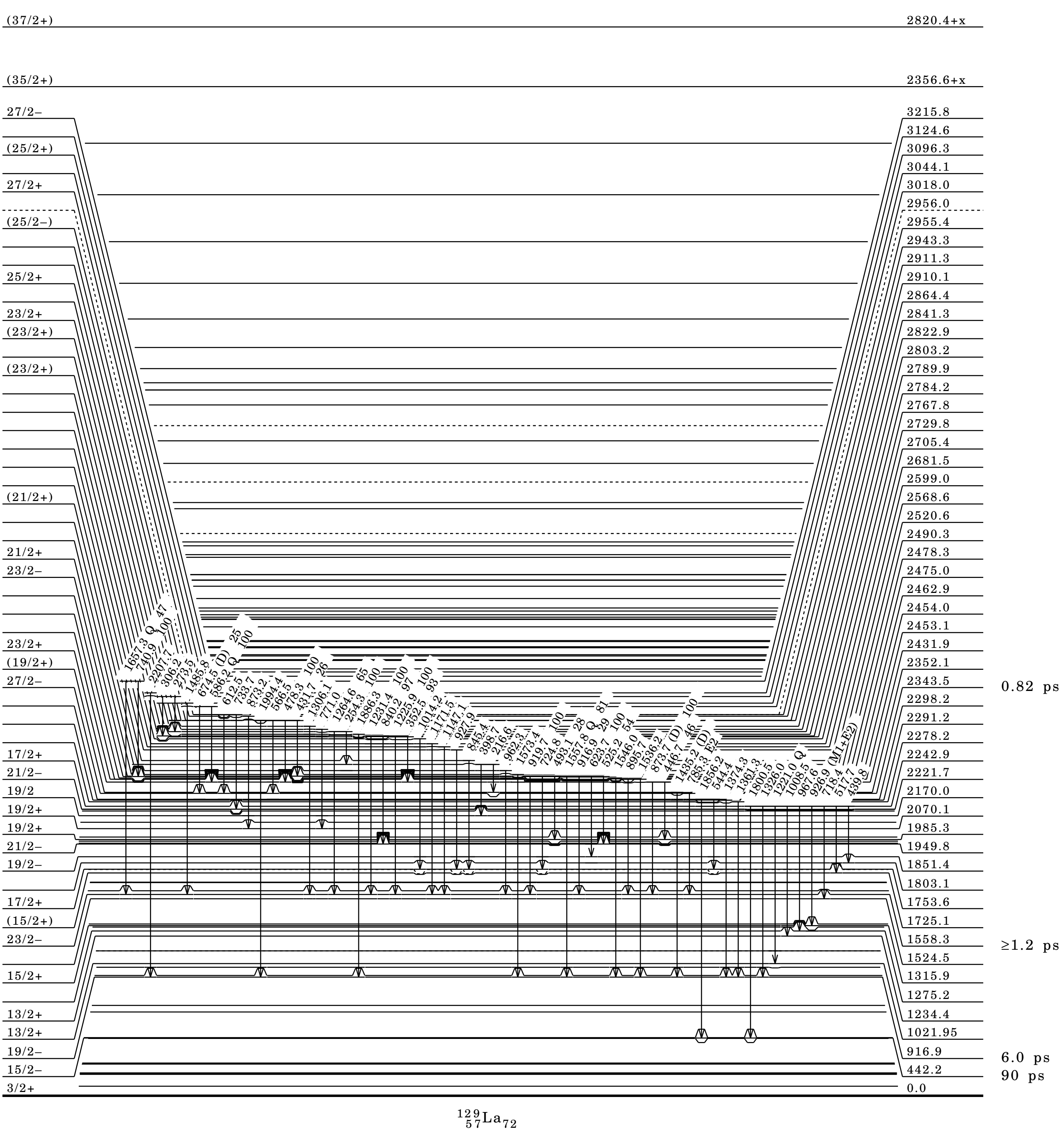


$^{129}_{57}$La$_{72}$

$^{119}Sn(^{14}N,4n\gamma)$ 1995Ku29,2008Sa36 (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level

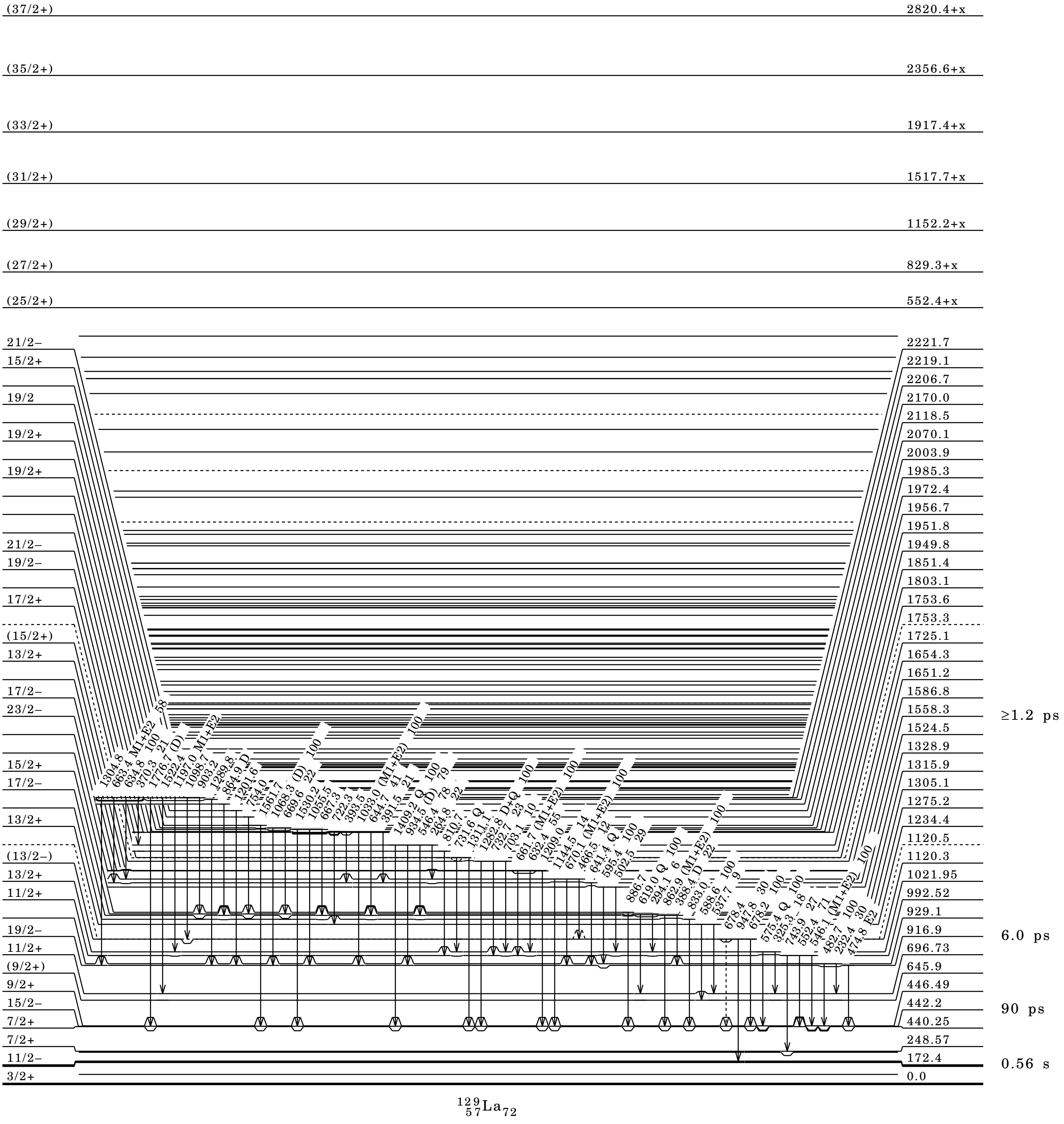


From NNDC(BNL)
program ENSDAT

^{119}Sn(^{14}N,4nγ) 1995Ku29,2008Sa36 (continued)

Level Scheme (continued)

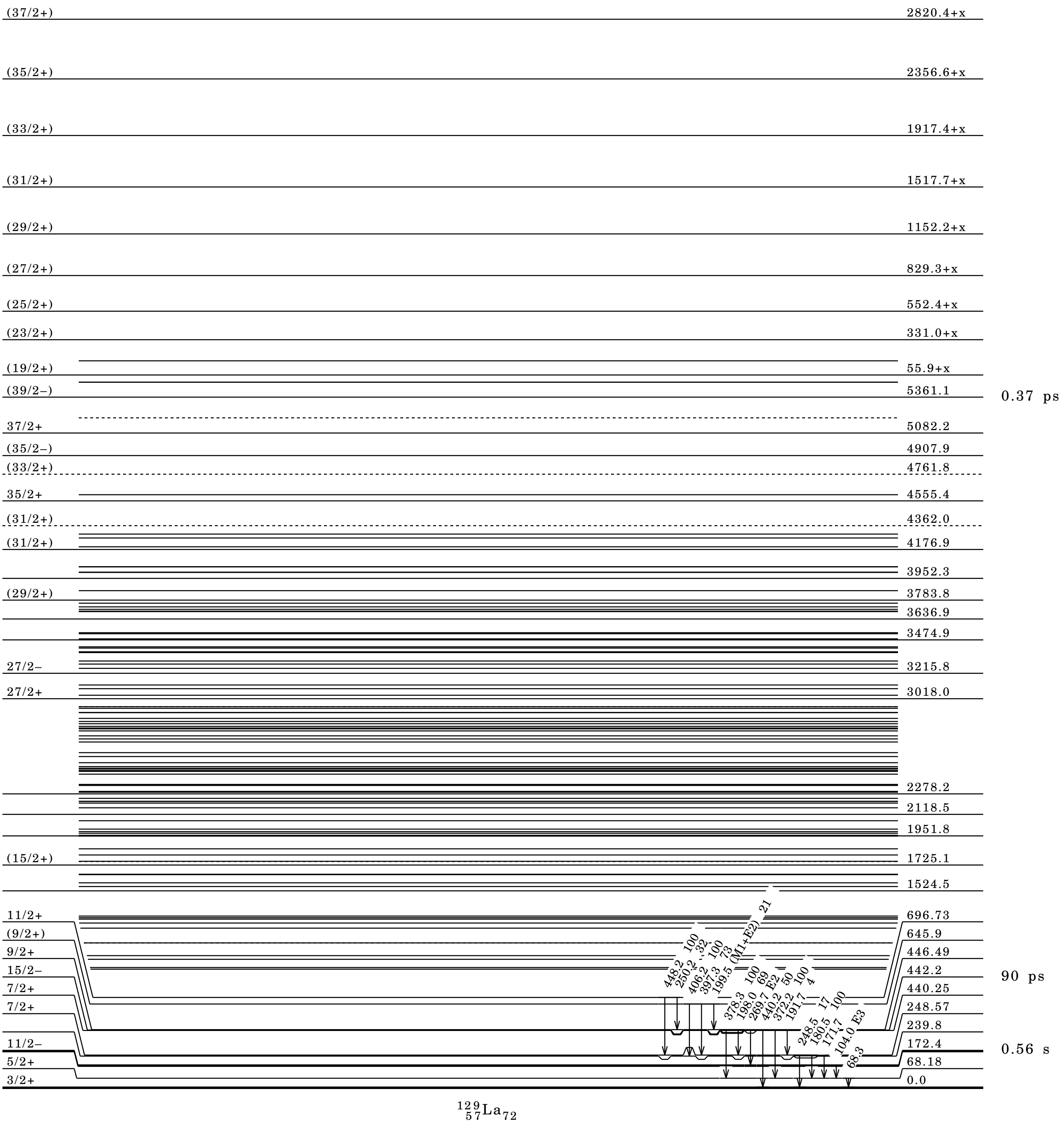
Intensities: relative photon branching from each level



$^{119}Sn(^{14}N,4n\gamma)$ 1995Ku29,2008Sa36 (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



Adopted Levels, Gammas

Q(β$^-$)=–6510 *40*; S(n)=8820 *40*; S(p)=4950 *60*; Q(α)=960 *30* 2012Wa38.
S(2n)=20450 *40*, S(2p)=8050 *30*, Q(εp)=1802 *28* (2012Wa38).
1969ArZZ: ^{129}Ce produced and identified in ^{114}Cd(^{20}Ne,5n) reaction followed by half–life measurement. Previous report (1963La03) of ≈13 min half–life for ^{129}Ce was not confirmed by 1969ArZZ. 1977Gi17 identified ^{129}Ce through in–beam γ–ray studies but did not measure its half–life. Later decay studies: 1993Al03, 1997Gi08, 2001Xi01.

^{129}Ce Levels

Cross Reference (XREF) Flags

A ^{129}Pr ε Decay (30 s)
B ^{100}Mo(^{34}S,5nγ)
C ^{104}Pd(^{28}Si,2pnγ)
D ^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ)

E(level)‡	Jπ†	XREF	T$_{1/2}$	Comments
0.0[b]	(5/2+)	ABCD	3.5 min *3*	%ε+%β$^+$=100. Jπ: 1998Io01 proposed 7/2+ based on 9/2– for the 107.6–keV isomer. See detailed Jπ comment for adopted (7/2–) assignment for 107.6 level, consequently (5/2+) for the ground state from ΔJ=1, (E1) nature of g.s. transition from the 107.6 level. T$_{1/2}$: from 1993Al03 (total absorption γ–ray spectrometer). Other: 3.5 min *5* (1969ArZZ). Value of ≈13 min (1963La03) is not confirmed by 1969ArZZ.
0.0+x	(1/2+)	A		E(level): x<0.5 keV from parallel decay paths from the 918.8 level to g.s. and the 0.0+x level. This level is expected to be an isomer.
0+y[f]	(9/2–)	B		
39.50+x *9*	(3/2+)	A		
107.60[e] *16*	(7/2–)	ABCD	60 ns *2*	μ=–0.648 *35* (1998Io01). Q=1.32 *13* (1998Io01,2014StZZ). μ: from g=–0.185 *10* (1998Io01, TDPAD method) and using Jπ=7/2– rather than 9/2– as suggested in 1998Io01. 2014StZZ quote μ=–0.83 *5*, based on 9/2 for 107.6 level. Q: TDPAD method (1998Io01). T$_{1/2}$: γγ(t) (1998Io01). Other: 62 ns *5* from γγ(t) (1977Gi17). Jπ: 9/2– is proposed in 1998Io01 based on quadrupole interaction TDPAD experiment, where fitting of the hyperfine structure is better for 9/2– (reduced χ^2=2.7) than for 7/2– (reduced χ^2=12). However, with 9/2– assignment, the α=1/2 signature branch would become the favored branch, in contradiction with many neutron h$_{11/2}$ bands in this mass region. 1998Io01 authors were aware of this issue and to counteract they tentatively introduced a new 11/2– level at 119.4 keV based on an apparent common energy difference of ≈12 keV between three sets of γ rays in ^{129}Pr to ^{129}Ce decay. But there has been no direct experimental evidence for this new 11/2– level at 119.4 keV based on the high–statistics triple γ coincidence data in ^{100}Mo(^{34}S,5nγ) (2009Pa40), and other experiments. Thus the evaluators have assigned (7/2–) for the 107.6–keV isomer, consequently (5/2+) (rather than 7/2+ proposed by 1998Io01) for the g.s. based on ΔJ=1, (E1) transition from the 107.6 level to g.s. The assignments for the 107.6 level and g.s are given in parentheses here since a direct measurement of any of these spins is not yet available, except for the work of 1998Io01, which seems to give a contradictory result for spin assignment of 107.6 level. The assignments for the 107.6 level and g.s. adopted here are supported by theoretical model calculations in 2010Bh03 and 1985Ha34. For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population. T$_{1/2}$: γγ(t) (1998Io01). Other: 62 ns *5* from γγ(t) (1977Gi17).
144.38[c] *9*	(7/2+)	ABCD		
189.59[d] *19*	(9/2–)	ABCD		
243.31+x *9*	(5/2+)	A		
279.01 *9*	(9/2+,7/2+)	A		
331.30+x *20*	(7/2+)	A		

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Adopted Levels, Gammas (continued)

^{129}Ce Levels (continued)

E(level)[‡]	Jπ[†]	XREF	$T_{1/2}$	Comments
334.93[e] *25*	(11/2–)	ABCD		
348.01[b] *17*	(9/2+)	ABCD		
419.9+y[@f] *10*	(13/2–)	BC		
589.68[c] *22*	(11/2+)	ABCD		
595.5[d] *3*	(13/2–)	BCD		
613.59 *16*		A		
616.9+x *5*		A		
671.41+x *22*	(9/2+)	A		
748.09 *24*		A		
781.1 *4*		A		
789.8+x *5*		A		
805.7[e] *3*	(15/2–)	BCD		
806+x *3*	(11/2+)	A		
808.6 *4*		A		
820.3 *4*		A		
830.0 *3*		A		
831.41+x *22*		A		
835.0+x *4*		A		
868.4[b] *3*	(13/2+)	ABCD		
918.86+x *21*		A		
967.2+y[@f] *11*	(17/2–)	BC		
979.9 *3*		A		
1134.0+x *5*	(3/2,5/2)	A		
1135.5 *4*		A		
1177.5[c] *3*	(15/2+)	BCD	0.51 ps[#] *6*	Q(transition)=7.1 *8* (2001Li69).
1186.7[d] *4*	(17/2–)	BCD		
1229.6 *5*		A		
1324.6 *11*		A		
1337.6 *3*		A		
1340+x *3*	(3/2,5/2)	A		
1347.5+x *10*		A		
1422.4[e] *4*	(19/2–)	BCD	1.24 ps[#] *10*	Q(transition)=4.35 *18* (1998Li32,2001Li69).
1445.4 *10*		A		
1514.6[b] *4*	(17/2+)	BCD		
1550.5 *5*		A		
1568.1+y[@f] *11*	(21/2–)	BC		
1678.5+x *4*	(3/2,5/2)	A		
1825.9+x *4*		A		
1870.1[c] *4*	(19/2+)	BCD	0.46 ps[#] *4*	Q(transition)=4.9 *4* (2001Li69).
1909.0[d] *4*	(21/2–)	BCD	0.20 ps[§] *6*	Q(transition)=6.50 *9* (2009Li67).
2008.9 *4*		A		
2150.4[e] *4*	(23/2–)	BCD	0.61 ps[§] *34*	Q(transition)=4.0 *14* (2009Li67). $T_{1/2}$: other: 1.01 ps *19* (1998Li32,2001Li69).
2202.0+y[f] *12*	(25/2–)	BC		
2233.1[b] *4*	(21/2+)	BCD		
2536.2[a] *4*	(23/2+)	BCD	0.374 ps[#] *35*	Q(transition)=5.3 *5* (2001Li69).
2622.1[c] *5*	(23/2+)	B		
2665.5[d] *5*	(25/2–)	BCD	0.334 ps[§] *22*	Q(transition)=3.57 *11* (2009Li67).
2776.0[&] *5*	(25/2+)	BCD		
2867.1[b] *6*	(25/2+)	B		
2889.7[e] *5*	(27/2–)	BCD	0.89 ps[§] *29*	Q(transition)=2.9 *6* (2009Li67). $T_{1/2}$: other: 0.47 ps *4* (1998Li32,2001Li69).
2901.2+y[f] *12*	(29/2–)	B		
3011.2[a] *5*	(27/2+)	BCD	1.74 ps[#] *25*	Q(transition)=4.5 *3* (2001Li69).
3145.5[c] *6*	(27/2+)	B		
3208.2[d] *5*	(29/2–)	BCD	1.14 ps[§] *26*	Q(transition)=5.1 *5* (2009Li67).
3291.8[&] *5*	(29/2+)	BCD		
3447.1[b] *7*	(29/2+)	B		
3461.2[e] *5*	(31/2–)	BCD	0.78 ps[§] *27*	Q(transition)=4.6 *9* (2009Li67). $T_{1/2}$: other: 0.92 ps *11* (1998Li32,2001Li69).
3586.1[a] *5*	(31/2+)	BCD	<1.8 ps[#]	$T_{1/2}$: effective half–life, not corrected for side feeding. Q(transition)>3.2 (2001Li69).
3675.4+y[f] *12*	(33/2–)	BC		

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Adopted Levels, Gammas (continued)

^{129}Ce Levels (continued)

E(level)[‡]	Jπ[†]	XREF	$T_{1/2}$	Comments
3788.2[d] *5*	(33/2−)	BCD	0.30 ps[§] *24*	Q(transition)=6.3 *19* (2009Li67).
3803.7[c] *7*	(31/2+)	B		
3934.4[&] *6*	(33/2+)	BC		
4117.4[e] *6*	(35/2−)	BCD	0.33 ps[§] *25*	Q(transition)=4.7 *15* (2009Li67). $T_{1/2}$: other: 0.69 ps *8* (1998Li32,2001Li69).
4179.0[b] *8*	(33/2+)	B		
4295.0[a] *6*	(35/2+)	BC		
4507.4[d] *6*	(37/2−)	BC	<0.33 ps[§]	Q(transition)>3.5 (2009Li67).
4526.4+y[f] *13*	(37/2−)	BC		
4596.9[c] *10*	(35/2+)	B		
4711.9[&] *6*	(37/2+)	B		
4910.7[e] *6*	(39/2−)	BCD	<0.28 ps[§]	$T_{1/2}$: other: <0.6 ps (effective half–life,1998Li32,2001Li69). Q(transition)>3.2 (2009Li67).
5048.8[b] *10*	(37/2+)	B		
5135.8[a] *6*	(39/2+)	BC		
5367.0[d] *6*	(41/2−)	BC		
5449.8+y[f] *13*	(41/2−)	BC		
5468.0[c] *11*	(39/2+)	B		
5619.3[&] *6*	(41/2+)	BC		
5836.8[e] *6*	(43/2−)	BC		
6009.8[b] *12*	(41/2+)	B		
6105.3[a] *7*	(43/2+)	BC		
6361.4[d] *7*	(45/2−)	BC		
6448.4+y[f] *14*	(45/2−)	BC		
6649.1[&] *9*	(45/2+)	BC		
6884.8[e] *8*	(47/2−)	BC		
6970.8[b] *13*	(45/2+)	B		
7193.1[a] *10*	(47/2+)	BC		
7479.7[d] *10*	(49/2−)	BC		
7520.8+y[f] *17*	(49/2−)	BC		
7789.9[&] *11*	(49/2+)	BC		
8038.5[e] *10*	(51/2−)	BC		
8385.0[a] *11*	(51/2+)	BC		
8667.8+y[f] *20*	(53/2−)	BC		
8711.9[d] *11*	(53/2−)	BC		
9033.6[&] *12*	(53/2+)	B		
9282.5[e] *12*	(55/2−)	BC		
9672.0[a] *13*	(55/2+)	B		
9890.3+y[f] *22*	(57/2−)	BC		
10045.3[d] *13*	(57/2−)	B		
10601.4[e] *13*	(59/2−)	B		
11189.4+y[f] *24*	(61/2−)	BC		
11470.3[d] *14*	(61/2−)	B		
11979.4[e] *15*	(63/2−)	B		
12565+y[f] *3*	(65/2−)	BC		
14021+y[f] *3*	(69/2−)	BC		
15554+y[f] *3*	(73/2−)	B		
17178+y[f] *4*	(77/2−)	B		
18905+y[f] *4*	(81/2−)	B		

[†] Spin and parity values are those proposed by 2009Pa40 on the basis of cranked–shell model analysis and measured γ multipolarities. Bandhead spins and parities were estimated from Nilsson levels for N=71. For some low–spin levels populated only in ε decay, the assignments are from 1996Gi08 based on systematics and models. The evaluators consider all Jπ assignments as tentative, including those for the g.s. and for the 60–ns isomer at 108 keV.

[‡] From least–squares fit to the adopted Eγ data. Eγ data in XREF=D differ considerably from the adopted Eγ values, therefore level energies at high spins in XREF=D differ by about 4 keV from the adopted level energies. However, it does not affect the level identification.

[§] From DSAM (2009Li67).

[#] From DSAM (1998Li32,2001Li69) unless otherwise stated. Both papers report same lifetimes for 19/2− to 39/2− levels in the 7/2[523] band. 2001Li69 report, in addition, lifetimes for 15/2+ to 31/2+ levels in the 5/2[402] band.

[@] Possibly feeds lowest members of positive–parity band. No linking transitions were found.

[&] (A): $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2}),\alpha=+1/2$. Quasiparticle configuration=fEB. Band crossing at ħω=0.294 MeV.

[a] (B): $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2}),\alpha=-1/2$. Quasiparticle configuration=eEB. Band crossing at ħω=0.301 MeV.

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Adopted Levels, Gammas (continued)

^{129}Ce Levels (continued)

[b] (C): ν$d_{5/2}$, α=+1/2. Quasiparticle configuration=a below, aEF above the band crossing. Band crossing at ħω=0.318 MeV. Second band crossing at ħω=0.48 MeV due to pair of π$h_{11/2}$ neutrons.

[c] (D): ν$d_{5/2}$, α=−1/2. Quasiparticle configuration=b below, bEF above the band crossing. Band crossing at ħω=0.318 MeV.

[d] (E): ν$h_{11/2}$,α=+1/2. Quasiparticle configuration=f below, fEF above the band crossing. Band crossing at ħω=0.312 MeV.

[e] (F): ν$h_{11/2}$,α=−1/2. Quasiparticle configuration=e below, eEF above the band crossing. Band crossing at ħω=0.325 MeV.

[f] (G): ν1/2[541], α=+1/2. Decoupled enhanced deformation band. Interpreted as SD band in 1996Ga13 on the basis of Q(intrinsic) measurement. Possible transitions to band based on 5/2+ and its signature partner.

γ(^{129}Ce)

E(level)	Eγ[†]	Iγ[†]	Mult.[‡]	δ[‡]	α[§]	Comments
39.50+x	39.5 *1*	100	[M1]		2.62 *5*	α(L)=2.07 *4*; α(M)=0.434 *7*. α(N)=0.0962 *16*; α(O)=0.01554 *25*; α(P)=0.001162 *19*.
107.60	107.7 *2*	100	(E1)		0.198	B(E1)(W.u.)=2.95×10^{-6} *10*. α(K)=0.169 *3*; α(L)=0.0234 *4*; α(M)=0.00486 *8*. α(N)=0.001063 *16*; α(O)=0.0001656 *25*; α(P)=1.027×10^{-5} *16*.
144.38	144.3 *1*	100	[M1+E2]		0.432 *14*	α(K)=0.361 *6*; α(L)=0.056 *7*; α(M)=0.0118 *16*. α(N)=0.0026 *4*; α(O)=0.00041 *5*; α(P)=2.73×10^{-5} *6*.
189.59	81.9 *1*	100	[M1+E2]		2.27 *18*	α(K)=1.82 *4*; α(L)=0.36 *12*; α(M)=0.08 *3*. α(N)=0.017 *6*; α(O)=0.0026 *8*; α(P)=0.000136 *3*.
243.31+x	203.8 *2*	100 *5*	[M1+E2]		0.1629 *25*	α(K)=0.1379 *21*; α(L)=0.0198 *12*; α(M)=0.0042 *3*. α(N)=0.00092 *6*; α(O)=0.000148 *8*; α(P)=1.05×10^{-5} *3*.
	243.3 *1*	79 *4*	[E2]		0.0957	α(K)=0.0749 *11*; α(L)=0.01633 *23*; α(M)=0.00354 *5*. α(N)=0.000769 *11*; α(O)=0.0001152 *17*; α(P)=4.78×10^{-6} *7*.
279.01	134.6 *2*	16.4 *23*	[M1+E2]		0.527 *19*	α(K)=0.440 *8*; α(L)=0.069 *10*; α(M)=0.0146 *23*. α(N)=0.0032 *5*; α(O)=0.00051 *7*; α(P)=3.32×10^{-5} *7*.
	279.0 *1*	100 *5*	[M1,E2]		0.0691 *12*	α(K)=0.0588 *13*; α(L)=0.00813 *19*; α(M)=0.00170 *5*. α(N)=0.000377 *10*; α(O)=6.08×10^{-5} *12*; α(P)=4.46×10^{-6} *13*.
331.30+x	88.0 *5*	8.8 *12*	[M1+E2]		1.83 *14*	α(K)=1.48 *4*; α(L)=0.28 *8*; α(M)=0.060 *19*. α(N)=0.013 *4*; α(O)=0.0020 *6*; α(P)=0.000111 *3*.
	291.8 *2*	100 *5*	[E2]		0.0532	α(K)=0.0426 *6*; α(L)=0.00835 *12*; α(M)=0.00180 *3*. α(N)=0.000392 *6*; α(O)=5.94×10^{-5} *9*; α(P)=2.80×10^{-6} *4*.
334.93	145.3 *2*	100 *3*	(M1)		0.412	α(K)=0.351 *6*; α(L)=0.0478 *7*; α(M)=0.01000 *15*. α(N)=0.00222 *4*; α(O)=0.000359 *6*; α(P)=2.72×10^{-5} *4*.
	227.8 *5*	32 *15*	(E2)		0.1189 *19*	α(K)=0.0922 *15*; α(L)=0.0210 *4*; α(M)=0.00456 *8*. α(N)=0.000989 *17*; α(O)=0.0001475 *24*; α(P)=5.81×10^{-6} *9*. Iγ: data are discrepant with values of 11.0 *10* in ε decay, 60.5 *14* in (^{34}S,nγ) and 24 *4* in (^{16}O,3nγ). Unweighted average is taken.
348.01	203.5 *2*	100 *3*	(M1+E2)	−0.40 *8*	0.1642 *24*	α(K)=0.1381 *20*; α(L)=0.0207 *8*; α(M)=0.00436 *17*. α(N)=0.00096 *4*; α(O)=0.000153 *5*; α(P)=1.035×10^{-5} *20*.
	348.7 *3*	31.2 *24*	(E2)		0.0306	α(K)=0.0249 *4*; α(L)=0.00447 *7*; α(M)=0.000957 *14*. α(N)=0.000209 *3*; α(O)=3.21×10^{-5} *5*; α(P)=1.679×10^{-6} *24*. Iγ: others: 22.5 *19* in ε decay, 74 *9* and 46 *7* in (^{16}O,3nγ); the latter are in severe disagreement.
419.9+y	419.9[#] *10*	100				

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Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	δ‡	α§	Comments
589.68	241.8 *3*	100 *5*	(M1+E2)	−0.25 *8*	0.1019	α(K)=0.0867 *14*; α(L)=0.0120 *3*; α(M)=0.00252 *6*. α(N)=0.000558 *13*; α(O)=8.99×10^{-5} *18*; α(P)=6.60×10^{-6} *12*.
	444.9 *3*	58 *4*	(E2)		0.01492	α(K)=0.01237 *18*; α(L)=0.00202 *3*; α(M)=0.000428 *6*. α(N)=9.40×10^{-5} *14*; α(O)=1.464×10^{-5} *21*; α(P)=8.59×10^{-7} *13*. Iγ: others: 103 *4* in ε decay, 244 *12* and 108 *11* in (^{16}O,3nγ) are in disagreement.
595.5	260.7 *3*	100 *4*	(M1+E2)	0.7 *2*	0.0812 *15*	α(K)=0.0678 *18*; α(L)=0.0106 *5*; α(M)=0.00224 *10*. α(N)=0.000493 *21*; α(O)=7.76×10^{-5} *25*; α(P)=4.96×10^{-6} *22*.
	405.8 *3*	25.8 *16*	(E2)		0.0194	α(K)=0.01601 *23*; α(L)=0.00270 *4*; α(M)=0.000576 *9*. α(N)=0.0001261 *18*; α(O)=1.95×10^{-5} *3*; α(P)=1.102×10^{-6} *16*. Iγ: others: 127 *5* and 72 *5* in (^{16}O,3nγ) are in disagreement.
613.59	334.5 *2*	16.7 *21*				
	506.1 *2*	100 *3*				
616.9+x	373 *1*	4.2 *8*				
	577.5 *5*	100 *8*				
671.41+x	340 *1*	9.3 *19*				
	428.1 *2*	100 *4*				
748.09	558.5 *2*	100 *6*				
	640.5 *3*	35 *3*				
781.1	≈446	<11				
	591.5 *3*	100 *6*				
	≈675	66 *5*				
789.8+x	546.5 *5*	100				
805.7	210.2 *3*	60.0 *25*	(M1+E2)	−1.1 *1*	0.1526 *23*	α(K)=0.1228 *19*; α(L)=0.0235 *7*; α(M)=0.00504 *15*. α(N)=0.00110 *4*; α(O)=0.000168 *5*; α(P)=8.48×10^{-6} *17*. Iγ: others: 25.0 *19* and 100 *6* in (^{16}O,3nγ) are in disagreement.
	470.7 *3*	100 *4*	(Q)			
806+x	≈475	100				
808.6	619 *1*	100 *6*				
	701.0 *3*	69 *4*				
820.3	630 *1*	76 *6*				
	712.8 *3*	100 *7*				
830.0	640.5 *3*	16.6 *14*				
	722.4 *3*	100 *7*				
831.41+x	≈501	4.6 *15*				
	588.1 *2*	100 *3*				
835.0+x	591.7 *3*	100				
868.4	278.7 *3*	100 *4*	[M1+E2]		0.0693 *12*	α(K)=0.0590 *13*; α(L)=0.00815 *20*; α(M)=0.00171 *5*. α(N)=0.000378 *10*; α(O)=6.10×10^{-5} *12*; α(P)=4.48×10^{-6} *14*.
	520.6 *3*	88 *5*	(Q)			Iγ: other: 154 *15* in (^{16}O,3nγ) is in disagreement.
918.86+x	305.3 *2*	43 *3*				
	675.5 *3*	100 *7*				
967.2+y	547.3 *3*	100				
979.9	789.7 *3*	81 *6*				
	873.0 *3*	100 *6*				
1134.0+x	1094.5 *5*	100				
1135.5	1027.9 *3*	100				

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Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	δ‡	α§	Comments
1177.5	309.5 *3*	48 *3*	(M1+E2)	−0.8 *4*	0.0496 *24*	B(M1)(W.u.)=(0.28 *12*); B(E2)(W.u.)=(1.3×10^{3} *8*). α(K)=0.042 *3*; α(L)=0.00633 *21*; α(M)=0.00134 *6*. α(N)=0.000295 *11*; α(O)=4.66×10^{-5} *10*; α(P)=3.0×10^{-6} *3*. Iγ: others: 29 *3* and 100 *6* in (^{16}O,3nγ), the former value in disagreement. δ: B(E2)(W.u.) is too high for $T_{1/21/2}$=0.51 ps and δ(E2/M1)=0.8 *4*; RUL<300 suggests either δ<0.3 or a longer half-life.
	587.5 *3*	100 *6*	(E2)		0.00703	B(E2)(W.u.)=270 *40*. α(K)=0.00591 *9*; α(L)=0.000884 *13*; α(M)=0.000187 *3*. α(N)=4.11×10^{-5} *6*; α(O)=6.49×10^{-6} *10*; α(P)=4.20×10^{-7} *6*.
1186.7	381.2 *3*	46 *4*	[M1+E2]		0.0303 *8*	α(K)=0.0259 *7*; α(L)=0.00349 *6*; α(M)=0.000729 *11*. α(N)=0.0001617 *24*; α(O)=2.61×10^{-5} *5*; α(P)=1.96×10^{-6} *7*.
	591.2 *3*	100 *7*	Q			
1229.6	1040.0 *5*	100 *10*				
	1122 *1*	48 *5*				
1324.6	1217 *1*	100				
1337.6	≈990	<14				
	1193.2 *3*	100 *5*				
	1230 *1*	21.9 *14*				
1340+x	1300 *3*	100 *6*				
1347.5+x	1104 *3*	20 *3*				
	1308 *1*	100 *10*				
1422.4	236.0 *3*	18.0 *14*	(M1+E2)		0.1087	α(K)=0.0923 *16*; α(L)=0.0130 *6*; α(M)=0.00273 *12*. α(N)=0.000604 *25*; α(O)=9.7×10^{-5} *4*; α(P)=7.00×10^{-6} *19*. Iγ: other: 11.9 *13* in (^{16}O,3nγ).
	616.5 *3*	100	(E2)		0.00622	B(E2)(W.u.)=110 *9*. α(K)=0.00524 *8*; α(L)=0.000774 *11*; α(M)=0.0001630 *23*. α(N)=3.59×10^{-5} *5*; α(O)=5.69×10^{-6} *8*; α(P)=3.74×10^{-7} *6*.
1445.4	1301 *1*	100				
1514.6	337.1 *3*	53 *3*	(M1+E2)		0.0418 *10*	α(K)=0.0356 *9*; α(L)=0.00485 *7*; α(M)=0.001014 *16*. α(N)=0.000225 *4*; α(O)=3.63×10^{-5} *6*; α(P)=2.70×10^{-6} *9*. Iγ: others: 30 *3* and 32 *5* in (^{16}O,3nγ) are in disagreement.
	646.1 *3*	100 *6*	(Q)			
1550.5	960.8 *4*	100				
1568.1+y	600.9 *3*	100				
1678.5+x	1639.0 *3*	100				
1825.9+x	1154.5 *3*	100				
1870.1	355.5 *3*	44 *3*	[M1+E2]		0.0363 *9*	α(K)=0.0310 *8*; α(L)=0.00420 *6*; α(M)=0.000879 *13*. α(N)=0.000195 *3*; α(O)=3.15×10^{-5} *5*; α(P)=2.35×10^{-6} *8*. Iγ: others: 11 *4* in (^{16}O,3nγ) is in disagreement.
	692.7 *3*	100 *8*	[E2]		0.00466	α(K)=0.00394 *6*; α(L)=0.000566 *8*; α(M)=0.0001190 *17*. α(N)=2.62×10^{-5} *4*; α(O)=4.17×10^{-6} *6*; α(P)=2.83×10^{-7} *4*. B(E2)(W.u.)=137 *18*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	δ‡	α§	Comments
1909.0	486.6 *3*	48 *5*	[M1+E2]		0.0162 *5*	α(K)=0.0139 *5*; α(L)=0.00184 *4*; α(M)=0.000385 *8*. α(N)=8.53×10^{-5} *18*; α(O)=1.38×10^{-5} *4*; α(P)=1.05×10^{-6} *4*. Iγ: others: 15 *3* in (^{16}O,3nγ) is in disagreement.
	722.3 *3*	100 *7*	[E2]		0.00421	B(E2)(W.u.)=250 *80*. α(K)=0.00357 *5*; α(L)=0.000508 *8*; α(M)=0.0001066 *15*. α(N)=2.35×10^{-5} *4*; α(O)=3.75×10^{-6} *6*; α(P)=2.57×10^{-7} *4*.
2008.9	1864.5 *3*	100				
2150.4	241.4 *3*	11.7 *13*	(M1+E2)		0.1022 *16*	α(K)=0.0868 *16*; α(L)=0.0122 *5*; α(M)=0.00256 *11*. α(N)=0.000566 *22*; α(O)=9.1×10^{-5} *3*; α(P)=6.59×10^{-6} *18*. Iγ: 12.5 *11* from (^{16}O,3nγ) agrees well.
	727.9 *3*	100 *5*	(E2)		0.00413	B(E2)(W.u.)=100 *60*. α(K)=0.00351 *5*; α(L)=0.000498 *7*; α(M)=0.0001045 *15*. α(N)=2.31×10^{-5} *4*; α(O)=3.68×10^{-6} *6*; α(P)=2.52×10^{-7} *4*.
2202.0+y	633.9 *3*	100				
2233.1	363.1 *3*	45 *4*	(M1+E2)	−0.95 *75*	0.031 *4*	α(K)=0.026 *4*; α(L)=0.00394 *7*; α(M)=0.000832 *12*. α(N)=0.000183 *3*; α(O)=2.90×10^{-5} *9*; α(P)=1.9×10^{-6} *4*. Iγ: other: 31 *6* from (^{16}O,3nγ).
	718.4 *3*	100 *6*	(Q)			
2536.2	303.2 *3*	67 *4*	(M1+E2)	−0.95 *75*	0.052 *4*	B(M1)(W.u.)=(0.4 *4*); B(E2)(W.u.)=(2.8×10^{3} *24*). α(K)=0.043 *5*; α(L)=0.0068 *4*; α(M)=0.00144 *11*. α(N)=0.000318 *21*; α(O)=4.99×10^{-5} *19*; α(P)=3.1×10^{-6} *6*. Iγ: other: 32 *4* from (^{16}O,3nγ) is in disagreement. δ: B(E2)(W.u.) is too high for $T_{1/21/2}$=0.51 ps and δ(E2/M1)=0.95 *75*; RUL<300 suggests either δ<0.2 or longer half–life.
	666.1 *3*	100 *5*	[E2]		0.00513	B(E2)(W.u.)=175 *20*. α(K)=0.00433 *6*; α(L)=0.000628 *9*; α(M)=0.0001320 *19*. α(N)=2.91×10^{-5} *4*; α(O)=4.62×10^{-6} *7*; α(P)=3.10×10^{-7} *5*.
2622.1	389.0 *6*	<70				
	752.1 *6*	100 *17*				
2665.5	515.2 *3*	68 *7*	[M1+E2]		0.0140 *5*	α(K)=0.0120 *4*; α(L)=0.00159 *4*; α(M)=0.000332 *7*. α(N)=7.37×10^{-5} *16*; α(O)=1.20×10^{-5} *3*; α(P)=9.1×10^{-7} *4*. Iγ: other: 33 *7* from (^{16}O,3nγ) is in disagreement.
	756.6 *3*	100 *12*	[E2]		0.00377	B(E2)(W.u.)=105 *17*. α(K)=0.00320 *5*; α(L)=0.000451 *7*; α(M)=9.47×10^{-5} *14*. α(N)=2.09×10^{-5} *3*; α(O)=3.33×10^{-6} *5*; α(P)=2.31×10^{-7} *4*.
2776.0	239.8 *3*	100 *4*	(M1+E2)	−0.25 *8*	0.1042	α(K)=0.0886 *14*; α(L)=0.0123 *3*; α(M)=0.00258 *7*. α(N)=0.000571 *13*; α(O)=9.20×10^{-5} *19*; α(P)=6.75×10^{-6} *13*.
	542.9 *3*	42 *4*				Iγ: other: 162 *13* from (^{16}O,3nγ) is in severe disagreement.
2867.1	245.0 *3*	100 *8*				
	633.9 *6*	<26				

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Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	δ‡	α§	Comments
2889.7	224.3 *3*	27.3 *18*	[M1+E2]		0.1250 *19*	α(K)=0.1060 *18*; α(L)=0.0150 *7*; α(M)=0.00316 *16*. α(N)=0.00070 *4*; α(O)=0.000112 *5*; α(P)=8.04×10^{-6} *22*. Iγ: other: 10.4 *8* from (^{16}O,3nγ) is in disagreement.
	739.3 *3*	100 *5*	(E2)		0.00398	B(E2)(W.u.)=57 *19*. α(K)=0.00338 *5*; α(L)=0.000478 *7*; α(M)=0.0001004 *14*. α(N)=2.22×10^{-5} *4*; α(O)=3.53×10^{-6} *5*; α(P)=2.43×10^{-7} *4*.
2901.2+y	699.2 *3*	100				
3011.2	235.2 *3*	100 *4*	[M1+E2]		0.1098	α(K)=0.0932 *16*; α(L)=0.0131 *6*; α(M)=0.00276 *13*. α(N)=0.00061 *3*; α(O)=9.8×10^{-5} *4*; α(P)=7.07×10^{-6} *19*.
	474.9 *3*	85 *5*	[E2]		0.01243	α(K)=0.01034 *15*; α(L)=0.001648 *24*; α(M)=0.000350 *5*. α(N)=7.68×10^{-5} *11*; α(O)=1.200×10^{-5} *17*; α(P)=7.23×10^{-7} *11*. Iγ: other: 100 *8* from (^{16}O,3nγ). B(E2)(W.u.)=150 *24*.
3145.5	278.4 *3*	100 *7*				
	523.5 *6*	45 *8*				
3208.2	318.5 *3*	100 *4*	(M1+E2)	−0.09 *6*	0.0492	α(K)=0.0421 *7*; α(L)=0.00561 *8*; α(M)=0.001173 *17*. α(N)=0.000260 *4*; α(O)=4.22×10^{-5} *6*; α(P)=3.22×10^{-6} *5*. B(M1)(W.u.)=(0.39 *10*); B(E2)(W.u.)=(21 *+28−21*).
	542.7 *3*	47 *3*	[E2]		0.00865	α(K)=0.00725 *11*; α(L)=0.001108 *16*; α(M)=0.000234 *4*. α(N)=5.15×10^{-5} *8*; α(O)=8.11×10^{-6} *12*; α(P)=5.13×10^{-7} *8*. Iγ: other: 81 *6* from (^{16}O,3nγ) is in disagreement. B(E2)(W.u.)=84 *21*.
3291.8	280.7 *3*	100 *5*				
	516.0 *6*	29 *4*				Iγ: other: 57 *7* from (^{16}O,3nγ) is in disagreement.
3447.1	301.8 *6*	100 *9*				
	579.9 *6*	95 *19*				
3461.2	253.1 *3*	100 *4*	[M1+E2]		0.0899 *14*	α(K)=0.0764 *15*; α(L)=0.0107 *4*; α(M)=0.00224 *8*. α(N)=0.000495 *17*; α(O)=7.97×10^{-5} *22*; α(P)=5.80×10^{-6} *17*.
	571.4 *3*	31.0 *21*	[E2]		0.00756	B(E2)(W.u.)=68 *25*. α(K)=0.00635 *9*; α(L)=0.000956 *14*; α(M)=0.000202 *3*. α(N)=4.44×10^{-5} *7*; α(O)=7.01×10^{-6} *10*; α(P)=4.50×10^{-7} *7*. Iγ: other: 156 *22* from (^{16}O,3nγ) is in severe disagreement.
3586.1	294.2 *3*	100 *5*	[M1+E2]		0.0599 *12*	α(K)=0.0510 *12*; α(L)=0.00702 *14*; α(M)=0.00147 *4*. α(N)=0.000326 *7*; α(O)=5.25×10^{-5} *9*; α(P)=3.87×10^{-6} *12*.
	574.9 *3*	89 *6*	[E2]		0.00744	B(E2)(W.u.)>59. α(K)=0.00625 *9*; α(L)=0.000940 *14*; α(M)=0.000198 *3*. α(N)=4.37×10^{-5} *7*; α(O)=6.89×10^{-6} *10*; α(P)=4.44×10^{-7} *7*. Iγ: other: 200 *25* from (^{16}O,3nγ) is in severe disagreement.
3675.4+y	774.2 *3*	100				

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Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ†	Iγ†	Mult.‡	α§	Comments
3788.2	327.1 *3*	100 *4*	[M1+E2]	0.0452 *10*	α(K)=0.0386 *10*; α(L)=0.00526 *8*; α(M)=0.001100 *18*. α(N)=0.000244 *4*; α(O)=3.94×10^{-5} *6*; α(P)=2.93×10^{-6} *10*.
	579.9 *3*	40 *3*	[E2]	0.00727	B(E2)(W.u.)=210 *170*. α(K)=0.00611 *9*; α(L)=0.000917 *13*; α(M)=0.000194 *3*. α(N)=4.26×10^{-5} *6*; α(O)=6.73×10^{-6} *10*; α(P)=4.34×10^{-7} *7*. Iγ: other: 164 *15* from (^{16}O,3nγ) is in severe disagreement.
3803.7	356.6 *6*	92 *16*			
	658.2 *6*	100 *20*			
3934.4	348.2 *3*	62 *6*			
	642.6 *3*	100 *9*			
4117.4	329.2 *3*	100 *4*	[M1+E2]	0.0445 *10*	α(K)=0.0379 *10*; α(L)=0.00517 *8*; α(M)=0.001082 *18*. α(N)=0.000240 *4*; α(O)=3.87×10^{-5} *6*; α(P)=2.88×10^{-6} *9*.
	656.3 *3*	62 *4*	[E2]	0.00532	B(E2)(W.u.)=140 *110*. α(K)=0.00449 *7*; α(L)=0.000653 *10*; α(M)=0.0001374 *20*. α(N)=3.03×10^{-5} *5*; α(O)=4.81×10^{-6} *7*; α(P)=3.21×10^{-7} *5*. Iγ: other: 137 *17* from (^{16}O,3nγ) is in severe disagreement.
4179.0	375.4 *6*	62 *15*			
	731.8 *6*	100 *26*			
4295.0	360.7 *3*	100 *8*			
	708.9 *3*	100 *10*			
4507.4	390.0 *3*	100 *5*	[M1+E2]	0.0285 *8*	α(K)=0.0244 *7*; α(L)=0.00328 *5*; α(M)=0.000686 *10*. α(N)=0.0001522 *23*; α(O)=2.46×10^{-5} *5*; α(P)=1.85×10^{-6} *7*.
	719.1 *3*	64 *6*	[E2]	0.00426	α(K)=0.00361 *5*; α(L)=0.000514 *8*; α(M)=0.0001079 *16*. α(N)=2.38×10^{-5} *4*; α(O)=3.79×10^{-6} *6*; α(P)=2.59×10^{-7} *4*. B(E2)(W.u.)>88.
4526.4+y	851.0 *3*	100			
4596.9	793.2 *6*	100			
4711.9	417.0 *3*	73 *7*			
	777.4 *3*	100 *10*			
4910.7	403.4 *3*	100 *7*	[M1+E2]	0.0262 *7*	α(K)=0.0224 *7*; α(L)=0.00300 *5*; α(M)=0.000628 *10*. α(N)=0.0001391 *22*; α(O)=2.25×10^{-5} *4*; α(P)=1.70×10^{-6} *6*.
	793.2 *3*	96 *7*	[E2]	0.00338	B(E2)(W.u.)>80. α(K)=0.00287 *4*; α(L)=0.000401 *6*; α(M)=8.40×10^{-5} *12*. α(N)=1.86×10^{-5} *3*; α(O)=2.97×10^{-6} *5*; α(P)=2.07×10^{-7} *3*.
5048.8	869.8 *6*	100			
5135.8	423.9 *3*	77 *8*			
	840.8 *3*	100 *14*			
5367.0	456.3 *3*	95 *16*			
	859.6 *3*	100 *9*			
5449.8+y	923.4 *3*	100			
5468.0	871.1 *6*	100			
5619.3	483.6 *6*	64 *8*			
	907.4 *3*	100 *10*			
5836.8	469.9 *3*	100 *9*			
	926.1 *3*	66 *10*			
6009.8	961.0@ *6*	100			
6105.3	486.0 *6*	78 *19*			
	969.6 *6*	100 *22*			
6361.4	524.5 *6*	74 *12*			
	994.3 *6*	100 *16*			
6448.4+y	998.6 *3*	100			
6649.1	1029.8 *6*	100			
6884.8	523#				Eγ: from (^{28}Si,2pnγ) only.
	1048.1 *6*	100			
6970.8	961.0#@ *6*	100			
7193.1	1087.8 *6*	100			
7479.7	1118.3 *6*	100			
7520.8+y	1072.4 *10*	100			
7789.9	1140.8 *6*	100			
8038.5	1153.7 *6*	100			
8385.0	1191.8 *6*	100			
8667.8+y	1147.0 *10*	100			
8711.9	1232.2 *6*	100			

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Adopted Levels, Gammas (continued)

γ(^{129}Ce) (continued)

E(level)	Eγ[†]	Iγ[†]
9033.6	1243.7 *6*	100
9282.5	1244.0 *6*	100
9672.0	1287.0[#] *6*	100
9890.3+y	1222.5 *10*	100
10045.3	1333.4 *6*	100
10601.4	1318.9 *6*	100
11189.4+y	1299.1 *10*	100
11470.3	1425.0 *6*	100
11979.4	1378.0 *6*	100
12565+y	1375.6 *10*	100
14021+y	1456.4 *10*	100
15554+y	1533.0 *10*	100
17178+y	1623.5 *10*	100
18905+y	1727.0 *10*	100

[†] Most data are from ^{100}Mo(^{34}S,5nγ). Weighted averages taken from ε decay, (^{34}S,5nγ) and ^{116}Sn(^{16}O,3nγ) for levels below ≈ 500 keV, where the values are in general agreement. Above this energy, levels populated in ε decay and high–spin reactions do not much overlap, the values are either from ε decay or from ^{100}Mo(^{34}S,5nγ).

[‡] From γ anisotropies (1977Gi17) and γ(θ) (1984Ar13); RUL for E2 and M2 used when level lifetimes are available or with assumed ≈10 ns coincidence resolving time in γγ data.

[§] δ(E2/M1)=0.3 assumed when not given.

[#] Placement of transition in the level scheme is uncertain.

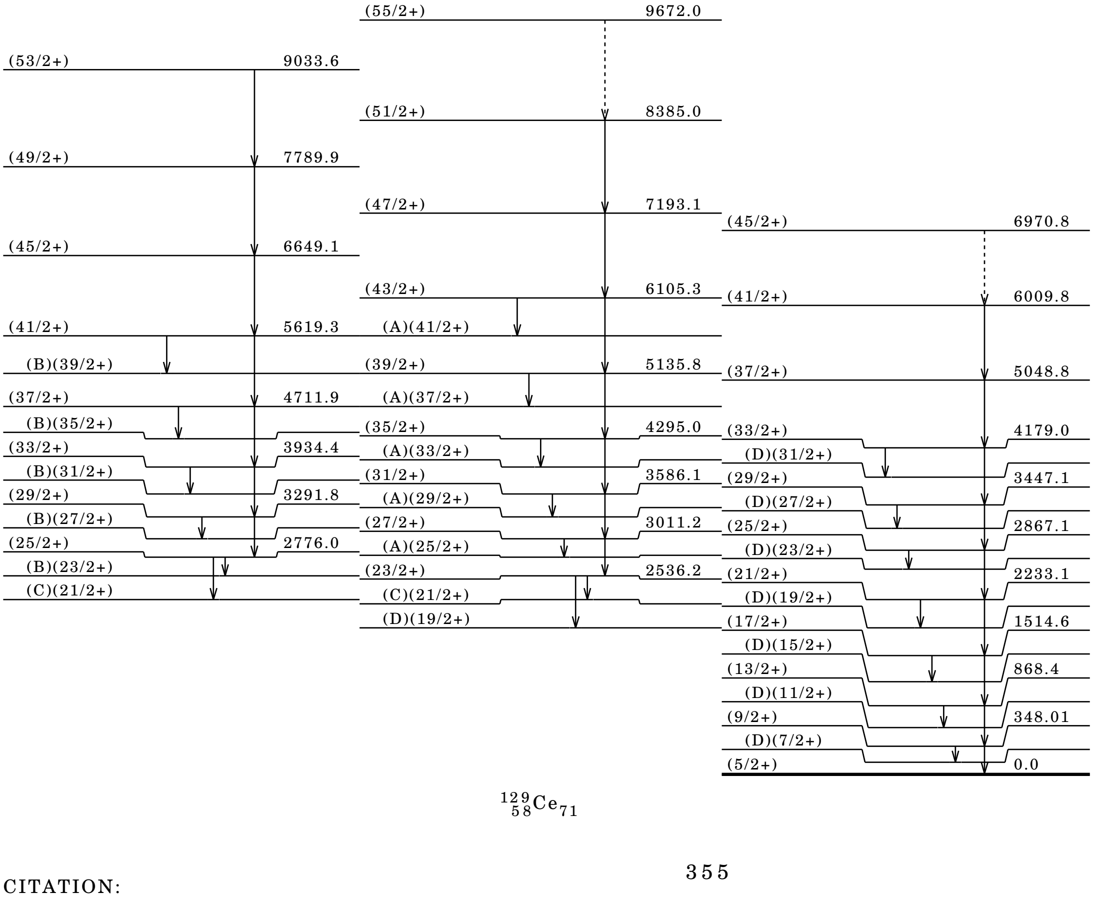
[@] Multiply placed.

Adopted Levels, Gammas (continued)

(A) $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$, $\alpha=+1/2$.

(B) $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$, $\alpha=-1/2$.

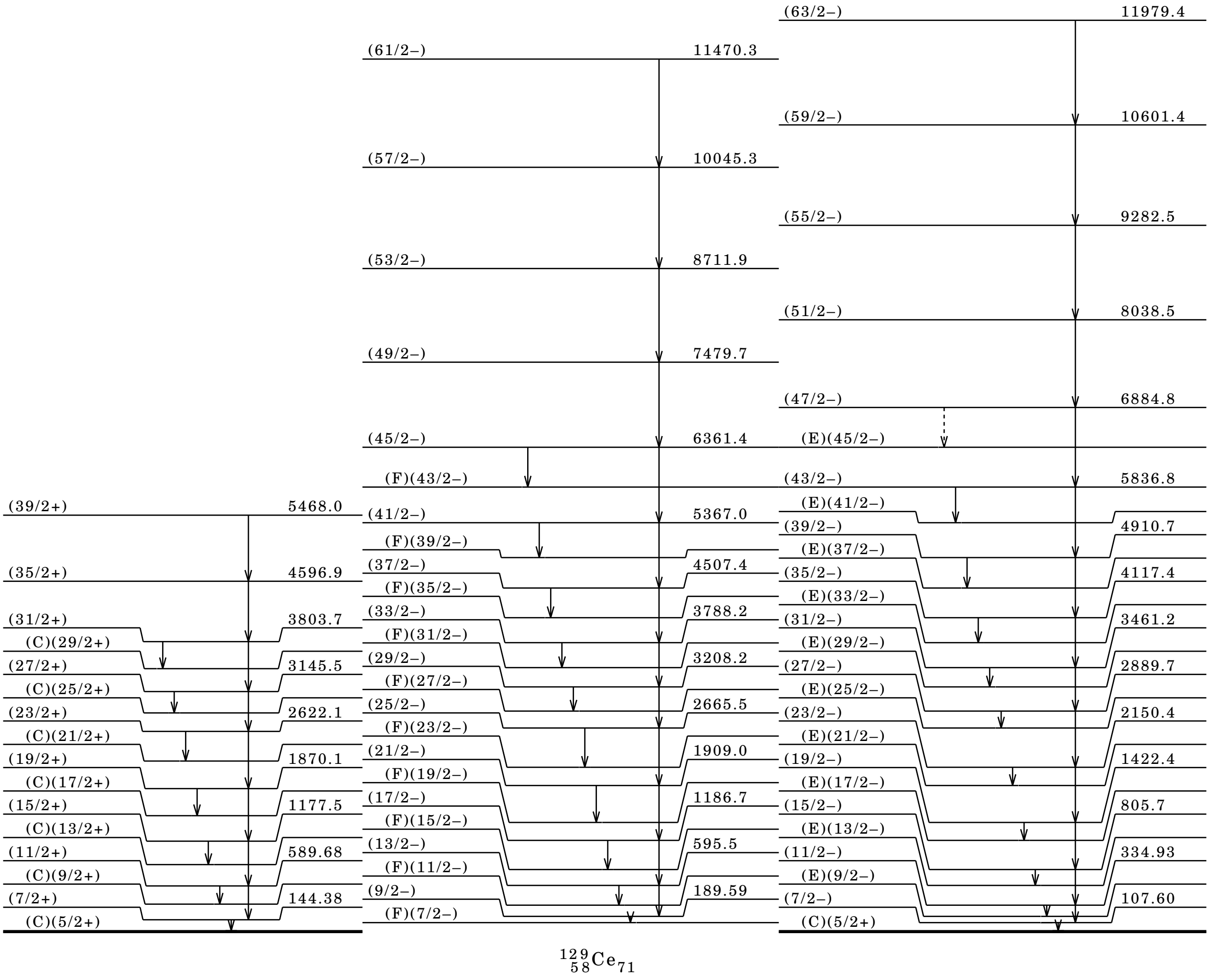
(C) $\nu d_{5/2}$, $\alpha=+1/2$.



$^{129}_{58}\mathrm{Ce}_{71}$

Adopted Levels, Gammas (continued)

(D) $\nu d_{5/2}$, $\alpha=-1/2$. **(E) $\nu h_{11/2}$,$\alpha=+1/2$.** **(F) $\nu h_{11/2}$,$\alpha=-1/2$.**



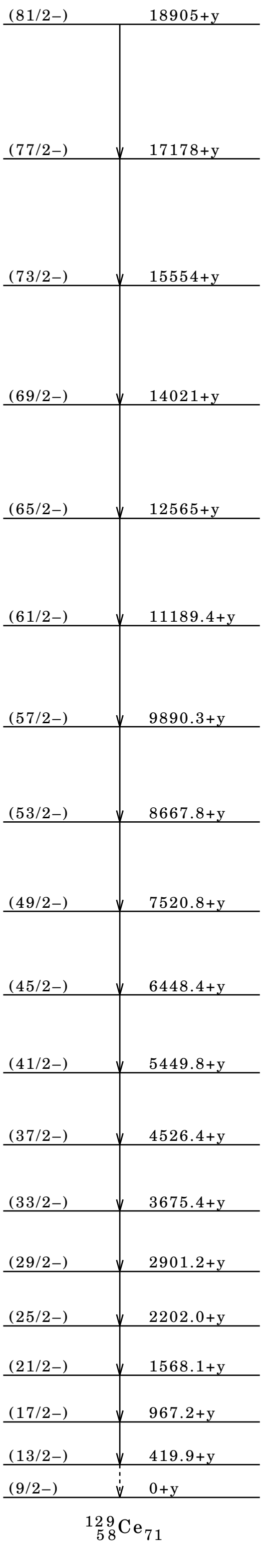
$^{129}_{58}$Ce$_{71}$

CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

(G) ν1/2[541], α=+1/2.



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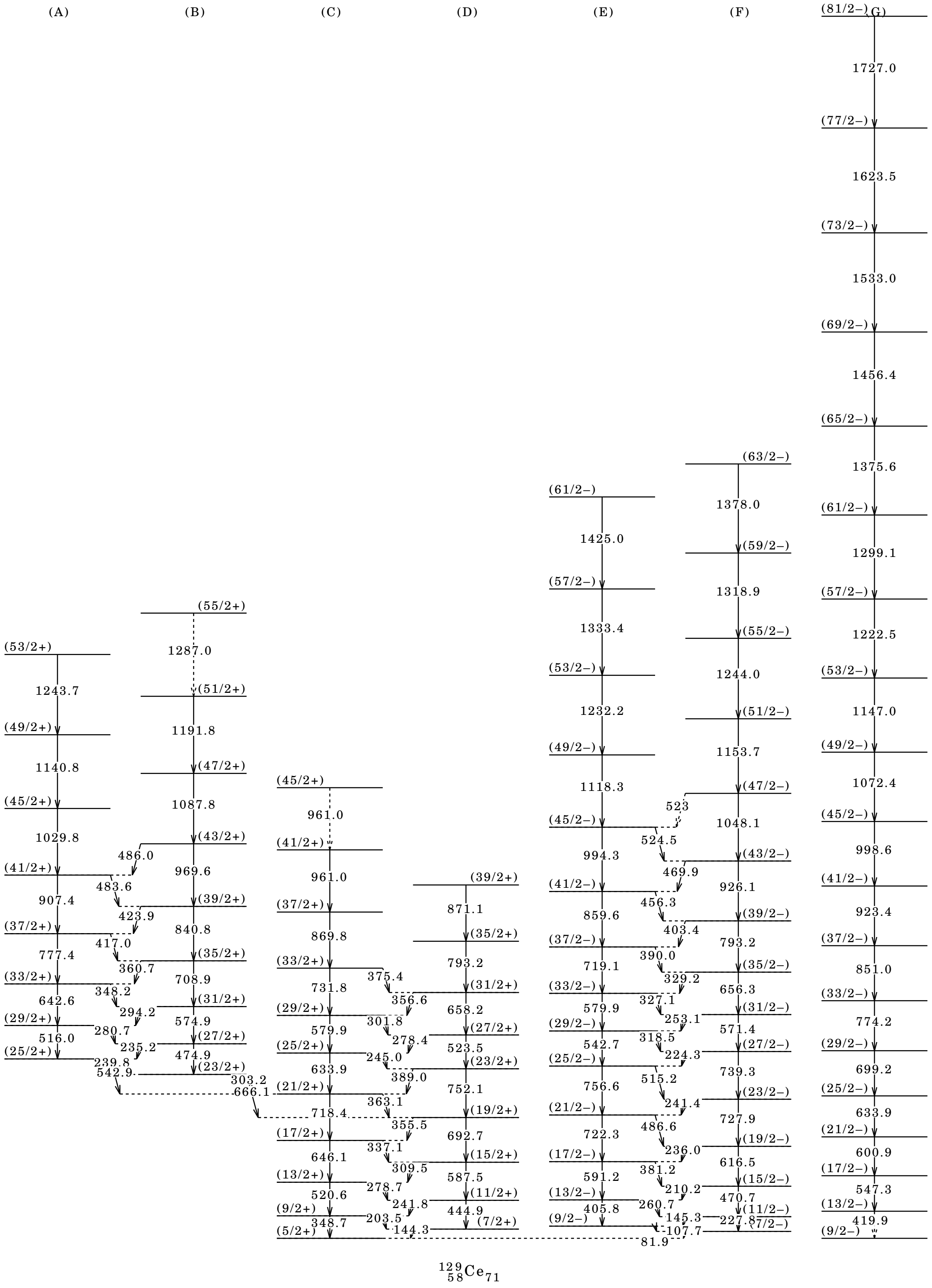
Adopted Levels, Gammas (continued)

Bands for ^{129}Ce



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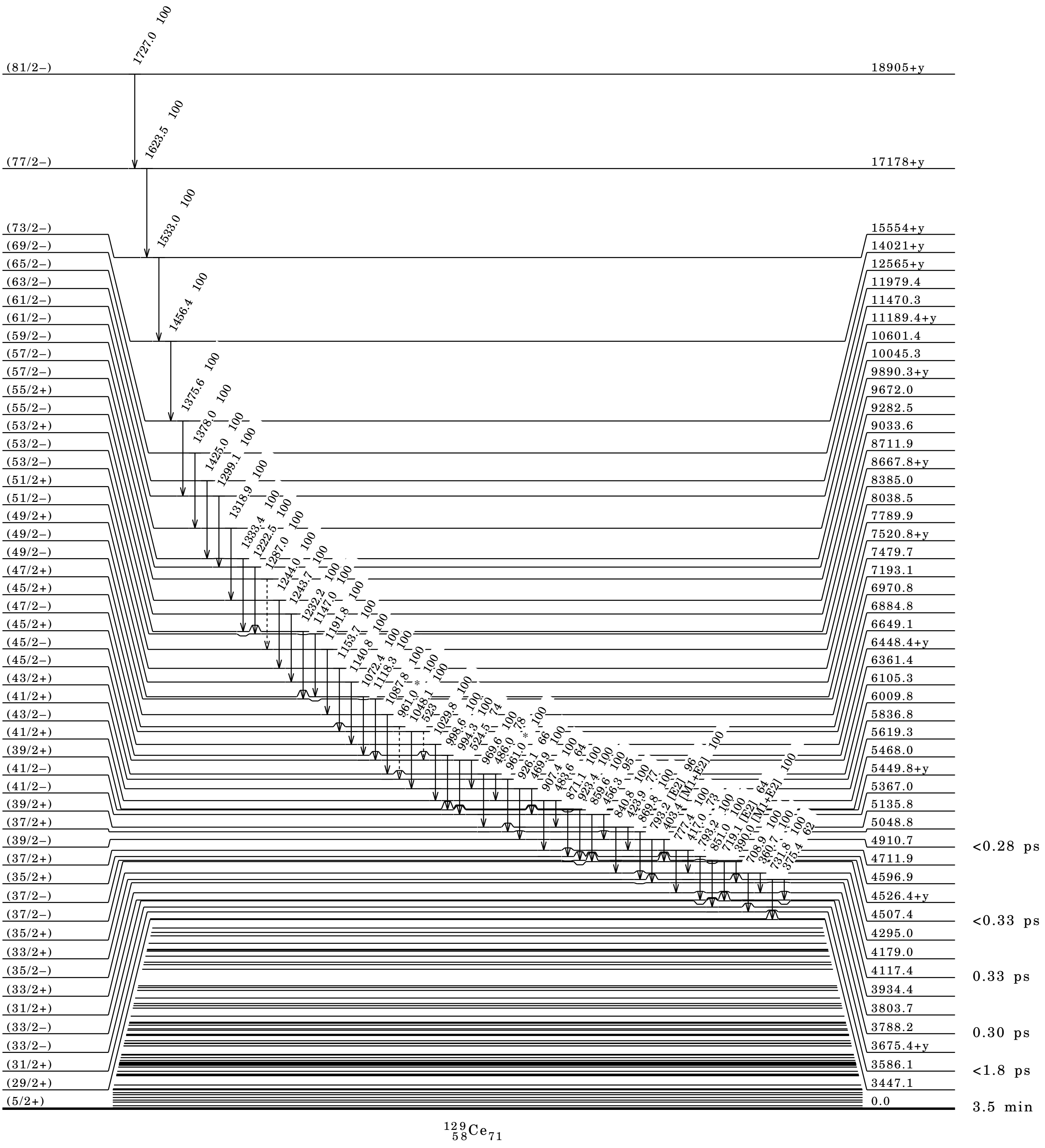
Adopted Levels, Gammas (continued)

Level Scheme

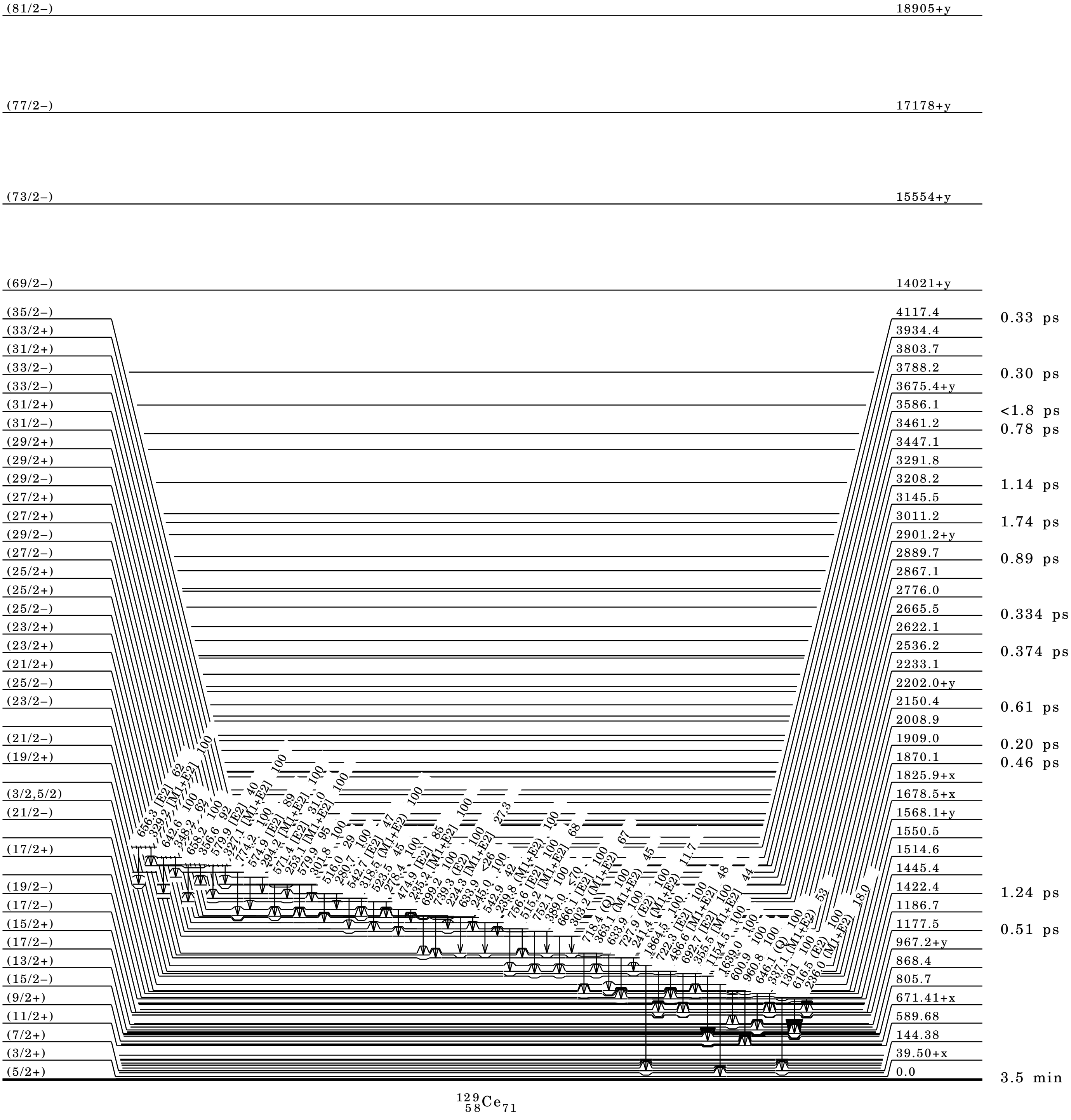
Intensities: relative photon branching from each level
* Multiply placed



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
* Multiply placed



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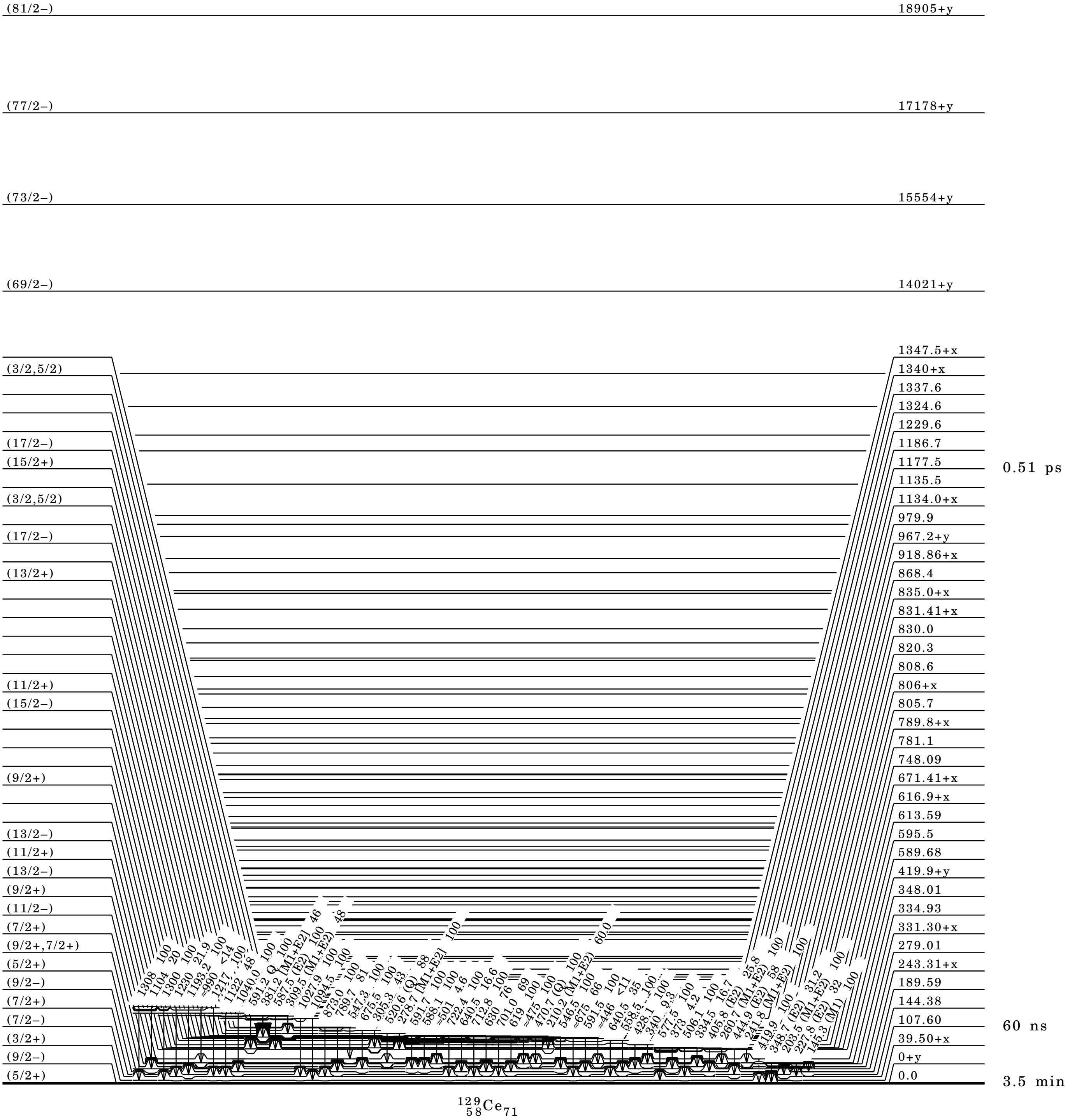
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme (continued)

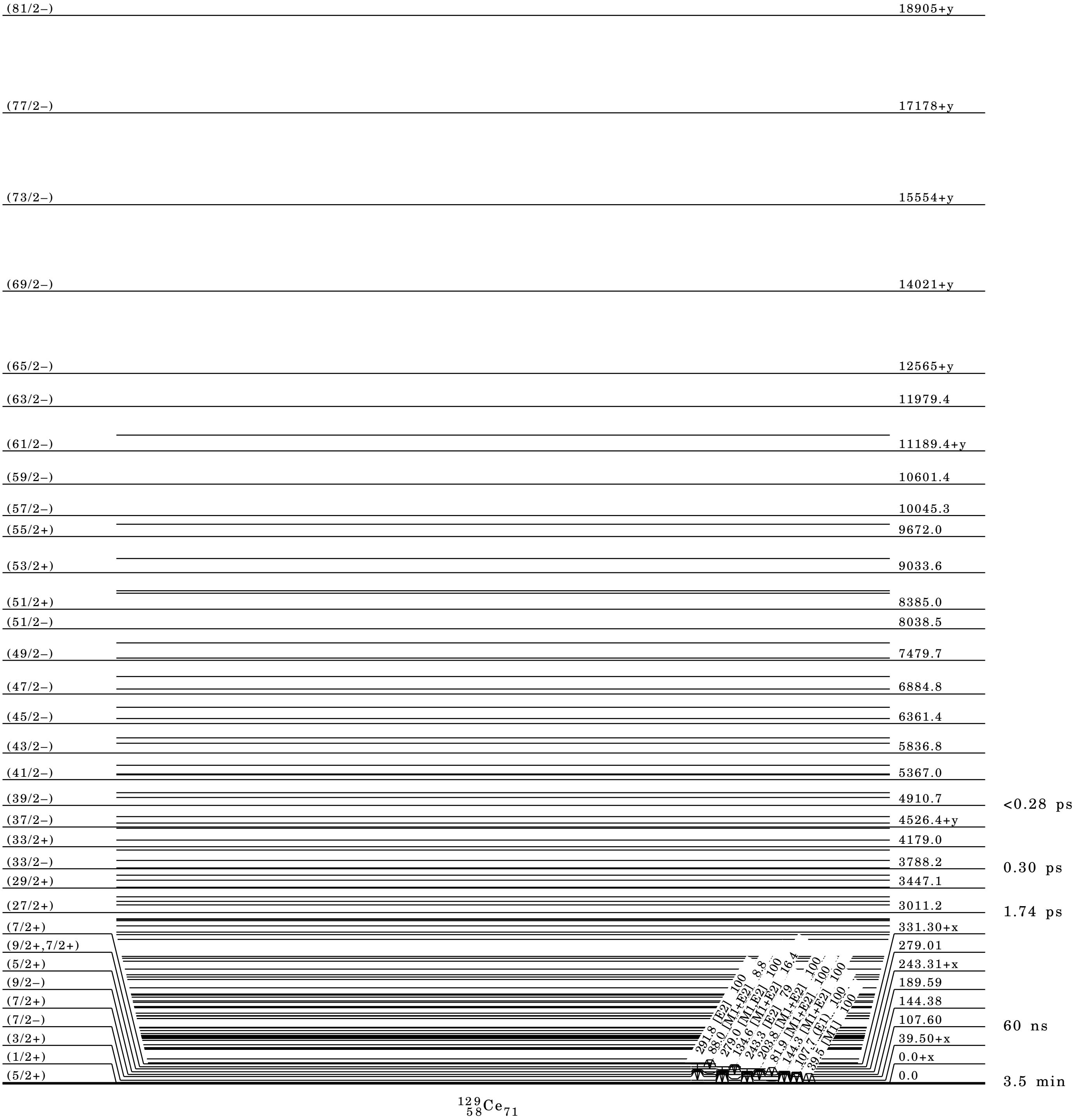
Intensities: relative photon branching from each level
* Multiply placed



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
* Multiply placed



CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

^{129}Pr ε Decay (30 s) 1996Gi08

Parent ^{129}Pr: E=0.0; Jπ=(3/2+); $T_{1/2}$=30 s *4*; Q(g.s.)=6510 *40*; %ε+%β^+ decay≈100.

^{129}Pr–Q(ε): From 2012Wa38.

^{129}Pr–J,$T_{1/2}$: From ^{129}Pr Adopted Levels.

^{129}Pr–E: Assumed contribution from only one activity.

1996Gi08: ^{94,96}Mo(^{40}Ca,X), E=255 MeV; Ge detectors, He–jet; measured γγ(t)–, (x ray)γ(t)–coin.

Other: 1977Bo02.

From assignment of 9/2– to the 60–ns isomer at 108 keV, 1998Io01 assigned 7/2+ to g.s. and increased spin by one unit all the positive– parity levels. For the negative–parity band, a new level was proposed at 119.4 keV with Jπ=11/2– and energies of higher levels were adjusted accordingly, and the spins increased by 2 units. The placements of 619γ, 701γ, 1028γ, 1040γ, and 1217γ were revised also. These modifications of the decay scheme proposed in 1998Io01 have not been adopted by the evaluators, since the spin of 9/2 for the 60–ns isomer at 107.6 is not considered by the evaluators as definitely determined. The experimental quadrupole interaction pattern (figure 1 in 1998Io01) fits 9/2 better than 7/2, but the fit for 9/2 still suffers from somewhat large χ^2 of 2.7. Assignment of 9/2– for the isomer also leads to serious discrepancies with band structures and theoretical predictions.

No meaningful ε and β^+ feedings can be deduced since feeding to ground state of ^{129}Ce is unknown and multipolarities of several low–energy transitions, with expected large conversion coefficients, are unknown. For these reasons, the decay scheme cannot be normalized to obtain γ–ray intensities per 100 ^{129}Pr nuclei.

^{129}Ce Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	(5/2+)	3.5 min *3*	Jπ: see discussion in Adopted Levels for (5/2+) assignment rather than 7/2+ as proposed by 1998Io01.
0.0+x	(1/2+)		E(level): x<0.5 keV from parallel decay paths from the 918.8 level to g.s. and the 0.0+x level; expected to be an isomer.
39.50+x *9*	(3/2+)		
107.58 *10*	(7/2–)	60 ns *2*	Jπ: see discussion in Adopted Levels for (7/2–) assignment rather than 9/2– as proposed by 1998Io01. $T_{1/2}$: from Adopted Levels.
144.41 *15*	(7/2+)		
189.55 *13*	(9/2–)		
243.30+x *9*	(5/2+)		
279.02 *9*	(9/2+,7/2+)		
331.30+x *20*	(7/2+)		
334.89 *14*	(11/2–)		
347.72 *25*	(9/2+)		
589.10 *25*	(11/2+)		
613.60 *16*			
616.9+x *5*			
671.40+x *22*	(9/2+)		
748.06 *20*			
781.1 *4*			
789.8+x *5*			
806+x *3*	(11/2+)		
808.6 *3*			
820.3 *3*			
830.02 *24*			
831.41+x *22*			
835.0+x *4*			
866.7 *11*	(13/2+)		
918.8+x *4*			
979.92 *24*			
1134.0+x *5*	(3/2,5/2)		
1135.5 *4*			
1229.6 *5*			
1324.6 *10*			
1337.6 *4*			
1340+x *3*	(3/2,5/2)		
1347.5+x *10*			
1445.4 *11*			
1549.9 *5*			
1678.5+x *4*	(3/2,5/2)		
1825.9+x *4*			
2008.9 *4*			

Footnotes continued on next page

^{129}Pr ε Decay (30 s) 1996Gi08 (continued)

^{129}Ce Levels (continued)

[†] From least–squares fit to Eγ data, 305.3γ not used in the fitting procedure.
[‡] From Adopted Levels.

γ(^{129}Ce)

Eγ	E(level)	Iγ	Mult.	α[#]	Comments
39.5 *1*	39.50+x	50 *6*			
81.9 *1*	189.55	18.3 *15*			
88.0 *5*	331.30+x	5.3 *7*			
107.6 *1*	107.58	100	[E1]	0.199	α(K)=0.1692 *24*; α(L)=0.0234 *4*; α(M)=0.00487 *7*. α(N)=0.001065 *16*; α(O)=0.0001660 *24*; α(P)=1.030×10^{-5} *15*. B(E1)(W.u.)=2.96×10^{-6} *10*.
134.6 *2*	279.02	6.4 *9*			
144.4 *2*	144.41	90 *4*			
145.4 *2*	334.89	21 *1*			
203.3 *2*	347.72	16 *2*			
203.8 *2*	243.30+x	117 *6*			
227.3 *1*	334.89	2.3 *2*			
241[†] *1*	589.10	17[†] *3*			
243.3 *1*	243.30+x	93 *5*			
279.0 *1*	279.02	39 *2*			
291.8 *2*	331.30+x	60 *3*			
305.3 *2*	918.8+x	12.4 *8*			
334.5 *2*	613.60	4.0 *5*			
340 *1*	671.40+x	2.5 *5*			
≈348[†]	347.72	3.6[†] *3*			
373 *1*	616.9+x	5[‡] *1*			
428.1 *2*	671.40+x	27 *1*			
^{x}441.2[§] *3*		60.9[‡]			
444.7 *2*	589.10	17.5 *5*			
≈446	781.1	<1			
≈475	806+x	<1			
≈501	831.41+x	3 *1*			
506.1 *2*	613.60	24 *2*			
519 *1*	866.7	<2			
546.5 *5*	789.8+x	50[‡] *5*			
558.5 *2*	748.06	13.8 *8*			
577.5 *5*	616.9+x	120[‡] *9*			
588.1 *2*	831.41+x	66 *2*			
591.5 *3*	781.1	9.4 *6*			
591.7 *3*	835.0+x	10 *1*			
619[a] *1*	808.6	13.4 *8*			
630 *1*	820.3	5.2 *4*			
640.5 *3*	748.06	4.8 *4*			
	830.02	4.8 *4*			
≈675	781.1	6.2 *5*			
675.5 *3*	918.8+x	29 *2*			
701.0[a] *3*	808.6	9.3 *6*			
712.8 *3*	820.3	6.8 *5*			
722.4 *3*	830.02	29 *2*			
789.7 *3*	979.92	6.2 *5*			
873.0 *3*	979.92	7.7 *5*			
960.8 *4*	1549.9	8.6 *6*			
≈990	1337.6	<2			
1027.9[@] *3*	1135.5	11.2 *8*			
1040.0[@] *5*	1229.6	4.2 *4*			
1094.5 *5*	1134.0+x	1.0 *2*			
1104 *3*	1347.5+x	2.0 *3*			
1122 *1*	1229.6	2.0 *2*			
1154.5 *3*	1825.9+x	15.4 *8*			
1193.2 *3*	1337.6	14.6 *7*			
1217[&] *1*	1324.6	6.5 *5*			
1230 *1*	1337.6	3.2 *2*			

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^{129}Pr ε Decay (30 s) 1996Gi08 (continued)

γ(^{129}Ce) (continued)

Eγ	E(level)	Iγ
1300 *3*	1340+x	31 *2*
1301 *1*	1445.4	5.0 *5*
1308 *1*	1347.5+x	10 *1*
1639.0 *3*	1678.5+x	21 *1*
1864.5 *3*	2008.9	<2

[†] Complex line.

[‡] Intensity estimated from A=129 on–line singles spectra in ^{92}Mo(^{40}Ca,X), E=190 MeV, and normalized to Iγ(203.8γ) and Iγ(243.3γ).

[§] The γ line in coin with Ce x rays only.

[#] δ(E2/M1)=0.3 assumed when not given.

[@] Based on their assignment of 9/2– for the 107.6 isomer, 1998Io01 proposed that 1040.0γ and 1027.9γ deexcite a new level at 1147.6; former transition to 107.6 level and the latter to a newly proposed 11/2– level at 119.4 keV. The evaluators have not adopted this proposal.

[&] Based on their assignment of 9/2– for the 107.6 isomer, 1998Io01 proposed that 1217γ deexcites level at 1337.6 to a newly proposed 11/2– level at 119.4 keV. The evaluators have not adopted this proposal.

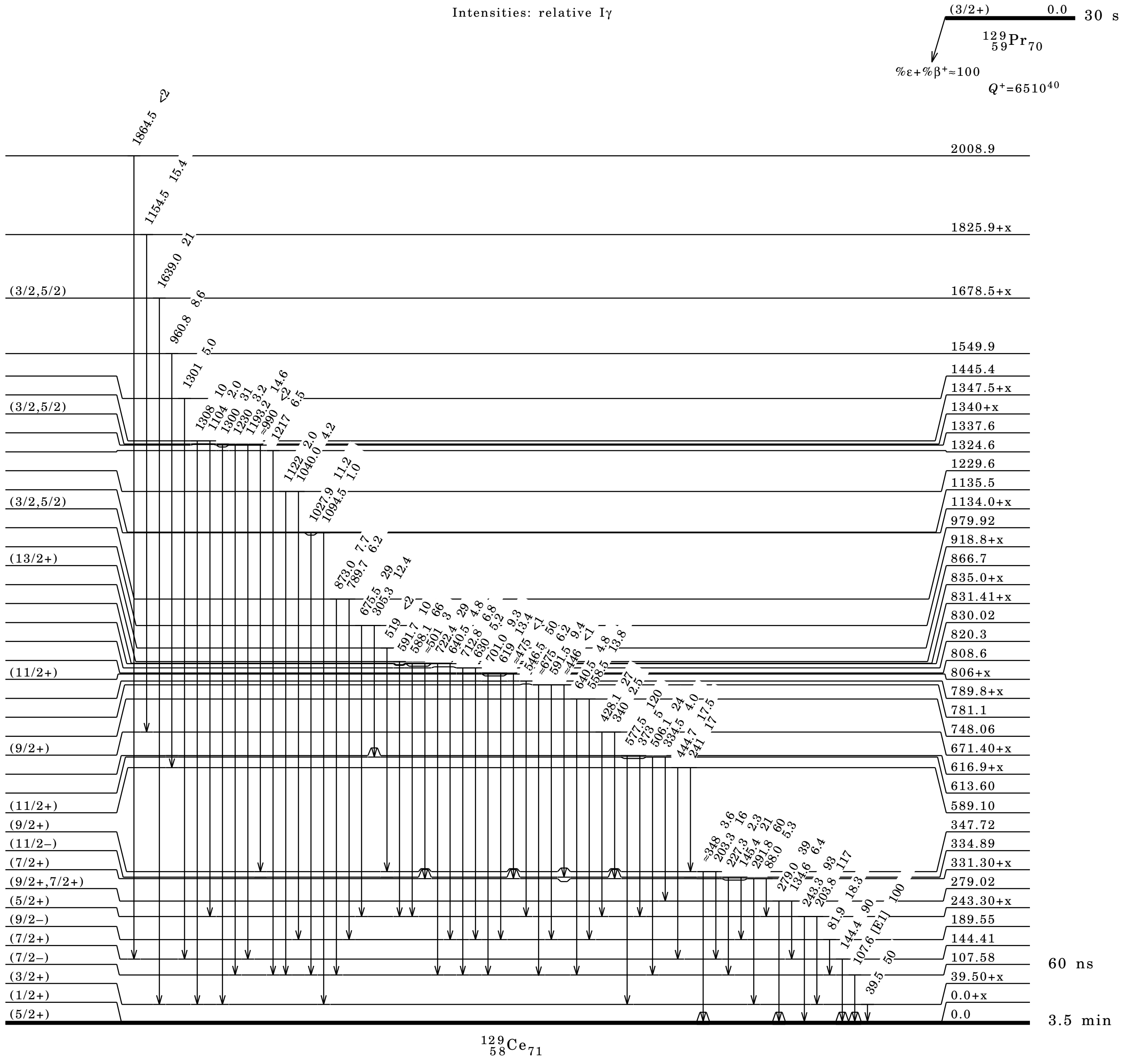
[a] Based on their assignment of 9/2– for the 107.6 isomer, 1998Io01 proposed that 619γ and 701.0γ deexcite level at 820.4; former transition to a 201.3, 13/2– level and the latter to a newly proposed 11/2– level at 119.4 keV. The evaluators have not adopted this proposal.

[x] γ ray not placed in level scheme.

^{129}Pr ε Decay (30 s) 1996Gi08 (continued)

Decay Scheme

Intensities: relative Iγ



^{100}Mo(^{34}S,5nγ) 2009Pa40

2009Pa40: E=155 MeV; measured Eγ, Iγ, γγ–coin using the EUROGAM 2 spectrometer at CRN, Strasbourg. The EUROGAM 2 array consisted of 30 tapered coaxial, 24 four–element clover escape suppressed HPGe detectors. Comparison with cranked Woods–Saxon calculations and systematics of other light odd–N cerium isotopes.

Configuration assignments in 2009Pa40 were made through comparison with Woods–Saxon cranking calculations.

2009Li67: ^{96}Mo(^{37}Cl,p3nγ) E=155 MeV. Measured lifetimes by Doppler–shift attenuation method (DSAM) using 15 Compton–suppressed HPGe detectors at CIAE, Beijing. Also there is a short report by the same group as 2009Li67 in Chin. Phys. C 32, s2–141 (2008).

^{129}Ce Levels

Quasiparticle labels with main components:
a: ν5/2[402],α=+1/2.
b: ν5/2[402],α=−1/2.
e: ν7/2[523],α=−1/2.
f: ν7/2[523],α=+1/2.
A: π5/2[413],α=+1/2.
B: π5/2[413],α=−1/2.
E: π1/2[550],α=−1/2.
F: π1/2[550],α=+1/2.

E(level)[†]	Jπ	$T_{1/2}$[‡]	Comments
0.0[&]	5/2+		
0+y?[d]	(9/2−)		Jπ: (13/2+) implied from data on 104PD(28SI,2PNG) (1996Ga13).
107.8[c] *3*	7/2−	60 ns *2*	$T_{1/2}$: from Adopted Levels.
144.73[a] *24*	7/2+		
190.3[b] *4*	9/2−		
335.8[c] *4*	11/2−		
348.57[&] *24*	9/2+		
419.9+y[§][d] *10*	(13/2−)		
590.5[a] *3*	11/2+		
596.3[b] *5*	13/2−		
806.5[c] *5*	15/2−		
869.1[&] *3*	13/2+		
967.2+y[§][d] *11*	(17/2−)		
1178.3[a] *4*	15/2+		
1187.5[b] *5*	17/2−		
1423.3[c] *5*	19/2−		
1515.3[&] *4*	17/2+		
1568.1+y[§][d] *11*	(21/2−)		
1870.8[a] *4*	19/2+		
1909.8[b] *5*	21/2−	0.20 ps *6*	Q(transition)=6.50 *9* (2009Li67).
2151.2[c] *5*	23/2−	0.61 ps *34*	Q(transition)=4.0 *14* (2009Li67).
2202.0+y[d] *12*	(25/2−)		
2233.8[&] *4*	21/2+		
2537.0[@] *5*	23/2+		
2622.8[a] *6*	23/2+		
2666.4[b] *6*	25/2−	0.334 ps *22*	Q(transition)=3.57 *11* (2009Li67).
2776.7[#] *5*	25/2+		
2867.8[&] *6*	25/2+		
2890.6[c] *6*	27/2−	0.89 ps *29*	Q(transition)=2.9 *6* (2009Li67).
2901.2+y[d] *12*	(29/2−)		
3011.9[@] *5*	27/2+		
3146.2[a] *6*	27/2+		
3209.1[b] *6*	29/2−	1.14 ps *26*	Q(transition)=5.1 *5* (2009Li67).
3292.6[#] *6*	29/2+		
3447.9[&] *7*	29/2+		
3462.0[c] *6*	31/2−	0.78 ps *27*	Q(transition)=4.6 *9* (2009Li67).
3586.9[@] *6*	31/2+		
3675.4+y[d] *12*	(33/2−)		
3789.1[b] *6*	33/2−	0.30 ps *24*	Q(transition)=6.3 *19* (2009Li67).
3804.4[a] *8*	31/2+		
3935.1[#] *6*	33/2+		
4118.3[c] *6*	35/2−	0.33 ps *25*	Q(transition)=4.7 *15* (2009Li67).
4179.8[&] *8*	33/2+		
4295.8[@] *6*	35/2+		
4508.2[b] *7*	37/2−	<0.33 ps	Q(transition)>3.5 (2009Li67).
4526.4+y[d] *13*	(37/2−)		

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^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

^{129}Ce Levels (continued)

E(level)[†]	Jπ	T$_{1/2}$[‡]	Comments
4597.6[a] *10*	35/2+		
4712.7[#] *6*	37/2+		
4911.5[c] *7*	39/2−	<0.28 ps	Q(transition)>3.2 (2009Li67).
5049.6[&] *10*	37/2+		
5136.5[@] *6*	39/2+		
5367.8[b] *7*	41/2−		
5449.8+y[d] *13*	(41/2−)		
5468.7[a] *12*	39/2+		
5620.1[#] *7*	41/2+		
5837.7[c] *7*	43/2−		
6010.6[&] *12*	41/2+		
6106.1[@] *8*	43/2+		
6362.1[b] *8*	45/2−		
6448.4+y[d] *14*	(45/2−)		
6649.9[#] *9*	45/2+		
6885.8[c] *9*	47/2−		
6971.6[&] *13*	45/2+		
7193.9[@] *10*	47/2+		
7480.5[b] *10*	49/2−		
7520.8+y[d] *17*	(49/2−)		
7790.7[#] *11*	49/2+		
8039.5[c] *11*	51/2−		
8385.7[@] *12*	51/2+		
8667.8+y[d] *20*	(53/2−)		
8712.7[b] *12*	53/2−		
9034.4[#] *13*	(53/2+)		
9283.5[c] *13*	55/2−		
9672.7[@] *13*	(55/2+)		
9890.3+y[d] *22*	(57/2−)		
10046.1[b] *13*	57/2−		
10602.4[c] *14*	59/2−		
11189.4+y[d] *24*	(61/2−)		
11471.1[b] *15*	61/2−		
11980.4[c] *15*	63/2−		
12565+y[d] *3*	(65/2−)		
14021+y[d] *3*	(69/2−)		
15554+y[d] *3*	(73/2−)		
17178+y[d] *4*	(77/2−)		
18905+y[d] *4*	(81/2−)		

[†] From least-squares fit to the Eγ data.

[‡] From DSAM (2009Li67) unless otherwise stated.

[§] Possibly feeds lowest members of positive-parity band. No linking transitions were found.

[#] (A): $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$,α=+1/2. Quasiparticle configuration=fEB. Band crossing at ħω=0.294 MeV.

[@] (B): $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$,α=−1/2. Quasiparticle configuration=eEB. Band crossing at ħω=0.301 MeV.

[&] (C): $\nu d_{5/2}$, α=+1/2. Quasiparticle configuration=a below, aEF above the band crossing. Band crossing at ħω=0.318 MeV. Second band crossing at ħω=0.48 MeV due to pair of $\pi h_{11/2}$ neutrons.

[a] (D): $\nu d_{5/2}$, α=−1/2. Quasiparticle configuration=b below, bEF above the band crossing. Band crossing at ħω=0.318 MeV.

[b] (E): $\nu h_{11/2}$,α=+1/2. Quasiparticle configuration=f below, fEF above the band crossing. Band crossing at ħω=0.312 MeV.

[c] (F): $\nu h_{11/2}$,α=−1/2. Quasiparticle configuration=e below, eEF above the band crossing. Band crossing at ħω=0.325 MeV.

[d] (G): ν1/2[541], α=+1/2. Decoupled enhanced deformation band. Interpreted as SD band in 1996Ga13 on the basis of Q(intrinsic) measurement. Possible transitions to band based on 5/2+ and its signature partner.

γ(^{129}Ce)

Multipolarities are assumed in 2009Pa40 as stretched quadrupoles (E2) for in-band transitions and dipoles (M1(+E2)) for interband transitions.

Eγ[†]	E(level)	Iγ	Mult.	α	Comments
82.3 *3*	190.3	>110			
107.8 *3*	107.8	30 *3*	[E1]	0.198 *4*	α(K)=0.168 *3*; α(L)=0.0233 *4*; α(M)=0.00485 *8*. α(N)=0.001060 *17*; α(O)=0.000165 *3*; α(P)=1.025×10^{-5} *17*.

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^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

γ(^{129}Ce) (continued)

Eγ[†]	E(level)	Iγ
144.6 *3*	144.73	>120
145.7 *3*	335.8	89 *3*
203.6 *3*	348.57	91 *3*
210.2 *3*	806.5	47.4 *20*
224.3 *3*	2890.6	17.2 *11*
228.2 *3*	335.8	53.8 *12*
235.2 *3*	3011.9	38.0 *16*
236.0 *3*	1423.3	18.0 *14*
239.8 *3*	2776.7	36.5 *16*
241.4 *3*	2151.2	10.8 *12*
241.8 *3*	590.5	53.5 *24*
245.0 *3*	2867.8	19.3 *15*
253.1 *3*	3462.0	92 *4*
260.7 *3*	596.3	74 *3*
278.4 *3*	3146.2	21.5 *15*
278.7 *3*	869.1	41.1 *15*
280.7 *3*	3292.6	33.6 *16*
294.2 *3*	3586.9	29.9 *14*
301.8 *6*	3447.9	9.1 *8*
303.2 *3*	2537.0	24.7 *14*
309.5 *3*	1178.3	25.1 *14*
318.5 *3*	3209.1	56.0 *21*
327.1 *3*	3789.1	48.6 *20*
329.2 *3*	4118.3	41.3 *18*
337.1 *3*	1515.3	26.0 *16*
348.2 *3*	3935.1	13.8 *13*
348.7 *3*	348.57	28.4 *22*
355.5 *3*	1870.8	16.9 *13*
356.6 *6*	3804.4	7.1 *12*
360.7 *3*	4295.8	16.8 *14*
363.1 *3*	2233.8	17.6 *15*
375.4 *6*	4179.8	5.3 *13*
381.2 *3*	1187.5	21.3 *17*
389.0 *6*	2622.8	<5.0
390.0 *3*	4508.2	25.0 *13*
403.4 *3*	4911.5	21.4 *14*
405.8 *3*	596.3	19.1 *12*
417.0 *3*	4712.7	11.7 *12*
419.9[‡] *10*	419.9+y	<2.0
423.9 *3*	5136.5	10.2 *11*
445.9 *3*	590.5	30.9 *19*
456.3 *3*	5367.8	18 *3*
469.9 *3*	5837.7	16.2 *14*
470.7 *3*	806.5	79 *3*
474.9 *3*	3011.9	32.4 *19*
483.6 *6*	5620.1	9.1 *12*
486.0 *6*	6106.1	5.0 *12*
486.6 *3*	1909.8	14.9 *17*
515.2 *3*	2666.4	16.9 *18*
516.0 *6*	3292.6	9.6 *12*
520.6 *3*	869.1	36.0 *21*
523.5 *6*	3146.2	9.6 *17*
524.5 *6*	6362.1	7.2 *12*
542.7 *3*	3209.1	26.3 *16*
542.9 *3*	2776.7	15.3 *15*
547.3 *3*	967.2+y	5.3 *5*
571.4 *3*	3462.0	28.5 *19*
574.9 *3*	3586.9	26.5 *19*
579.9 *6*	3447.9	8.6 *17*
579.9 *3*	3789.1	19.2 *16*
587.5 *3*	1178.3	52 *3*
591.2 *3*	1187.5	46 *3*
600.9 *3*	1568.1+y	9.9 *9*
616.5 *3*	1423.3	100
633.9 *3*	2202.0+y	9.3 *9*
633.9 *6*	2867.8	<5.0
642.6 *3*	3935.1	22.3 *19*
646.1 *3*	1515.3	49 *3*
656.3 *3*	4118.3	25.4 *17*
658.2 *6*	3804.4	7.7 *15*
666.1 *3*	2537.0	36.7 *19*
692.7 *3*	1870.8	38 *3*
699.2 *3*	2901.2+y	8.2 *8*
708.9 *3*	4295.8	16.8 *16*
718.4 *3*	2233.8	39.0 *23*
719.1 *3*	4508.2	16.0 *16*
722.3 *3*	1909.8	31.3 *21*
727.9 *3*	2151.2	92 *5*
731.8 *6*	4179.8	8.6 *22*
739.3 *3*	2890.6	63 *3*
752.1 *6*	2622.8	7.1 *19*
756.6 *3*	2666.4	25 *3*
774.2 *3*	3675.4+y	7.5 *8*
777.4 *3*	4712.7	16.1 *16*
793.2 *6*	4597.6	<5.0
793.2 *3*	4911.5	20.5 *16*
840.8 *3*	5136.5	13.3 *18*
851.0 *3*	4526.4+y	6.2 *7*
859.6 *3*	5367.8	19.0 *17*
869.8 *6*	5049.6	<5.0
871.1 *6*	5468.7	<5.0
907.4 *3*	5620.1	14.3 *15*
923.4 *3*	5449.8+y	4.8 *7*
926.1 *3*	5837.7	10.7 *16*
961.0[§] *6*	6010.6	<5.0
	6971.6	<5.0
969.6 *6*	6106.1	6.4 *14*
994.3 *6*	6362.1	9.7 *16*
998.6 *3*	6448.4+y	4.4 *7*
1029.8 *6*	6649.9	7.1 *14*
1048.1 *6*	6885.8	8.8 *14*
1072.4 *10*	7520.8+y	3.3 *6*
1087.8 *6*	7193.9	5.6 *13*
1118.3 *6*	7480.5	5.3 *15*
1140.8 *6*	7790.7	<5.0
1147.0 *10*	8667.8+y	2.1 *6*
1153.7 *6*	8039.5	<5.0
1191.8 *6*	8385.7	<5.0
1222.5 *10*	9890.3+y	1.6 *5*
1232.2 *6*	8712.7	<5.0
1243.7 *6*	9034.4	<5.0
1244.0 *6*	9283.5	<5.0
1287.0[‡] *6*	9672.7	<5.0
1299.1 *10*	11189.4+y	<1.0
1318.9 *6*	10602.4	<5.0
1333.4 *6*	10046.1	<5.0
1375.6 *10*	12565+y	<1.0
1378.0 *6*	11980.4	<5.0
1425.0 *6*	11471.1	<5.0
1456.4 *10*	14021+y	<1.0
1533.0 *10*	15554+y	<1.0
1623.5 *10*	17178+y	<1.0
1727.0 *10*	18905+y	<1.0

Footnotes continued on next page

^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

γ(^{129}Ce) (continued)

† General uncertainty stated for bands 1,2 and 3 in 2009Pa40 is 0.3 keV for Iγ>10, rising to 0.6 keV for weaker transitions. The evaluators assign 0.6 keV for transitions with Iγ≤10. For band 4, stated uncertainty is 0.3 keV for Iγ>4 rising to 1 keV for weaker transitions. The evaluators assign 1 keV for transitions with Iγ≤4.

‡ Placement of transition in the level scheme is uncertain.

§ Multiply placed.

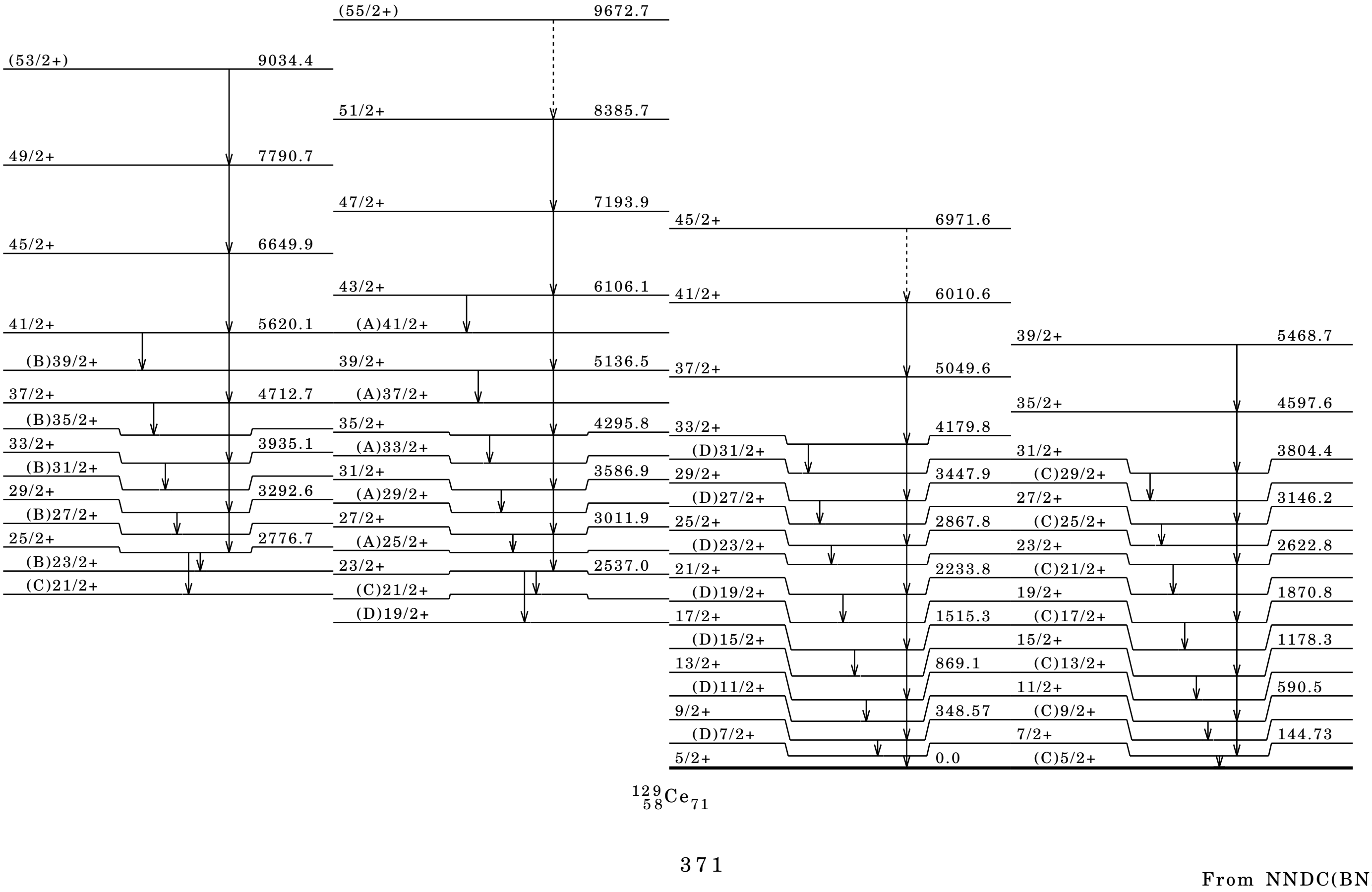
^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

(A) $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$, α=+1/2.

(B) $\nu h_{11/2}\otimes\pi(h_{11/2},g_{7/2})$, α=−1/2.

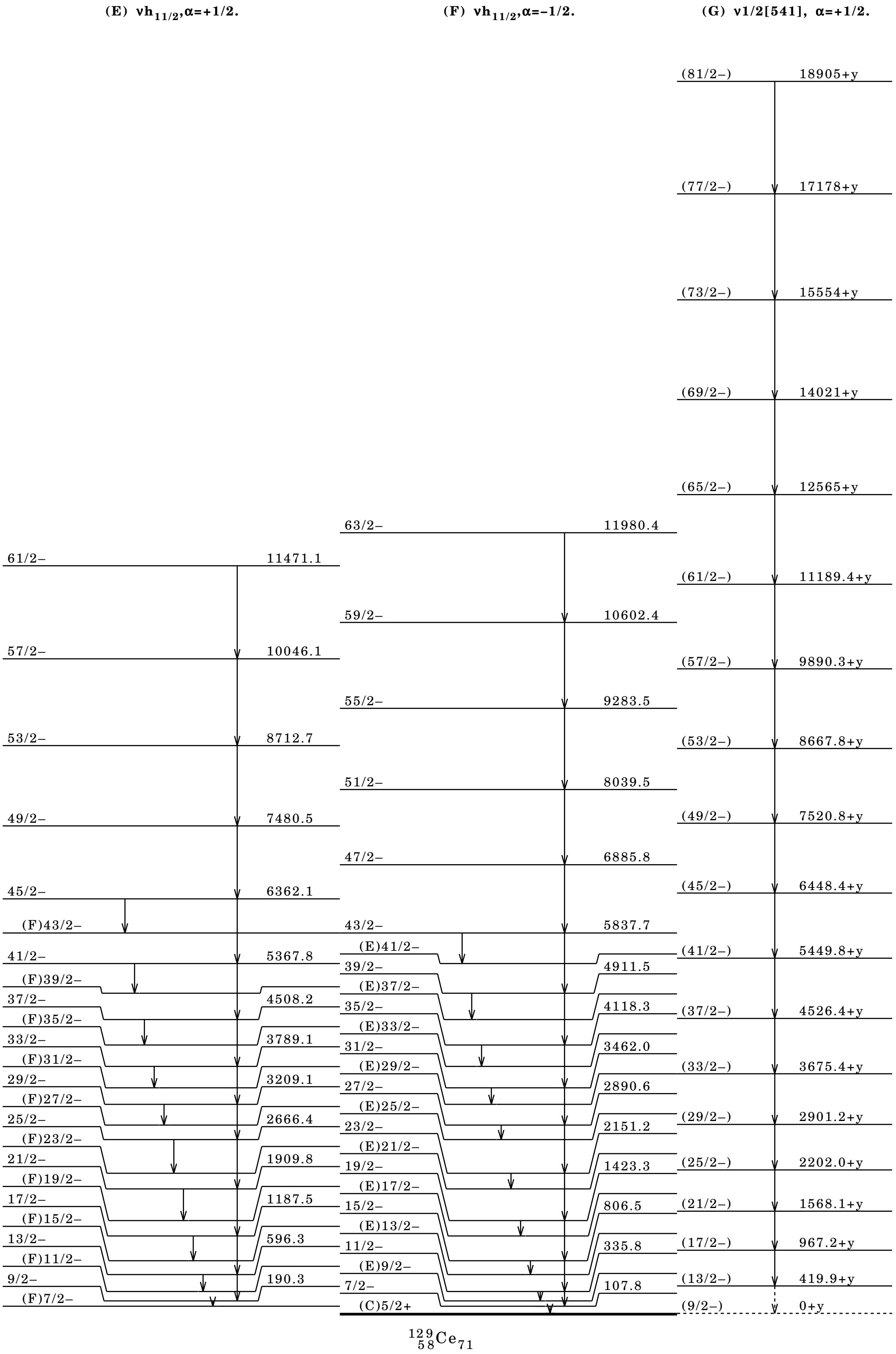
(C) $\nu d_{5/2}$, α=+1/2.

(D) $\nu d_{5/2}$, α=−1/2.



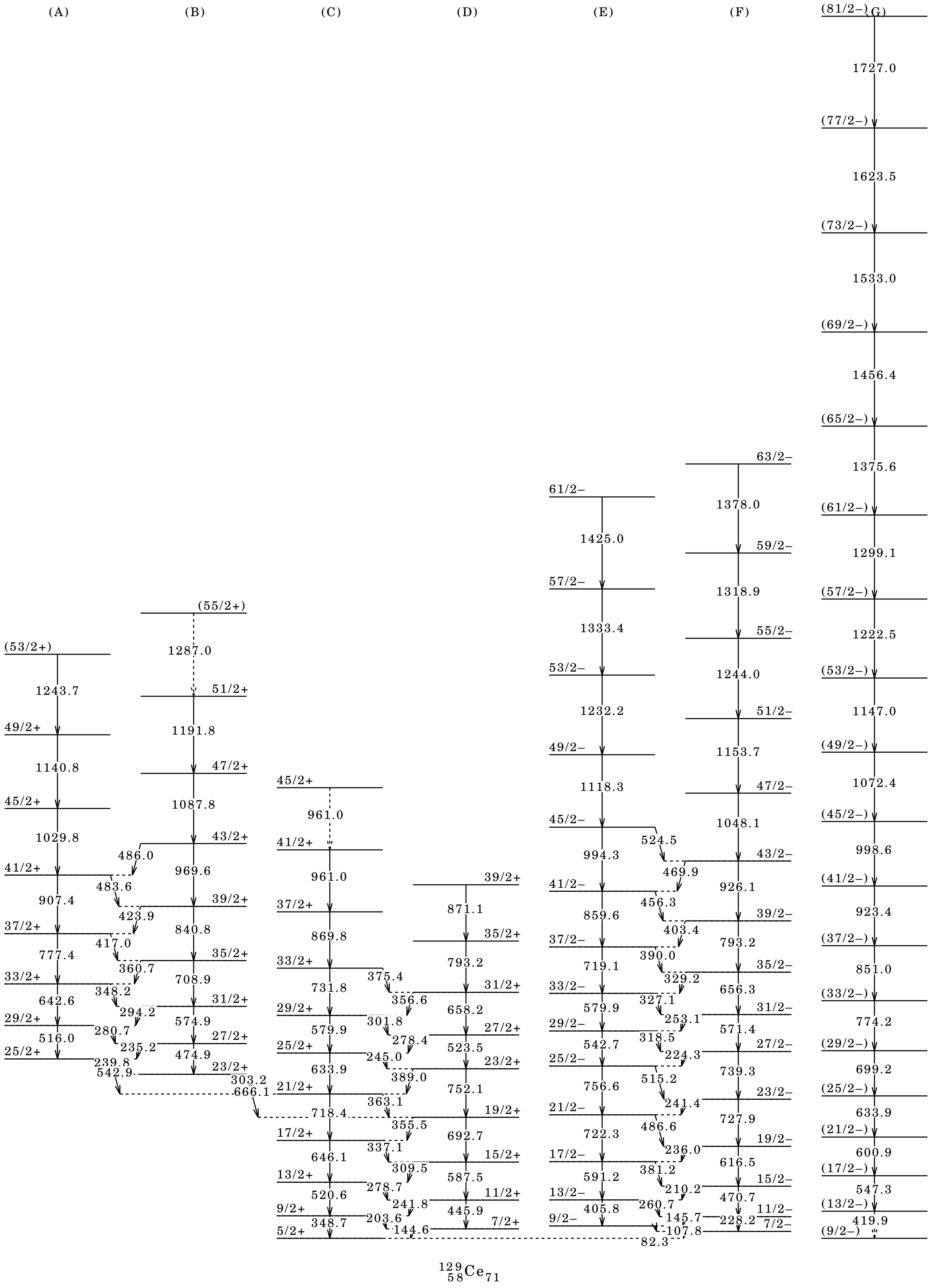
$^{129}_{58}$Ce$_{71}$

^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)



^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

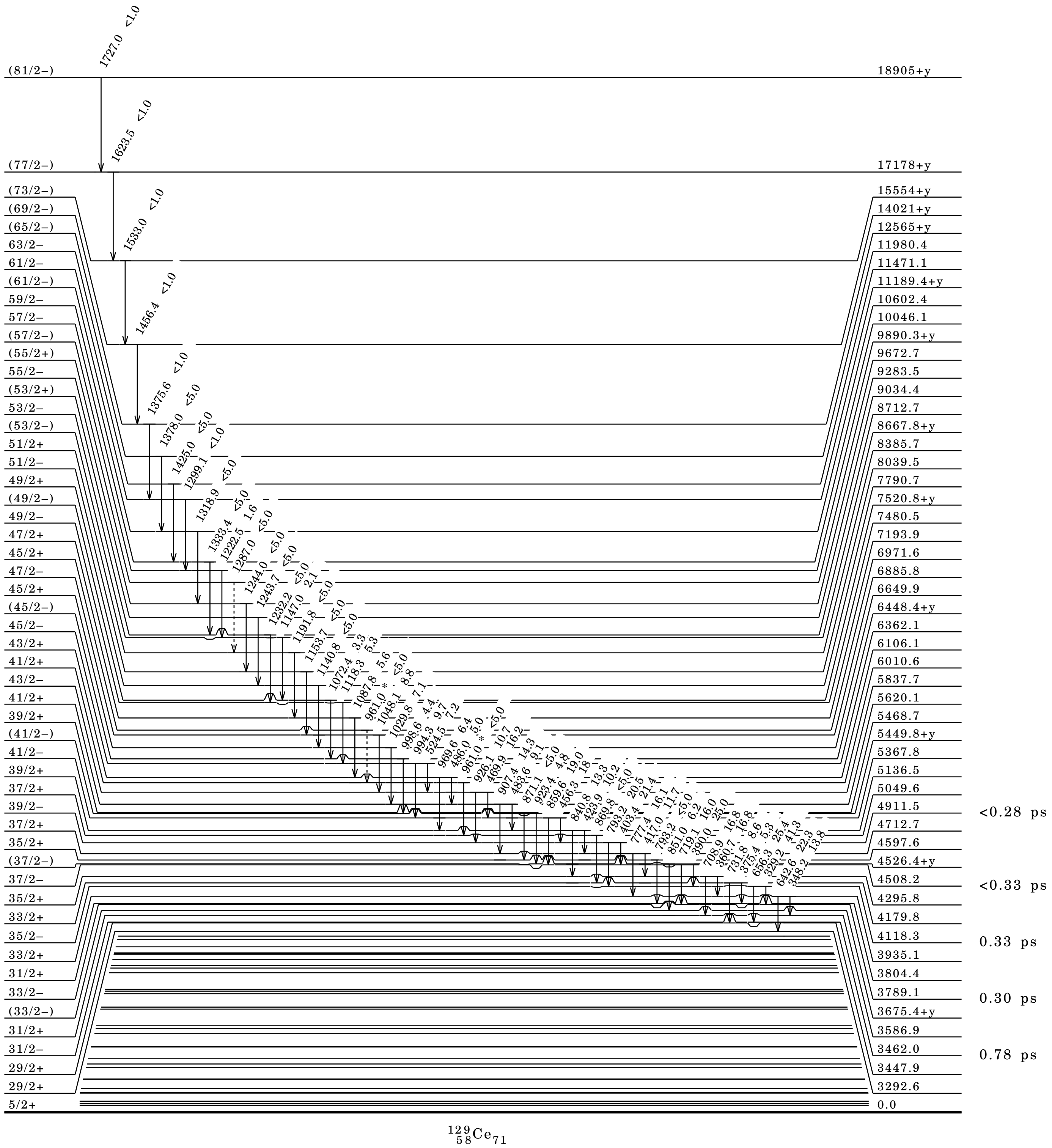
Bands for ^{129}Ce



^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

Level Scheme

Intensities: relative Iγ
* Multiply placed



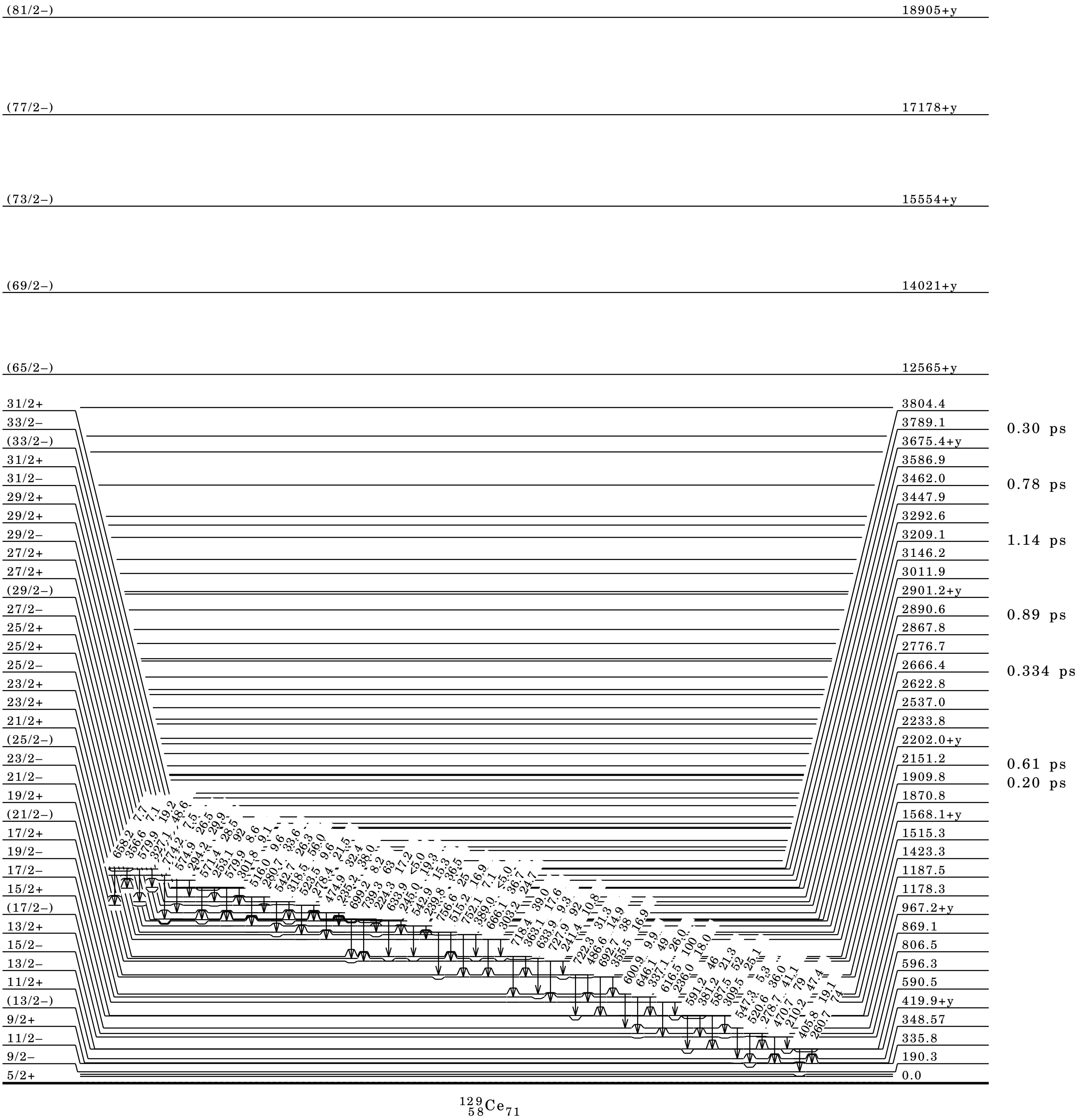
$^{129}_{58}Ce_{71}$

From NNDC(BNL)
program ENSDAT

$^{100}Mo(^{34}S,5n\gamma)$ 2009Pa40 (continued)

Level Scheme (continued)

Intensities: relative Iγ
* Multiply placed

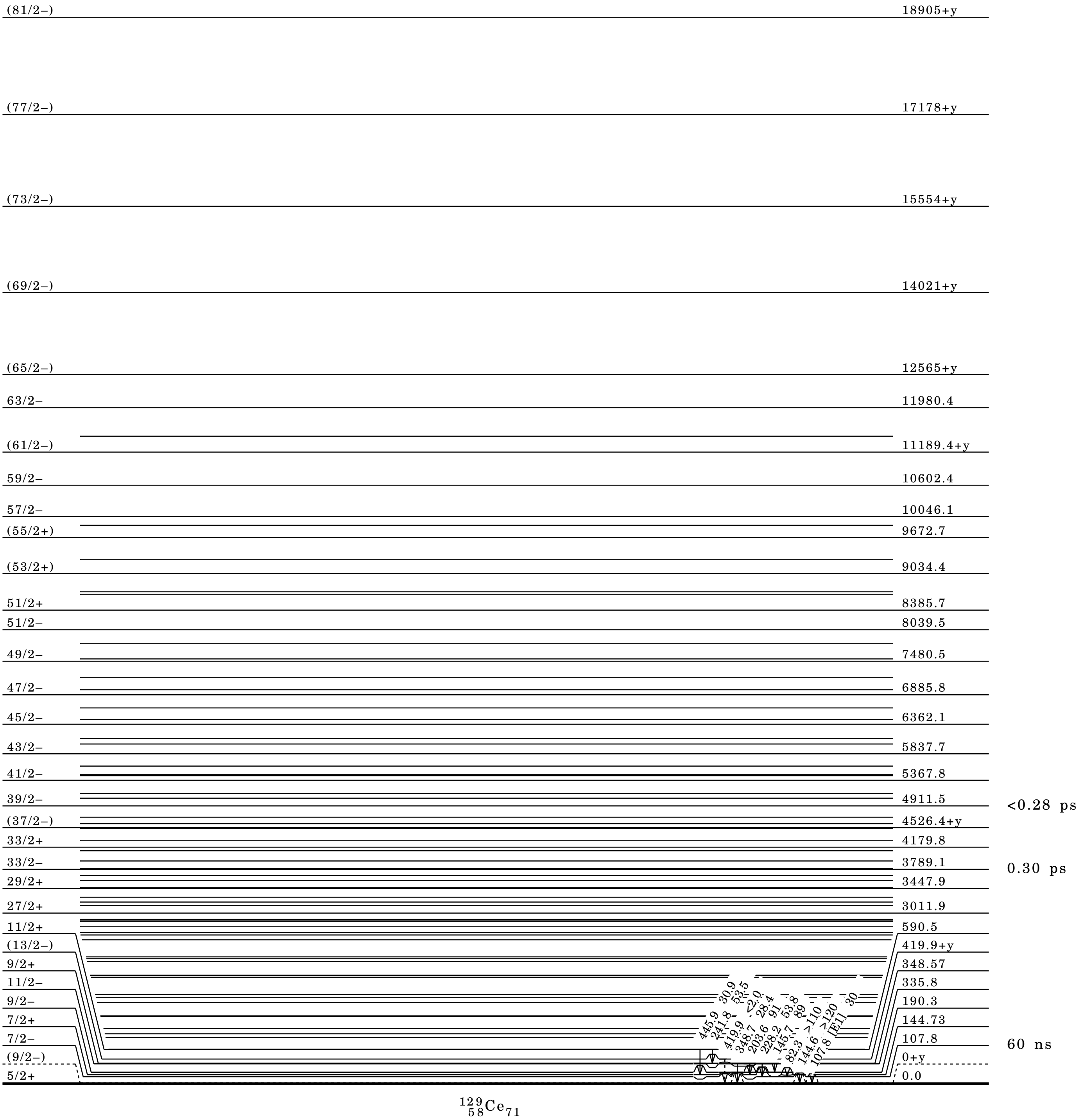


$^{129}_{58}Ce_{71}$

^{100}Mo(^{34}S,5nγ) 2009Pa40 (continued)

Level Scheme (continued)

Intensities: relative Iγ
* Multiply placed



From NNDC(BNL)
program ENSDAT

^{104}Pd(^{28}Si,2pnγ) 1996Ga13

1996Ga13: E=125 MeV. Measured Eγ, Iγ, γγ, lifetimes by Doppler– shift attenuation method (DSAM) using the 8π array of 20 Compton– suppressed detectors and 27 BGO inner array detectors at Chalk–River facility. Deduced SD band and extended previously known strongly coupled normal bands to 51/2+ and 55/2–.

^{129}Ce Levels

E(level)†	Jπ	$T_{1/2}$	Comments
0.0‡	5/2+		
107.0# *10*	7/2–	60 ns *2*	$T_{1/2}$: from Adopted Levels.
144.4§ *8*	7/2+		
189.2@ *13*	9/2–		
334.8# *13*	11/2–		
347.6‡ *8*	9/2+		
589.5§ *10*	11/2+		
594.9@ *14*	13/2–		
804.9# *15*	15/2–		
867.5‡ *11*	13/2+		
1176.6§ *12*	15/2+		
1185.7@ *15*	17/2–		
1421.4# *16*	19/2–		
1513.3‡ *13*	17/2+		
1869.1§ *13*	19/2+		
1907.7@ *17*	21/2–		
2148.2# *17*	23/2–		
2231.1‡ *14*	21/2+		
2534.3§ *15*	23/2+		
2663.4@ *18*	25/2–		
2773.8‡ *15*	25/2+		
2887.3# *18*	27/2–		
3009.2§ *16*	27/2+		
3205.4@ *19*	29/2–		
3289.4‡ *17*	29/2+		
3458.1# *20*	31/2–		
3583.3§ *17*	31/2+		
3784.7@ *20*	33/2–		
3932.3‡ *18*	33/2+		
4113.3# *21*	35/2–		
4291.4§ *18*	35/2+		
4503.0@ *21*	37/2–		
4709.2‡ *19*	37/2+		
4906.1# *22*	39/2–		
5132.8§ *20*	39/2+		
5362.1@ *22*	41/2–		
5616.2‡ *22*	41/2+		
5832.1# *22*	43/2–		
6100.8§ *22*	43/2+		
6356.1@ *23*	45/2–		
6645.2‡ *24*	45/2+		
6879.1# *24*	47/2–		
7186.8§ *24*	47/2+		
7474.1@ *25*	49/2–		
7785‡ *3*	49/2+		
8032# *3*	51/2–		
8379§ *3*	51/2+		
8707@ *3*	53/2–		
9275# *3*	55/2–		
0+y&	J≈(17/2+)		E(level): this level is at 419.9+y in Adopted Levels with Jπ=(13/2–) based on level scheme from 2009Pa40 in (^{34}S,5nγ). Jπ: 17/2 and positive parity are preferred (1996Ga13) on the basis of coincidences observed between SD band transitions and those of 5/2[402] positive parity band, 2009Pa40 propose (13/2–). Possible transitions to 13/2+ and 17/2+ levels of 5/2[402] band.
547.0+y& *10*	J+2		Possible transition to 17/2+ level of 5/2[402] band.
1148.0+y& *15*	J+4		
1782.0+y& *18*	J+6		
2480.0+y& *20*	J+8		

Continued on next page (footnotes at end of table)

^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

^{129}Ce Levels (continued)

E(level)[†]	Jπ
3253.0+y[&] *23*	J+10
4102.0+y[&] *25*	J+12
5025+y[&] *3*	J+14
6022+y[&] *3*	J+16
7093+y[&] *3*	J+18
8239+y[&] *4*	J+20
9460+y[&] *4*	J+22
10758+y[&] *4*	J+24
12133+y[&] *4*	J+26
13584+y[&] *4*	J+28

[†] From least–squares fit to Eγ data, assuming 1 keV uncertainty for each γ ray.

[‡] (A): ν5/2[402],α=+1/2 Q(transition)=3.5 *5* (1996Ga13) from DSAM data.

[§] (B): ν5/2[402],α=–1/2.

[#] (C): ν7/2[523],α=–1/2.

[@] (D): ν7/2[523],α=+1/2.

[&] (E): SD band. Possible intruder neutron orbitals: $i_{13/2}$[660]1/2 or $h_{9/2}/f_{7/2}$ [541]1/2 with preference for the latter two (1996Ga13). Q(transition)=6.3 *4* (1996Ga13) from DSAM data for ten γ rays in the cascade. The band intensity=1.7% of total intensity of 5/2[402] and 7/2[523] bands (1996Ga13). The same band is populated in (^{34}S,5nγ) reaction and shown in Adopted Levels, where 419.9+y level corresponds to 0+y level here.

γ(^{129}Ce)

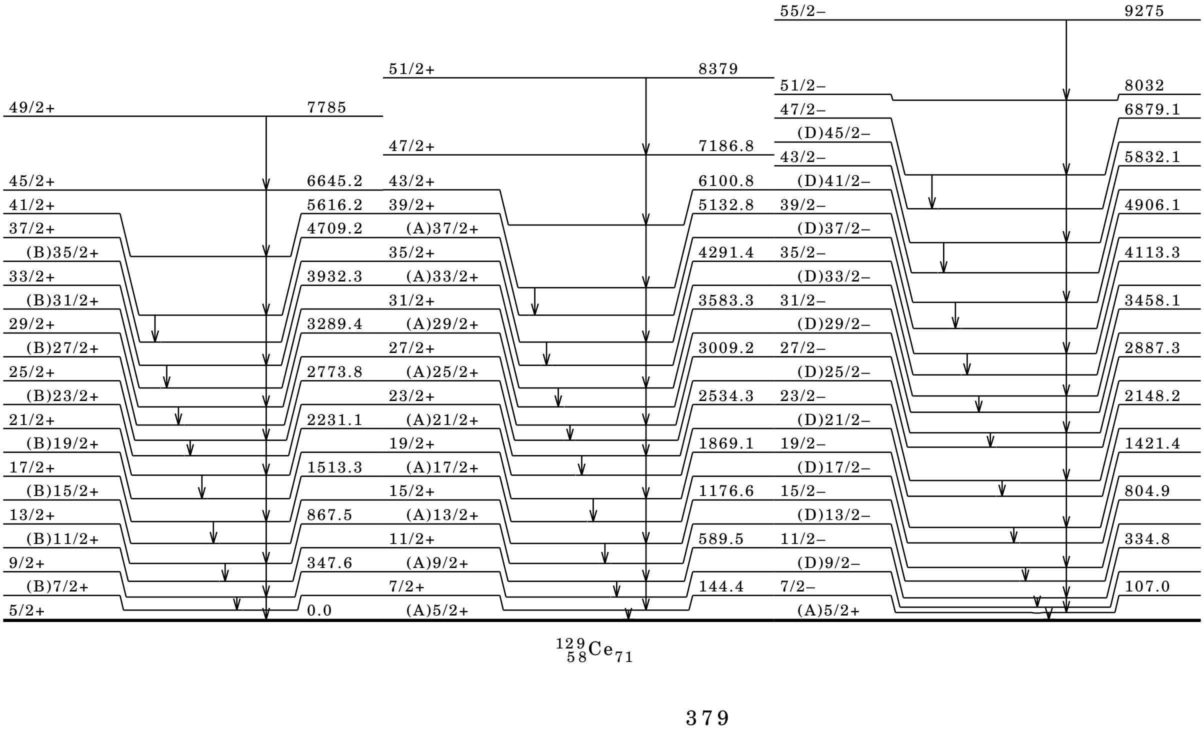
Eγ	E(level)
82	189.2
107	107.0
144	144.4
145	334.8
203	347.6
210	804.9
224	2887.3
228	334.8
235	3009.2
236	1421.4
239	2773.8
240	2148.2
242	589.5
253	3458.1
260	594.9
278	867.5
280	3289.4
294	3583.3
303	2534.3
309	1176.6
318	3205.4
327	3784.7
329	4113.3
337	1513.3
348	347.6
349	3932.3
356	1869.1
359	4291.4
362	2231.1
381	1185.7
390	4503.0
403	4906.1
406	594.9
418	4709.2
424	5132.8
445	589.5
456	5362.1
470	804.9
	5832.1
475	3009.2
486	1907.7
515	2663.4
516	3289.4
520	867.5
523	6879.1
524	6356.1
542	3205.4
543	2773.8
547	547.0+y
571	3458.1
574	3583.3
579	3784.7
587	1176.6
591	1185.7
601	1148.0+y
616	1421.4
634	1782.0+y
643	3932.3
646	1513.3
655	4113.3
665	2534.3
692	1869.1
698	2480.0+y
708	4291.4
718	2231.1
	4503.0
722	1907.7
727	2148.2
739	2887.3
756	2663.4
773	3253.0+y
777	4709.2
793	4906.1
841	5132.8
849	4102.0+y
859	5362.1
907	5616.2
923	5025+y
926	5832.1
968	6100.8
994	6356.1
997	6022+y
1029	6645.2
1047	6879.1
1071	7093+y
1086	7186.8
1118	7474.1
1140	7785
1146	8239+y
1153	8032
1192	8379
1221	9460+y
1233	8707
1243	9275
1298	10758+y
1375	12133+y
1451	13584+y

^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

(A) ν5/2[402],α=+1/2

(B) ν5/2[402],α=–1/2.

(C) ν7/2[523],α=–1/2.

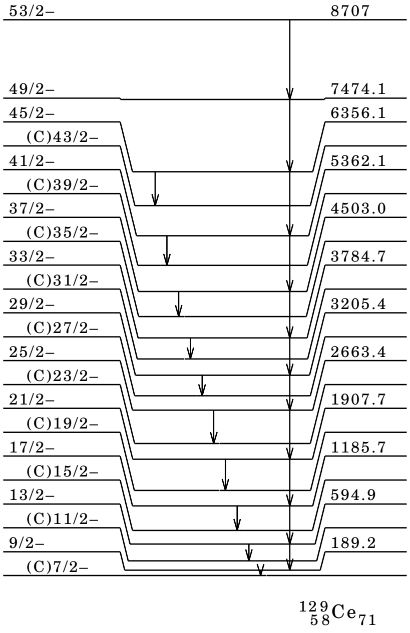


$^{129}_{58}$Ce$_{71}$

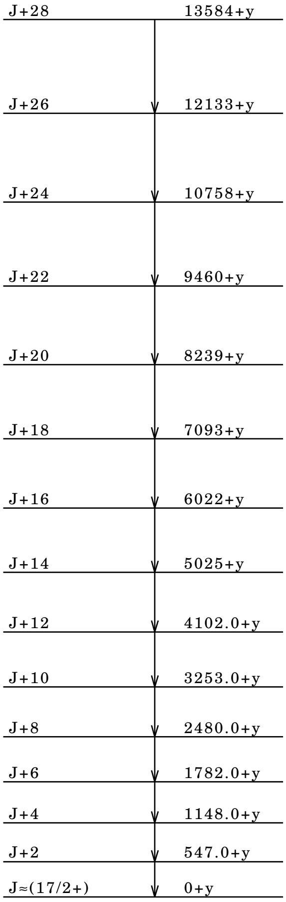
From NNDC(BNL)
program ENSDAT

^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

(D) ν7/2[523],α=+1/2.

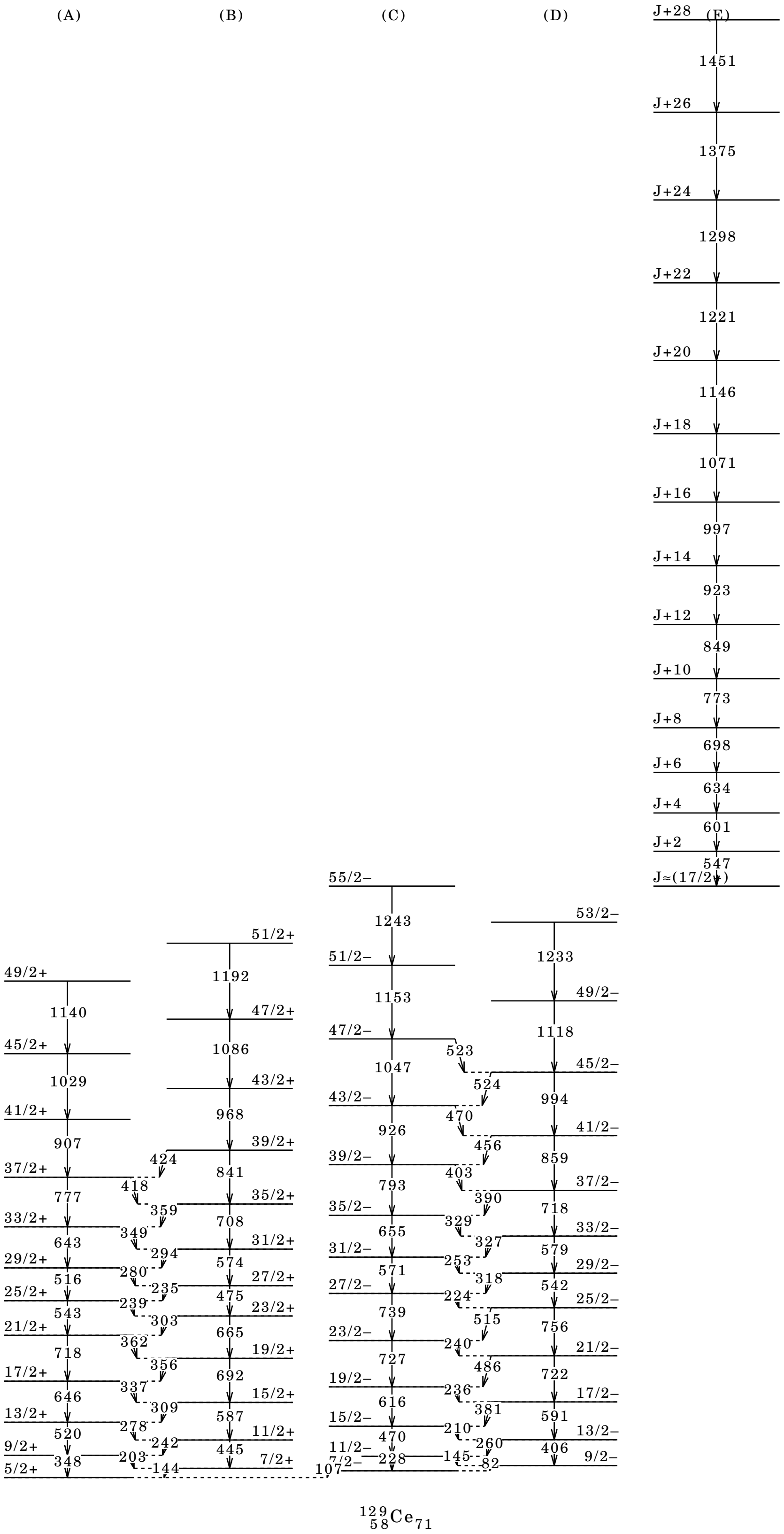


(E) SD band.



^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

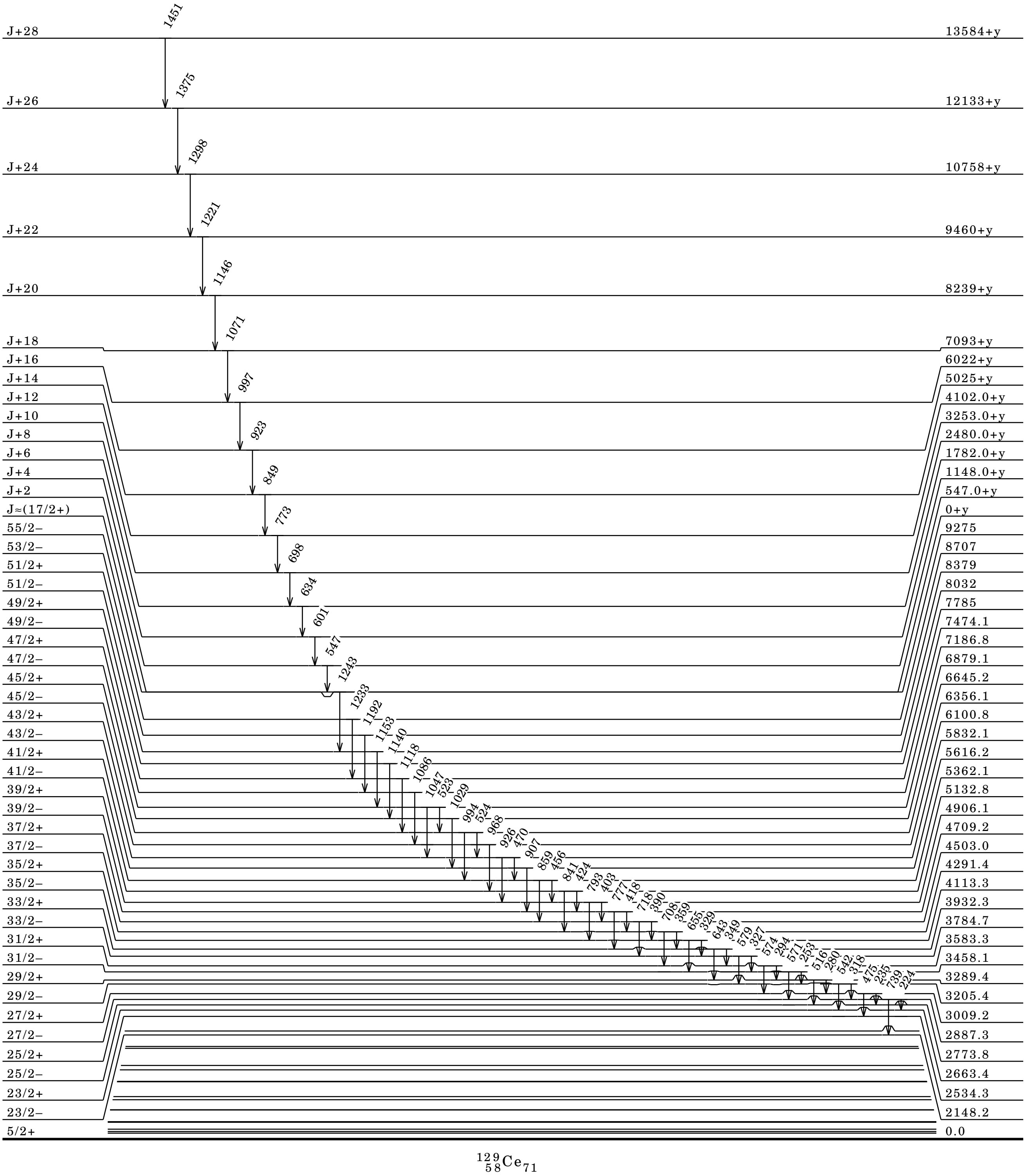
Bands for ^{129}Ce



From NNDC(BNL)
program ENSDAT

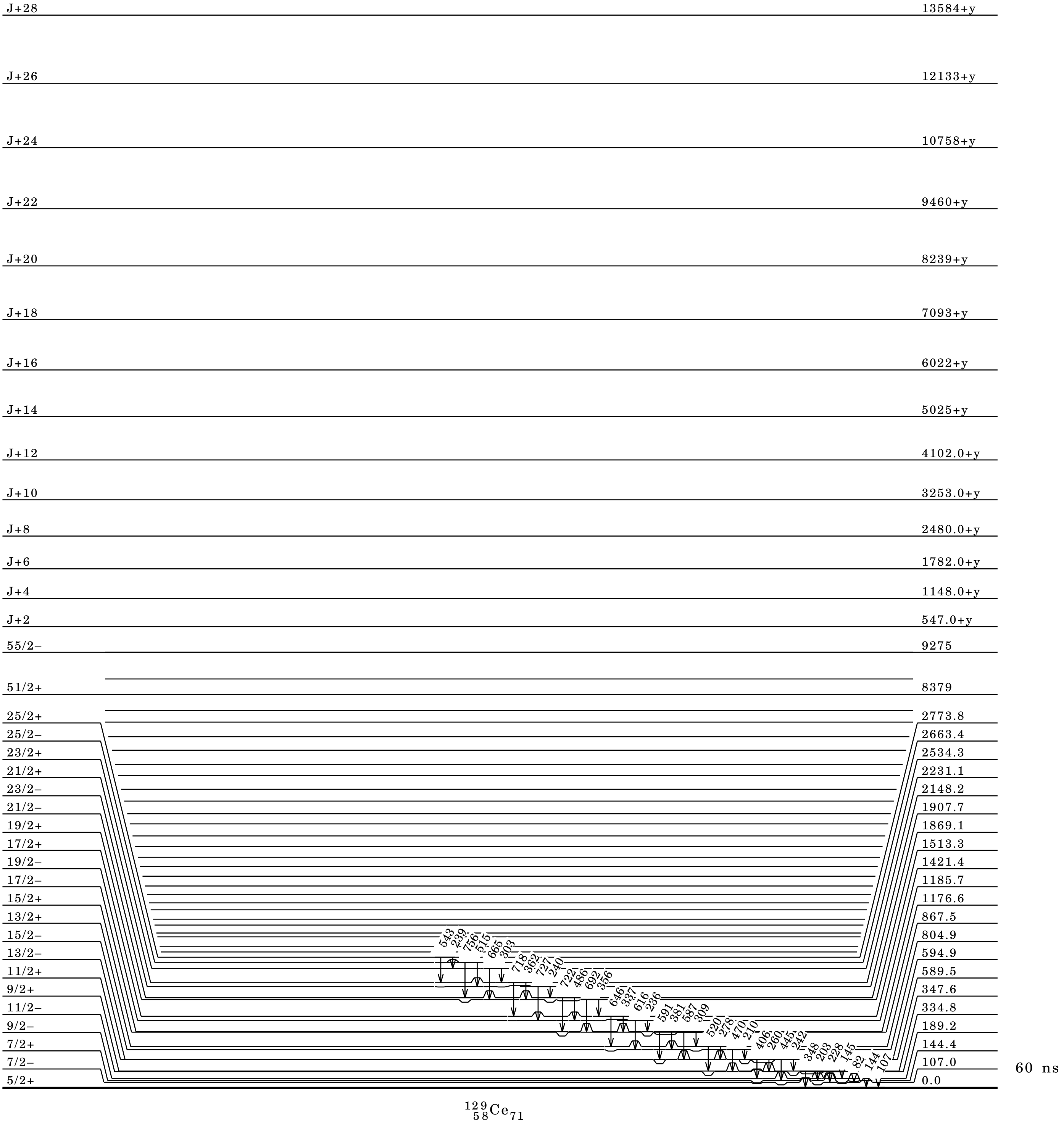
^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

Level Scheme



^{104}Pd(^{28}Si,2pnγ) 1996Ga13 (continued)

Level Scheme (continued)



^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17

1984Ar13: E=73–85 MeV. Measured Eγ, Iγ, γγ, γ(θ) using four Escape–Suppressed Ge detectors (ESS) at the Niels Bohr Institute.

1977Gi17: ^{116}Sn(^{16}O,3nγ) E=55–85 MeV. Measured Eγ, Iγ, γγ, γγ(t), γ(θ), and excitation function.

1998Li32, 2001Li69: ^{116}Sn(^{16}O,3nγ) E=73 MeV. Measured lifetimes by Doppler–shift attenuation method (DSAM) using seven Compton–suppressed HPGe detectors at CIAE, Beijing. Lifetimes for 19/2– to 39/2– levels in the 7/2[523] band in both papers, lifetimes for 15/2+ to 31/2+ levels in the 5/2[402] band in 2001Li69 only.

1998Io01: ^{116}Sn(^{16}O,3nγ) E=70 MeV; measured Iγ(t), Iγ(t,θ,H). Deduced $T_{1/2}$, g–factors, quadrupole moments, pulsed beam. Time–differential perturbed angular distribution (TDPAD) method. Experiments at LNL–GASP facility, Legnaro.

From assignment of 9/2– to the 60–ns isomer at 108 keV, 1998Io01 assign 7/2+ to g.s. and increase spin by one unit for all the positive– parity levels. For the negative–parity band, a new level is proposed at 119 keV with Jπ=11/2– and energies of higher levels are adjusted accordingly, and the spins increased by 2 units. These modifications proposed by 1998Io01 are not adopted by the evaluators, since the spin of 9/2 for the 60–ns isomer at 108 is not considered by the evaluators as definitely determined. The experimental quadrupole interaction pattern (figure 1 in 1998Io01) fits 9/2 better than 7/2, but the fit for 9/2 still suffers from somewhat large χ^2 of 2.7.

Level scheme is from 1984Ar13. Level scheme in 1977Gi17 contains both band members but level energies are different due to assignment of 82γ and 108γ and revised placements of 144γ, 145γ in 1984Ar13. Some revisions were also proposed in 1998Io01, but as discussed above, these are not adopted by the evaluators.

^{129}Ce Levels

E(level)	Jπ[‡]	$T_{1/2}$[†]	Comments
0.0[§]	5/2+		
108.10[@] *20*	7/2–	60 ns *2*	g=–0.185 *10* (1998Io01); Q=1.32 *13* (1998Io01). g,Q: from Time–differential perturbed angular distribution (TDPAD) method (1998Io01). Jπ: 9/2– proposed in 1998Io01 based on quadrupole interaction TDPAD experiment, fit for 9/2– is claimed to be better than that for 7/2, but for 9/2, χ^2 is also 2.7. $T_{1/2}$: γγ(t) (1998Io01). Other: 62 ns *5* from γγ(t) (1977Gi17).
144.34[#] *10*	7/2+		
190.5[&] *8*	9/2–		
335.7[@] *8*	11/2–		
348.09[§] *20*	9/2+		
589.2[#] *4*	11/2+		
596.0[&] *8*	13/2–		
805.8[@] *8*	15/2–		
867.5[§] *5*	13/2+		
1175.8[#] *5*	15/2+	0.51 ps *6*	Q(transition)=7.1 *8* (2001Li69).
1186.5[&] *9*	17/2–		
1421.8[@] *10*	19/2–	1.24 ps *10*	Q(transition)=4.35 *18* (1998Li32,2001Li69).
1512.6[§] *6*	17/2+		
1867.7[#] *8*	19/2+	0.46 ps *4*	Q(transition)=4.9 *4* (2001Li69).
1906.6[&] *11*	21/2–		
2148.6[@] *11*	23/2–	1.01 ps *19*	Q(transition)=3.0 *3* (1998Li32,2001Li69).
2230.6[§] *8*	21/2+		
2533.6[#] *10*	23/2+	0.374 ps *35*	Q(transition)=5.3 *5* (2001Li69).
2663.6[&] *12*	25/2–		
2772.6[§] *11*	25/2+		
2887.6[@] *13*	27/2–	0.471 ps *42*	Q(transition)=4.07 *18* (1998Li32,2001Li69).
3007.6[#] *12*	27/2+	1.74 ps *25*	Q(transition)=4.5 *3* (2001Li69).
3205.6[&] *14*	29/2–		
3285.6[§] *13*	29/2+		
3458.6[@] *14*	31/2–	0.92 ps *11*	Q(transition)=4.3 *3* (1998Li32,2001Li69).
3581.6[#] *14*	31/2+	<1.8 ps	$T_{1/2}$: effective half–life, not corrected for side feeding. Q(transition)>3.2 (2001Li69).
3784.6[&] *15*	33/2–		
4114.6[@] *16*	35/2–	0.69 ps *8*	Q(transition)=3.45 *21* (1998Li32,2001Li69).
4905.6[@] *19*	39/2–	<0.60 ps	$T_{1/2}$: effective half–life, not corrected for side feeding. Q(transition)>3.0 (1998Li32,2001Li69). Weakly populated level. Besides the 791γ, there may be other transitions from this level.

[†] From DSAM (1998Li32,2001Li69) unless otherwise stated. Both papers report same lifetimes for 19/2– to 39/2– levels in the 7/2[523] band. 2001Li69 report, in addition, lifetimes for 15/2+ to 31/2+ levels in the 5/2[402] band.

[‡] As proposed in 1984Ar13 on the basis of γ(θ) data, band structures, comparison with cranked–shell model calculation for available Nilsson orbitals. In Adopted Levels, Gammas dataset, all Jπ assignments are given in parentheses since the spins of the ground state and the 60–ns isomer are not definite.

[§] (A): ν5/2[402],α=+1/2.

Footnotes continued on next page

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

^{129}Ce Levels (continued)

[#] (B): ν5/2[402],α=−1/2.
[@] (C): ν7/2[523],α=−1/2.
[&] (D): ν7/2[523],α=+1/2.

γ(^{129}Ce)

A_2 and A_4 coefficients are from 1984Ar13 unless otherwise noted.

A composite line at 788.4 with Iγ=11.3 *25* and placed from (23/2+) level in 1977Gi17 is omitted here as no such line is reported in 1984Ar13.

Eγ[†]	E(level)	Iγ[#]	Mult.[@]	δ[&]	α[a]	I(γ+ce)[§]	Comments
82	190.5	30 *6*	[M1]		2.09	94 *20*	ce(K)/(γ+ce)=0.577 *5*; ce(L)/(γ+ce)=0.0791 *13*; ce(M)/(γ+ce)=0.0166 *3*. α(K)=1.783 *25*; α(L)=0.244 *4*; α(M)=0.0512 *8*; α(N)=0.01135 *16*; α(O)=0.00184 *3*. ce(N)/(γ+ce)=0.00367 *7*; ce(O)/(γ+ce)=0.000594 *10*; ce(P)/(γ+ce)=4.46×10^{-5} *8*.
108.1[‡] *2*	108.10	100 *7*	(E1)		0.196	120 *8*	A_2=−0.15 *5* (1977Gi17); A_2=−0.21 *2* (1998Io01). ce(K)/(γ+ce)=0.1396 *18*; ce(L)/(γ+ce)=0.0193 *3*; ce(M)/(γ+ce)=0.00402 *6*. ce(N)/(γ+ce)=0.000879 *14*; ce(O)/(γ+ce)=0.0001370 *21*; ce(P)/(γ+ce)=8.50×10^{-6} *13*. α(K)=0.1670 *25*; α(L)=0.0231 *4*; α(M)=0.00481 *8*; α(N)=0.001052 *16*; α(O)=0.0001639 *25*. B(E1)(W.u.)=2.92×10^{-6} *10*.
144.3 *1*	144.34	40.7 *21*	[M1+E2]		0.432 *14*	59 *3*	ce(K)/(γ+ce)=0.252 *4*; ce(L)/(γ+ce)=0.039 *5*; ce(M)/(γ+ce)=0.0082 *11*. ce(N)/(γ+ce)=0.00181 *24*; ce(O)/(γ+ce)=0.00029 *4*; ce(P)/(γ+ce)=1.90×10^{-5} *5*. α(K)=0.361 *6*; α(L)=0.056 *7*; α(M)=0.0118 *16*; α(N)=0.0026 *4*. α(O)=0.00041 *5*; α(P)=2.73×10^{-5} *6*.
145.1 *2*	335.7	46 *3*	(M1)		0.413	66 *4*	A_2=−0.52 *5* (1977Gi17). ce(K)/(γ+ce)=0.250 *3*; ce(L)/(γ+ce)=0.0339 *5*; ce(M)/(γ+ce)=0.00710 *11*. α(K)=0.353 *6*; α(L)=0.0480 *7*; α(M)=0.01004 *15*; α(N)=0.00223 *4*; α(O)=0.000361 *6*. ce(N)/(γ+ce)=0.001576 *24*; ce(O)/(γ+ce)=0.000255 *4*; ce(P)/(γ+ce)=1.93×10^{-5} *3*.
203.6[‡] *2*	348.09	21 *2*	(M1+E2)	−0.40 *8*	0.1640 *24*	24 *2*	A_2=−0.38 *3*; A_4=−0.02 *2*. ce(K)/(γ+ce)=0.1184 *16*; ce(L)/(γ+ce)=0.0177 *7*; ce(M)/(γ+ce)=0.00374 *15*. α(K)=0.1379 *20*; α(L)=0.0206 *8*; α(M)=0.00435 *17*; α(N)=0.00096 *4*; α(O)=0.000153 *5*. ce(N)/(γ+ce)=0.00083 *3*; ce(O)/(γ+ce)=0.000131 *5*; ce(P)/(γ+ce)=8.88×10^{-6} *17*.

Continued on next page (footnotes at end of table)

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) **1984Ar13,1977Gi17 (continued)**

γ(^{129}Ce) (continued)

Eγ[†]	E(level)	Iγ[#]	Mult.[@]	δ[&]	α[a]	I(γ+ce)[§]	Comments
209.9[‡] *2*	805.8	13 *1*	(M1+E2)	−1.1 *1*	0.1532 *23*	15 *1*	A_2=−0.81 *2*; A_4=+0.11 *3*. ce(K)/(γ+ce)=0.1069 *14*; ce(L)/(γ+ce)=0.0204 *6*; ce(M)/(γ+ce)=0.00439 *13*. α(K)=0.1233 *18*; α(L)=0.0236 *7*; α(M)=0.00507 *15*; α(N)=0.00111 *4*; α(O)=0.000169 *5*. ce(N)/(γ+ce)=0.00096 *3*; ce(O)/(γ+ce)=0.000147 *4*; ce(P)/(γ+ce)=7.38×10^{-6} *15*.
224	2887.6	2.5 *2*	[M1+E2]		0.1255	2.8 *2*	ce(K)/(γ+ce)=0.0945 *14*; ce(L)/(γ+ce)=0.0134 *6*; ce(M)/(γ+ce)=0.00282 *14*. ce(N)/(γ+ce)=0.00062 *3*; ce(O)/(γ+ce)=0.000100 *4*; ce(P)/(γ+ce)=7.17×10^{-6} *19*. α(K)=0.1064 *17*; α(L)=0.0151 *7*; α(M)=0.00317 *16*; α(N)=0.00070 *4*; α(O)=0.000113 *5*.
228	335.7	11 *2*	(E2)		0.1186	12 *2*	A_2=+0.20 *5*; A_4=−0.05 *5*. ce(K)/(γ+ce)=0.0822 *11*; ce(L)/(γ+ce)=0.0187 *3*; ce(M)/(γ+ce)=0.00406 *6*. α(K)=0.0920 *13*; α(L)=0.0209 *3*; α(M)=0.00454 *7*; α(N)=0.000986 *14*; α(O)=0.0001470 *21*. ce(N)/(γ+ce)=0.000881 *13*; ce(O)/(γ+ce)=0.0001314 *19*; ce(P)/(γ+ce)=5.18×10^{-8} *8*.
235[b]	1421.8	5.7[b] *6*	(M1+E2)		0.1100	6.3[b] *7*	A_2=−0.38 *7* (1977Gi17). ce(K)/(γ+ce)=0.0841 *13*; ce(L)/(γ+ce)=0.0119 *5*; ce(M)/(γ+ce)=0.00249 *11*. ce(N)/(γ+ce)=0.000551 *23*; ce(O)/(γ+ce)=8.8×10^{-5} *3*; ce(P)/(γ+ce)=6.38×10^{-6} *17*. α(K)=0.0934 *16*; α(L)=0.0132 *6*; α(M)=0.00276 *13*; α(N)=0.00061 *3*; α(O)=9.8×10^{-5} *4*.
	3007.6	12[b] *1*	[M1+E2]		0.1100	13[b] *1*	ce(K)/(γ+ce)=0.0841 *13*; ce(L)/(γ+ce)=0.0119 *5*; ce(M)/(γ+ce)=0.00249 *11*. ce(N)/(γ+ce)=0.000551 *23*; ce(O)/(γ+ce)=8.8×10^{-5} *3*; ce(P)/(γ+ce)=6.38×10^{-6} *17*. α(K)=0.0934 *16*; α(L)=0.0132 *6*; α(M)=0.00276 *13*; α(N)=0.00061 *3*; α(O)=9.8×10^{-5} *4*.
239	2772.6	8 *1*	(M1+E2)	−0.25 *8*	0.1051	9 *1*	A_2=−0.54 *10*; A_4=+0.11 *8*. ce(K)/(γ+ce)=0.0809 *11*; ce(L)/(γ+ce)=0.01123 *25*; ce(M)/(γ+ce)=0.00235 *6*. α(K)=0.0895 *14*; α(L)=0.0124 *3*; α(M)=0.00260 *7*; α(N)=0.000576 *13*; α(O)=9.29×10^{-5} *19*. ce(N)/(γ+ce)=0.000522 *12*; ce(O)/(γ+ce)=8.40×10^{-5} *17*; ce(P)/(γ+ce)=6.17×10^{-6} *11*. δ: −2.2 *5* also possible but less likely due to ΔJ=1 coupled structure.

Continued on next page (footnotes at end of table)

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

γ(^{129}Ce) (continued)

Eγ[†]	E(level)	Iγ[#]	Mult.[@]	δ[&]	α[a]	I(γ+ce)[§]	Comments
241	589.2	9 *1*	(M1+E2)	−0.25 *8*	0.1028	10 *1*	A_2=−0.47 *8*; A_4=+0.02 *8*. ce(K)/(γ+ce)=0.0793 *11*; ce(L)/(γ+ce)=0.01100 *24*; ce(M)/(γ+ce)=0.00231 *6*. α(K)=0.0875 *13*; α(L)=0.0121 *3*; α(M)=0.00254 *6*; α(N)=0.000563 *13*; α(O)=9.07×10^{-5} *18*. ce(N)/(γ+ce)=0.000511 *12*; ce(O)/(γ+ce)=8.23×10^{-5} *16*; ce(P)/(γ+ce)=6.04×10^{-6} *11*. δ: −2.1 *4* also possible but less likely due to ΔJ=1 coupled structure.
242	2148.6	3.5 *3*	[M1+E2]		0.1015	3.9 *3*	ce(K)/(γ+ce)=0.0783 *13*; ce(L)/(γ+ce)=0.0110 *4*; ce(M)/(γ+ce)=0.00231 *10*. ce(N)/(γ+ce)=0.000511 *20*; ce(O)/(γ+ce)=8.21×10^{-5} *25*; ce(P)/(γ+ce)=5.94×10^{-6} *17*. α(K)=0.0862 *15*; α(L)=0.0121 *5*; α(M)=0.00254 *11*; α(N)=0.000562 *22*; α(O)=9.0×10^{-5} *3*.
253	3458.6	9 *2*	[M1+E2]		0.0900 *14*	10 *2*	ce(K)/(γ+ce)=0.0702 *12*; ce(L)/(γ+ce)=0.0098 *4*; ce(M)/(γ+ce)=0.00206 *8*. ce(N)/(γ+ce)=0.000455 *16*; ce(O)/(γ+ce)=7.32×10^{-5} *20*; ce(P)/(γ+ce)=5.32×10^{-6} *15*. α(K)=0.0765 *14*; α(L)=0.0107 *4*; α(M)=0.00224 *8*; α(N)=0.000496 *17*; α(O)=7.98×10^{-5} *21*.
260.4[‡] *3*	596.0	19 *1*	(M1+E2)	−0.7 *2*	0.0814 *15*	21 *1*	A_2=−0.66 *2*; A_4=0.00 *2*. ce(K)/(γ+ce)=0.0629 *15*; ce(L)/(γ+ce)=0.0098 *4*; ce(M)/(γ+ce)=0.00208 *10*. α(K)=0.0680 *18*; α(L)=0.0106 *5*; α(M)=0.00225 *10*; α(N)=0.000494 *21*; α(O)=7.8×10^{-5} *3*. ce(N)/(γ+ce)=0.000457 *19*; ce(O)/(γ+ce)=7.21×10^{-5} *24*; ce(P)/(γ+ce)=4.60×10^{-6} *21*.
278	867.5	13 *1*	[M1+E2]		0.0697 *12*	14 *1*	ce(K)/(γ+ce)=0.0555 *11*; ce(L)/(γ+ce)=0.00767 *18*; ce(M)/(γ+ce)=0.00161 *5*. ce(N)/(γ+ce)=0.000356 *9*; ce(O)/(γ+ce)=5.74×10^{-5} *12*; ce(P)/(γ+ce)=4.21×10^{-6} *13*. α(K)=0.0594 *13*; α(L)=0.00821 *20*; α(M)=0.00172 *5*; α(N)=0.000381 *10*; α(O)=6.14×10^{-5} *12*.
	3285.6	14 *1*	[M1+E2]		0.0697 *12*	15 *1*	ce(K)/(γ+ce)=0.0555 *11*; ce(L)/(γ+ce)=0.00767 *18*; ce(M)/(γ+ce)=0.00161 *5*. ce(N)/(γ+ce)=0.000356 *9*; ce(O)/(γ+ce)=5.74×10^{-5} *12*; ce(P)/(γ+ce)=4.21×10^{-6} *13*. α(K)=0.0594 *13*; α(L)=0.00821 *20*; α(M)=0.00172 *5*; α(N)=0.000381 *10*; α(O)=6.14×10^{-5} *12*.

Continued on next page (footnotes at end of table)

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

γ(^{129}Ce) (continued)

Eγ[†]	E(level)	Iγ[#]	Mult.[@]	δ[&]	α[a]	I(γ+ce)[§]	Comments
296	3581.6	4.0 *5*	[M1+E2]		0.0589 *11*	4.2 *5*	ce(K)/(γ+ce)=0.0474 *10*; ce(L)/(γ+ce)=0.00652 *13*; ce(M)/(γ+ce)=0.00137 *3*. ce(N)/(γ+ce)=0.000303 *7*; ce(O)/(γ+ce)=4.88×10^{-5} *8*; ce(P)/(γ+ce)=3.60×10^{-6} *11*. α(K)=0.0502 *11*; α(L)=0.00690 *14*; α(M)=0.00145 *3*; α(N)=0.000320 *7*; α(O)=5.17×10^{-5} *9*.
303	2533.6	5.2 *6*	(M1+E2)	−0.95 *75*	0.052 *4*	5.5 *6*	A_2=−0.49 *5*; A_4=−0.05 *5*. ce(K)/(γ+ce)=0.041 *4*; ce(L)/(γ+ce)=0.0065 *4*; ce(M)/(γ+ce)=0.00138 *10*. ce(N)/(γ+ce)=0.000303 *20*; ce(O)/(γ+ce)=4.75×10^{-5} *18*; ce(P)/(γ+ce)=3.0×10^{-6} *5*. α(K)=0.043 *5*; α(L)=0.0068 *4*; α(M)=0.00145 *11*; α(N)=0.000318 *21*; α(O)=5.00×10^{-5} *19*. B(M1)(W.u.)=(0.27 *21*); B(E2)(W.u.)=(1.8×10^{3} *15*).
308.3[‡] *3*	1175.8	5.3 *6*	(M1+E2)	−0.8 *4*	0.0501 *24*	5.6 *6*	A_2=−0.60 *7*; A_4=−0.02 *7*. ce(K)/(γ+ce)=0.0400 *24*; ce(L)/(γ+ce)=0.00610 *20*; ce(M)/(γ+ce)=0.00129 *5*. ce(N)/(γ+ce)=0.000284 *10*; ce(O)/(γ+ce)=4.49×10^{-5} *10*; ce(P)/(γ+ce)=2.9×10^{-6} *3*. α(K)=0.042 *3*; α(L)=0.00641 *21*; α(M)=0.00135 *6*; α(N)=0.000298 *11*; α(O)=4.72×10^{-5} *11*. B(M1)(W.u.)=(0.20 *9*); B(E2)(W.u.)=($9.\times10^{2}$ *6*).
318	3205.6	16 *1*	(M1+E2)	−0.09 *6*	0.0494	17 *1*	A_2=−0.26 *6*; A_4=−0.02 *6*. ce(K)/(γ+ce)=0.0403 *6*; ce(L)/(γ+ce)=0.00537 *8*; ce(M)/(γ+ce)=0.001122 *16*. α(K)=0.0423 *6*; α(L)=0.00564 *8*; α(M)=0.001178 *17*; α(N)=0.000261 *4*; α(O)=4.24×10^{-5} *6*. ce(N)/(γ+ce)=0.000249 *4*; ce(O)/(γ+ce)=4.04×10^{-5} *6*; ce(P)/(γ+ce)=3.08×10^{-6} *5*.
326	3784.6	6.7 *10*	[M1+E2]		0.0456 *10*	7 *1*	ce(K)/(γ+ce)=0.0372 *9*; ce(L)/(γ+ce)=0.00507 *8*; ce(M)/(γ+ce)=0.001062 *18*. ce(N)/(γ+ce)=0.000235 *4*; ce(O)/(γ+ce)=3.80×10^{-5} *6*; ce(P)/(γ+ce)=2.82×10^{-6} *9*. α(K)=0.0389 *10*; α(L)=0.00531 *8*; α(M)=0.001111 *18*; α(N)=0.000246 *4*; α(O)=3.97×10^{-5} *6*.
330	4114.6	5.8 *10*	[M1+E2]		0.0442 *10*	6 *1*	ce(K)/(γ+ce)=0.0361 *9*; ce(L)/(γ+ce)=0.00492 *8*; ce(M)/(γ+ce)=0.001029 *17*. ce(N)/(γ+ce)=0.000228 *4*; ce(O)/(γ+ce)=3.68×10^{-5} *6*; ce(P)/(γ+ce)=2.74×10^{-6} *9*. α(K)=0.0377 *10*; α(L)=0.00513 *8*; α(M)=0.001074 *17*; α(N)=0.000238 *4*; α(O)=3.85×10^{-5} *6*.

Continued on next page (footnotes at end of table)

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

γ(^{129}Ce) (continued)

Eγ[†]	E(level)	Iγ[#]	Mult.[@]	δ[&]	α[a]	I(γ+ce)[§]	Comments
336.8[‡] *3*	1512.6	5.1 *5*	(M1+E2)		0.0419 *10*	5.3 *5*	A_2=−0.55 *10* (1977Gi17). ce(K)/(γ+ce)=0.0343 *9*; ce(L)/(γ+ce)=0.00466 *7*; ce(M)/(γ+ce)=0.000976 *15*. ce(N)/(γ+ce)=0.000216 *4*; ce(O)/(γ+ce)=3.49×10^{-5} *5*; ce(P)/(γ+ce)=2.60×10^{-6} *9*. α(K)=0.0357 *9*; α(L)=0.00486 *7*; α(M)=0.001017 *16*; α(N)=0.000225 *4*; α(O)=3.64×10^{-5} *6*.
348.7[‡] *4*	348.09	15.5 *19*	[E2]		0.0306	16 *2*	ce(K)/(γ+ce)=0.0241 *4*; ce(L)/(γ+ce)=0.00434 *7*; ce(M)/(γ+ce)=0.000929 *14*. α(K)=0.0249 *4*; α(L)=0.00447 *7*; α(M)=0.000957 *14*; α(N)=0.000209 *3*; α(O)=3.21×10^{-5} *5*. ce(N)/(γ+ce)=0.000203 *3*; ce(O)/(γ+ce)=3.12×10^{-5} *5*; ce(P)/(γ+ce)=1.630×10^{-6} *24*.
355	1867.7	2.1 *8*	[M1+E2]		0.0365 *9*	2.2 *8*	ce(K)/(γ+ce)=0.0300 *8*; ce(L)/(γ+ce)=0.00407 *6*; ce(M)/(γ+ce)=0.000851 *12*. ce(N)/(γ+ce)=0.000189 *3*; ce(O)/(γ+ce)=3.05×10^{-5} *5*; ce(P)/(γ+ce)=2.28×10^{-6} *8*. α(K)=0.0311 *8*; α(L)=0.00422 *6*; α(M)=0.000882 *13*; α(N)=0.000196 *3*; α(O)=3.16×10^{-5} *5*.
363	2230.6	4.7 *9*	(M1+E2)	−0.95 *75*	0.031 *4*	4.8 *9*	A_2=−0.57 *6*; A_4=0.00 *6*. ce(K)/(γ+ce)=0.025 *4*; ce(L)/(γ+ce)=0.00382 *7*; ce(M)/(γ+ce)=0.000807 *12*. α(K)=0.026 *4*; α(L)=0.00394 *7*; α(M)=0.000832 *12*; α(N)=0.000183 *3*; α(O)=2.91×10^{-5} *9*. ce(N)/(γ+ce)=0.000178 *3*; ce(O)/(γ+ce)=2.82×10^{-5} *9*; ce(P)/(γ+ce)=1.9×10^{-6} *4*.
380.5[‡] *4*	1186.5	8.4 *7*	(M1+E2)		0.0304 *8*	8.6 *7*	A_2=−0.66 *9* (1977Gi17). ce(K)/(γ+ce)=0.0252 *7*; ce(L)/(γ+ce)=0.00340 *5*; ce(M)/(γ+ce)=0.000711 *11*. ce(N)/(γ+ce)=0.0001577 *24*; ce(O)/(γ+ce)=2.55×10^{-5} *5*; ce(P)/(γ+ce)=1.91×10^{-6} *7*. α(K)=0.0260 *8*; α(L)=0.00350 *6*; α(M)=0.000733 *11*; α(N)=0.0001624 *24*; α(O)=2.63×10^{-5} *5*.
405.5[‡] *4*	596.0	24 *1*	(E2)		0.0195	24 *1*	ce(K)/(γ+ce)=0.01574 *23*; ce(L)/(γ+ce)=0.00266 *4*; ce(M)/(γ+ce)=0.000566 *9*. ce(N)/(γ+ce)=0.0001240 *18*; ce(O)/(γ+ce)=1.92×10^{-5} *3*; ce(P)/(γ+ce)=1.083×10^{-6} *16*. α(K)=0.01605 *23*; α(L)=0.00271 *4*; α(M)=0.000577 *9*; α(N)=0.0001264 *19*; α(O)=1.96×10^{-5} *3*. A_2=+0.24 *3*; A_4=−0.08 *4*.

Continued on next page (footnotes at end of table)

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

γ(^{129}Ce) (continued)

Eγ†	E(level)	Iγ#	Mult.@	α^a	I(γ+ce)§	Comments
444.8‡ *5*	589.2	22 *1*	(E2)	0.01493	22 *1*	ce(K)/(γ+ce)=0.01219 *18*; ce(L)/(γ+ce)=0.00199 *3*; ce(M)/(γ+ce)=0.000422 *6*. ce(N)/(γ+ce)=9.27×10^{-5} *14*; ce(O)/(γ+ce)=1.444×10^{-5} *21*; ce(P)/(γ+ce)=8.47×10^{-7} *13*. α(K)=0.01237 *18*; α(L)=0.00202 *3*; α(M)=0.000429 *7*; α(N)=9.41×10^{-5} *14*; α(O)=1.465×10^{-5} *22*. A_2=+0.21 *9* (1977Gi17).
469.8‡ *5*	805.8	52 *3*	(Q)		52 *3*	A_2=+0.30 *6*; A_4=−0.01 *7*.
474	3007.6	12 *1*			12 *1*	
485	1906.6	2.5 *5*			2.5 *5*	
513	3285.6	8 *1*			8 *1*	
515	2663.6	5 *1*			5 *1*	
519.4‡ *5*	867.5	20 *2*	(Q)		20 *2*	A_2=+0.19 *8* (1977Gi17).
542	2772.6	13 *1*			13 *1*	
	3205.6	13 *1*			13 *1*	
571	3458.6	14 *2*			14 *2*	
574	3581.6	8 *1*			8 *1*	
579	3784.6	11 *1*			11 *1*	
586.7‡ *6*	1175.8	18 *1*	(E2)	0.00706	18 *1*	A_2=+0.42 *9* (1977Gi17). ce(K)/(γ+ce)=0.00589 *9*; ce(L)/(γ+ce)=0.000882 *13*; ce(M)/(γ+ce)=0.000186 *3*. ce(N)/(γ+ce)=4.09×10^{-5} *6*; ce(O)/(γ+ce)=6.47×10^{-6} *10*; ce(P)/(γ+ce)=4.19×10^{-7} *6*. α(K)=0.00593 *9*; α(L)=0.000888 *13*; α(M)=0.000187 *3*; α(N)=4.12×10^{-5} *6*; α(O)=6.51×10^{-6} *10*. B(E2)(W.u.)=310 *50*.
590.6‡ *6*	1186.5	18 *2*	Q		18 *2*	A_2=+0.50 *7*; A_4=−0.18 *7*.
616.2‡ *6*	1421.8	48 *2*	(E2)	0.00623	48 *2*	A_2=+0.7 *2*; A_4=0.0 *2*. ce(K)/(γ+ce)=0.00521 *8*; ce(L)/(γ+ce)=0.000770 *11*; ce(M)/(γ+ce)=0.0001623 *24*. ce(N)/(γ+ce)=3.57×10^{-5} *5*; ce(O)/(γ+ce)=5.66×10^{-6} *8*; ce(P)/(γ+ce)=3.72×10^{-7} *6*. α(K)=0.00525 *8*; α(L)=0.000775 *11*; α(M)=0.0001633 *24*; α(N)=3.60×10^{-5} *6*; α(O)=5.69×10^{-6} *9*. B(E2)(W.u.)=117 *12*.
645.1‡ *7*	1512.6	17 *1*	(Q)		17 *1*	A_2=+0.17 *9* (1977Gi17).
656	4114.6	8 *1*			8 *1*	
666	2533.6	16 *2*			16 *2*	
692	1867.7	20 *2*			20 *2*	
718.0‡ *7*	2230.6	15 *2*	(Q)		15 *2*	A_2=+0.34 *12*; A_4=−0.02 *9*.
720	1906.6	17 *2*			17 *2*	
726.8‡ *7*	2148.6	28 *2*	(E2)	0.00415	28 *2*	A_2=+0.15 *8*; A_4=−0.02 *8*. ce(K)/(γ+ce)=0.00350 *5*; ce(L)/(γ+ce)=0.000498 *7*; ce(M)/(γ+ce)=0.0001045 *15*. ce(N)/(γ+ce)=2.31×10^{-5} *4*; ce(O)/(γ+ce)=3.67×10^{-6} *6*; ce(P)/(γ+ce)=2.52×10^{-7} *4*. α(K)=0.00352 *5*; α(L)=0.000500 *8*; α(M)=0.0001049 *15*; α(N)=2.32×10^{-5} *4*; α(O)=3.69×10^{-6} *6*. B(E2)(W.u.)=63 *14*.
739	2887.6	24 *2*	(E2)	0.00399	24 *2*	A_2=+0.28 *11*; A_4=−0.05 *8*. ce(K)/(γ+ce)=0.00337 *5*; ce(L)/(γ+ce)=0.000477 *7*; ce(M)/(γ+ce)=0.0001001 *14*. ce(N)/(γ+ce)=2.21×10^{-5} *3*; ce(O)/(γ+ce)=3.52×10^{-6} *5*; ce(P)/(γ+ce)=2.42×10^{-7} *4*. α(K)=0.00338 *5*; α(L)=0.000479 *7*; α(M)=0.0001005 *14*; α(N)=2.22×10^{-5} *4*; α(O)=3.54×10^{-6} *5*. B(E2)(W.u.)=126 *18*.
757	2663.6	15 *2*			15 *2*	
^{x}788.4						Eγ: complex line reported in 1977Gi17 only.
791	4905.6	4 *1*			4 *1*	

Footnotes continued on next page

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

γ(^{129}Ce) (continued)

[†] From 1984Ar13 unless otherwise stated.

[‡] From 1977Gi17, value from 1984Ar13 is in agreement but less precise. Uncertainty is 0.1% in 1977Gi17, the evaluators assign minimum uncertainty of 0.2 keV.

[§] From 1984Ar13.

[#] Deduced by the evaluators from I(γ+ce) given by 1984Ar13.

[@] From γ(θ) data in 1984Ar13 and 1977Gi17. The ΔJ=2, quadrupole transitions are most likely E2, and ΔJ=1, D+Q are most likely (M1+E2) for ΔJ=1 coupled–band structures. RUL for E2 and M2 used when level lifetimes are available or with assumed ≈10 ns coincidence resolving time in γγ data.

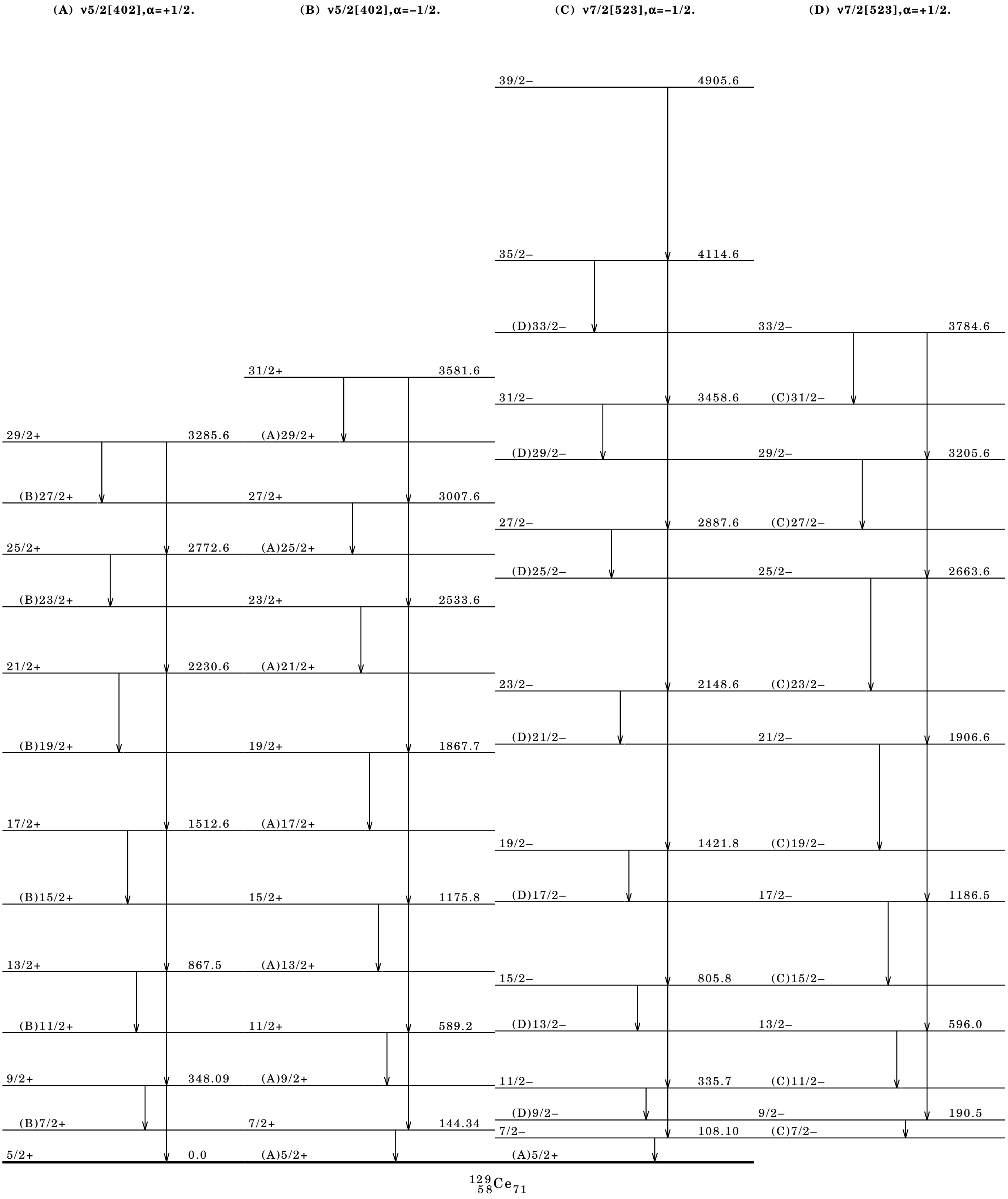
[&] From γ(θ) (1984Ar13); with sign reversed to make it consistent with Krane–Steffen convention.

[a] δ(E2/M1)=0.3 assumed when not given for M1+E2 transition.

[b] Multiply placed; intensity suitably divided.

[x] γ ray not placed in level scheme.

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

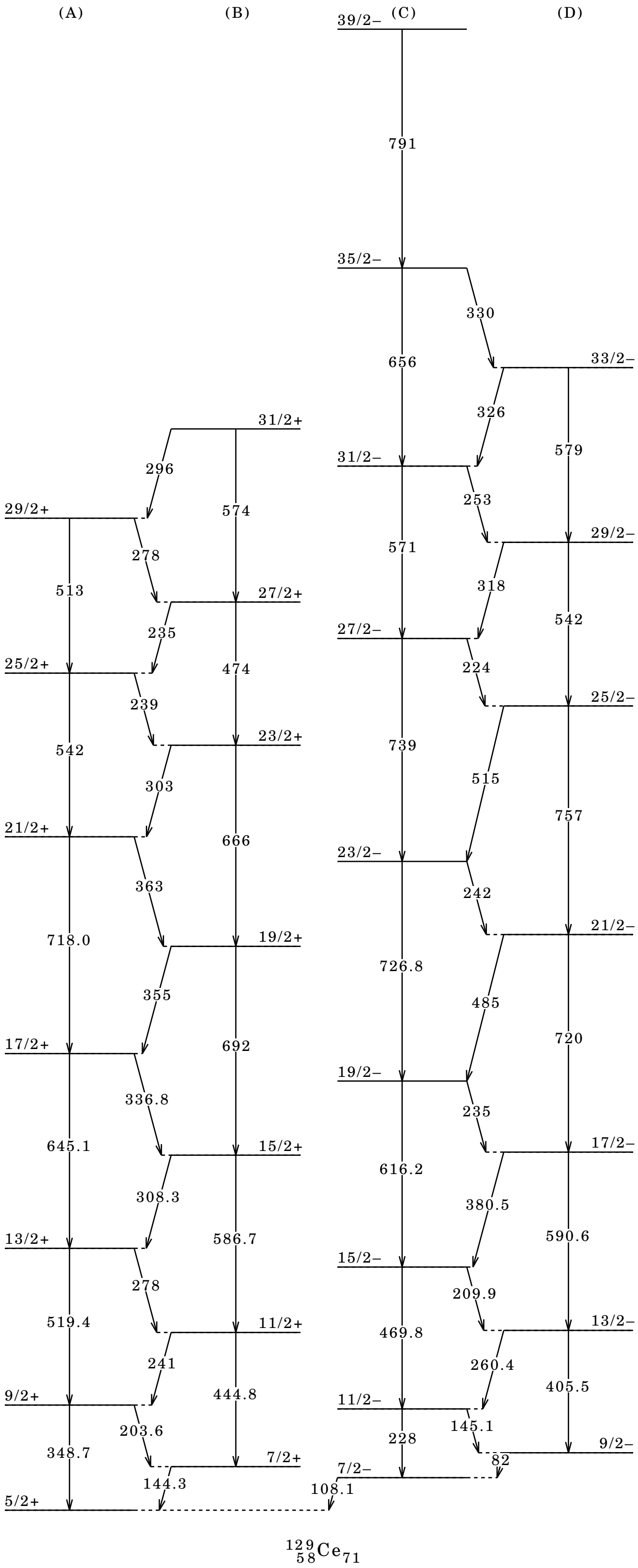


CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

Bands for ^{129}Ce

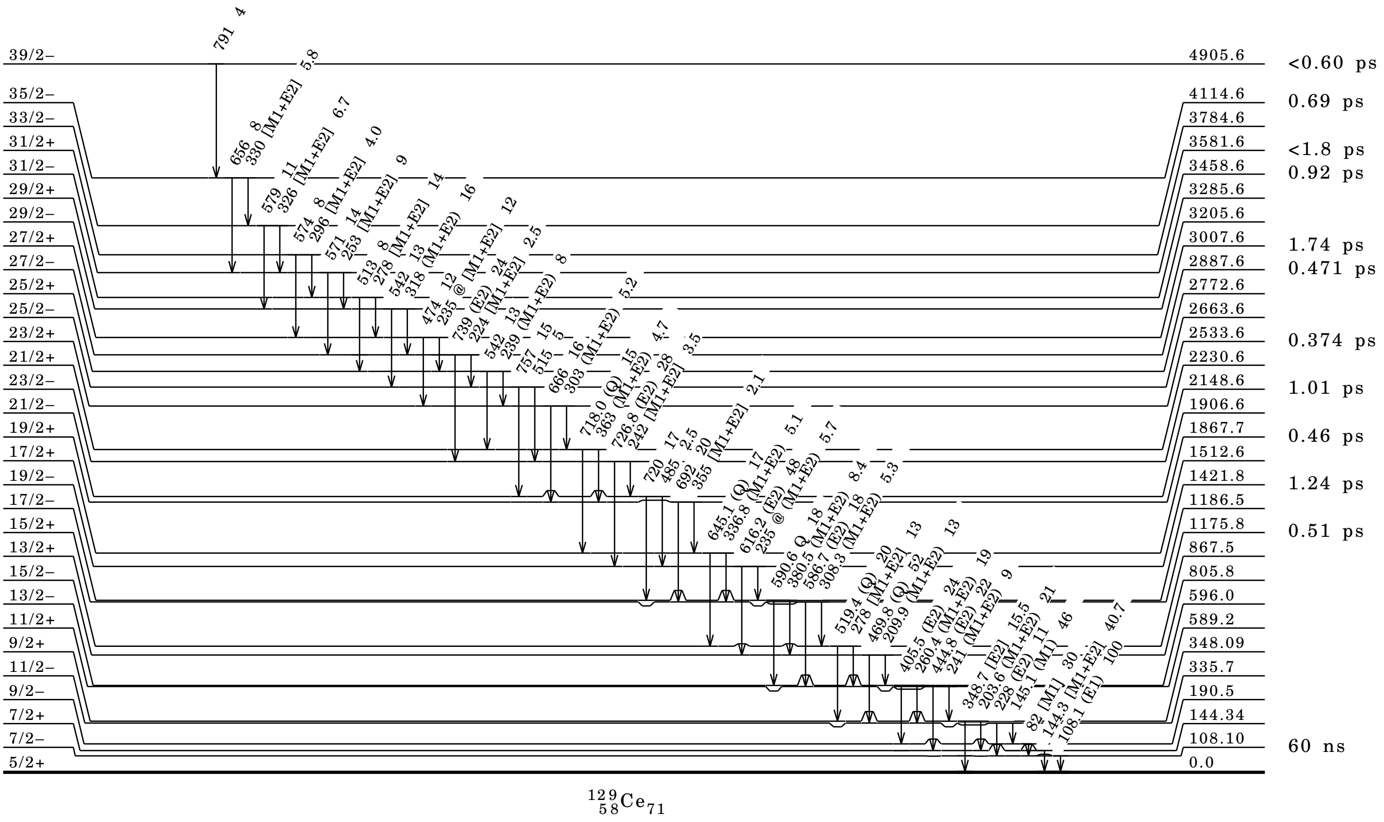


^{116}Sn(^{16}O,3nγ),^{117}Sn(^{16}O,4nγ) 1984Ar13,1977Gi17 (continued)

Level Scheme

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided



Adopted Levels, Gammas

Q(β$^-$)=–7460 *SY*; S(n)=11510 *40*; S(p)=1530 *40*; Q(α)=1560 *40* 2012Wa38.
Estimated uncertainty=200 for Q(β$^-$) (2012Wa38).
S(2n)=21370 *200* (syst), S(2p)=6460 *40*, Q(εp)=1560 *60* (2012Wa38).
1977Bo02: ^{129}Pr produced and identified in ^{102}Pd,^{106}Cd(^{32}S,X) reactions followed by half–life measurement.
Later decay studies: 1996Gi08.

^{129}Pr Levels

Cross Reference (XREF) Flags

A ^{129}Nd ε Decay: Mixed
B ^{94}Mo(^{40}Ca,3p2nγ)

E(level)	Jπ[†]	XREF	T$_{1/2}$	Comments
0.0[&]	(3/2+)	AB	30 s *4*	%ε+%β$^+$=100. E(level): tentatively assigned as g.s. by the evaluators. T$_{1/2}$: weighted average of 24 s *5* (1977Bo02) and 32 s *3* (1996Gi08).
91.10[@] *10*	(5/2+)	AB		
241.82[&] *16*	(7/2+)	AB		
327.3 *4*	(5/2+,7/2+)	A		
382.57[‡] *24*	(11/2–)	A		E(level): proposed by 1997Gi07 to be an isomer but no half–life data are available in the literature, 2012Au07 suggest 1 ms from systematics.
418.43[@] *23*	(9/2+)	AB		
437.7 *4*		A		
452.7 *3*	(1/2+,3/2+)	A		
462.1 *4*		A		
471.21 *24*	(7/2+,9/2+)	A		
497.3[§] *4*	(9/2+)	AB	≈60 ns	T$_{1/2}$: from γγ(t) (1990JaZU) in high–spin studies, not clear whether the value listed by the authors is the mean lifetime or half–life. It is assumed as half–life here.
516.83 *18*	(7/2–)	A		
569.3 *4*	(+)	A		
580.3 *4*	(+)	A		
620.0[‡] *23*	(15/2–)	B		
632.44[&] *25*	(11/2+)	AB		
682.3[#] *4*	(11/2+)	AB		
724.5 *4*	(7/2+,9/2+,11/2+)	A		
728.87 *20*	(9/2–)	A		
889.2[§] *15*	(13/2+)	B		
900.9[@] *12*	(13/2+)	B		
975.00 *10*		A		
986.10 *14*	(5/2+,7/2+)	A		
1035.0[‡] *21*	(19/2–)	B		
1118.9[#] *16*	(15/2+)	B		
1147.0[&] *13*	(15/2+)	B		
1368.6[§] *17*	(17/2+)	B		
1492.9[@] *16*	(17/2+)	B		
1595.0[‡] *21*	(23/2–)	B		
1636.9[#] *17*	(19/2+)	B		
1744.0[&] *16*	(19/2+)	B		
1922.2[§] *18*	(21/2+)	B		
2153.0[@] *22*	(21/2+)	B		
2225.0[#] *19*	(23/2+)	B		
2267.0[‡] *22*	(27/2–)	B		
2311.0[&] *19*	(23/2+)	B		A possible 1297γ to 11/2– band is not shown.
2546.3[§] *19*	(25/2+)	B		
2585.0[@] *23*	(25/2+)	B		
2759.0[&] *21*	(27/2+)	B		A possible 1185γ to 11/2– band is not shown.
2884.6[#] *20*	(27/2+)	B		
3020.0[‡] *24*	(31/2–)	B		
3076.0[@] *25*	(29/2+)	B		
3238.4[§] *20*	(29/2+)	B		
3311.0[&] *22*	(31/2+)	B		A possible 1065γ to 11/2– band is not shown.
3611.6[#] *22*	(31/2+)	B		
3695[@] *3*	(33/2+)	B		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Pr Levels (continued)

E(level)	Jπ[†]	XREF	Comments
3830[‡] *3*	(35/2−)	B	
3998.0[&] *24*	(35/2+)	B	A possible 999γ to 11/2− band is not shown.
4013.4[§] *23*	(33/2+)	B	
4457[@] *3*	(37/2+)	B	
4701[‡] *3*	(39/2−)	B	
4821[&] *3*	(39/2+)	B	
5348[@] *3*	(41/2+)	B	
5654[‡] *3*	(43/2−)	B	
5771[&] *3*	(43/2+)	B	
6349[@] *4*	(45/2+)	B	
6704[‡] *3*	(47/2−)	B	
7466[@] *4*	(49/2+)	B	
7858[‡] *4*	(51/2−)	B	

[†] From systematics of decoupled $h_{11/2}$ proton band in neighboring odd Pr nuclei. All assignments are considered as tentative including that for the g.s. For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

[‡] (A): $\pi h_{11/2}$ band. Possible Nilsson configuration=3/2[541] (1993We05).

[§] (B): $\pi g_{9/2}$, α=+1/2.

[#] (C): $\pi g_{9/2}$, α=−1/2.

[@] (D): The g.s. band,α=+1/2.

[&] (E): The g.s. band,α=−1/2.

γ(^{129}Pr)

E(level)	Eγ	Iγ	Mult.	α	Comments
91.10	91.1 *1*	100			
241.82	150.8 *2*	100 *12*			
	241.8 *3*	24 *7*			
327.3	236.2 *3*	100			
382.57	140.9 *4*	100 *33*	[M2]	3.64 *7*	α(K)=2.90 *5*; α(L)=0.583 *11*; α(M)=0.1283 *23*. α(N)=0.0287 *6*; α(O)=0.00454 *9*; α(P)=0.000298 *6*.
	291.6 *4*	89 *33*	[E3]	0.220	α(K)=0.1437 *22*; α(L)=0.0598 *10*; α(M)=0.01355 *21*. α(N)=0.00295 *5*; α(O)=0.000423 *7*; α(P)=9.55×10^{-6} *14*.
418.43	176.6 *3*	100 *17*			
	327.2 *3*	83 *17*			
437.7	346.6[‡] *3*	100[†‡]			
452.7	452.7 *3*	100			
462.1	371.0 *3*	100			
471.21	229.5 *3*	46 *15*			
	380.0 *3*	100 *23*			
497.3	255.5 *3*	100			
516.83	134.0 *4*	100 *15*	[E2]	0.752 *14*	α(K)=0.502 *9*; α(L)=0.195 *4*; α(M)=0.0437 *9*. α(N)=0.00948 *18*; α(O)=0.00135 *3*; α(P)=2.79×10^{-5} *5*.
	275.0 *1*	17 *6*			
569.3	116.6[‡] *2*	100[‡]			
580.3	127.6 *2*	100			
620.0	238	100	(E2)	0.1064	
632.44	214.0 *1*	<83			
	391.0 *5*	100 *33*			
682.3	185.0 *1*	100			
724.5	482.7 *3*	100			
728.87	212.0 *1*	<33			
	346.6[‡] *3*	100[†‡] *20*			
	487.0 *5*	100			
889.2	208				
	394				
900.9	268				
	483				
975.00	882.0 *1*	48 *8*			Eγ: poor fit, level–energy difference=883.9.
	975.0 *1*	100 *16*			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Pr) (continued)

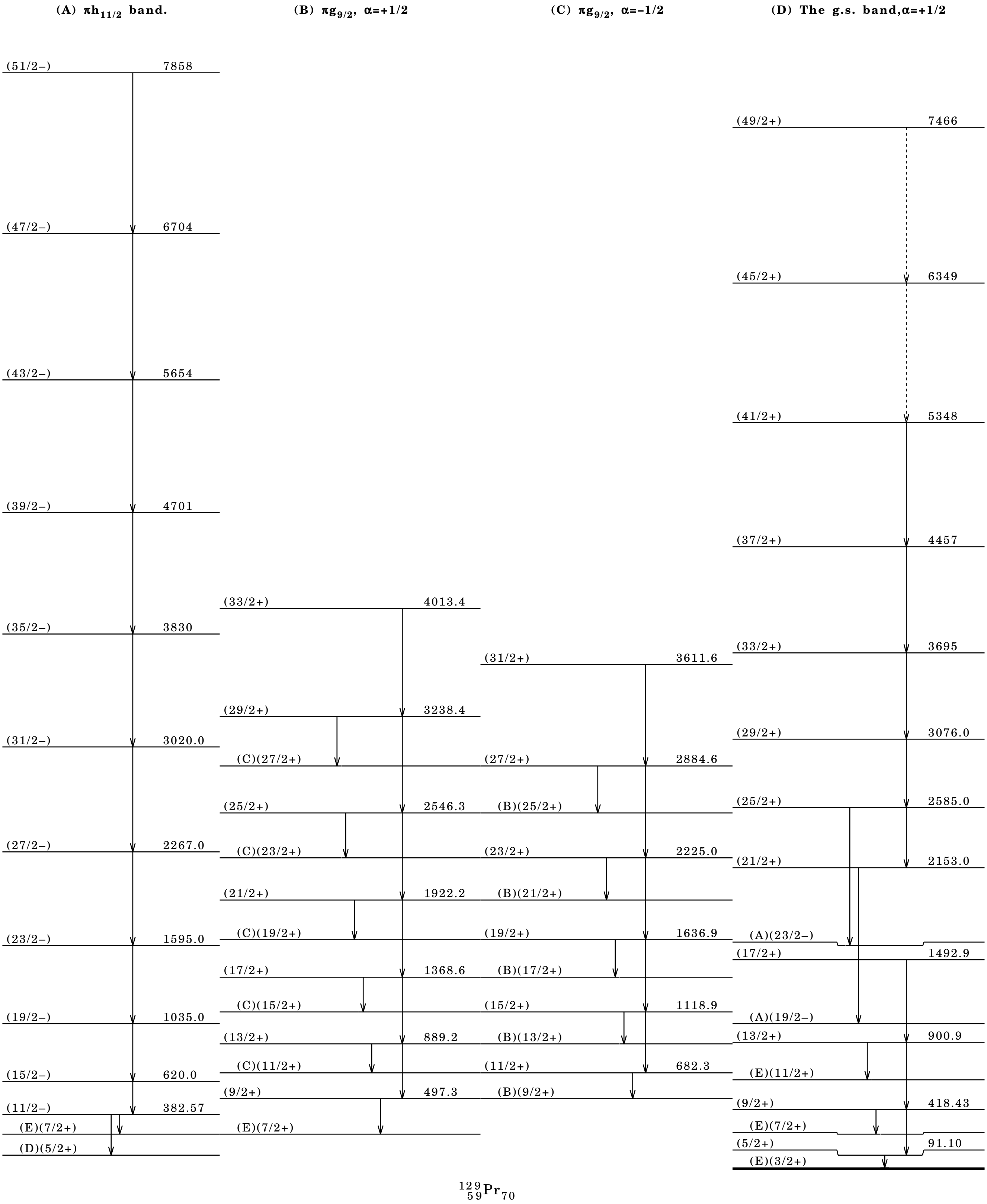
E(level)	Eγ	Iγ	Mult.	α
986.10	895.0 *1*	100		
1035.0	415	100	(E2)	0.0190
1118.9	230			
	438			
1147.0	246			
	514			
1368.6	250			
	479			
1492.9	592			
1595.0	560	100	(E2)	0.0083 *4*
1636.9	268			
	518			
1744.0	597			
1922.2	285			
	554			
2153.0	1118			
2225.0	303			
	588			
2267.0	672	100		
2311.0	567			
2546.3	321			
	624			
2585.0	432			
	990			
2759.0	448			
2884.6	338			
	660			
3020.0	753	100		
3076.0	491			
3238.4	354			
	692			
3311.0	552			
3611.6	727			
3695	619			
3830	810			
3998.0	687			
4013.4	775			
4457	762			
4701	871			
4821	823			
5348	891			
5654	953			
5771	950			
6349	1001[§]			
6704	1050			
7466	1117[§]			
7858	1154			

[†] 346.6γ is a doublet with separate intensities quoted in 1997Gi0 but the authors did not specify these intensities with levels. The evaluators have arbitrarily assigned higher intensity to the decay of the low–lying level.

[‡] Multiply placed; intensity suitably divided.

[§] Placement of transition in the level scheme is uncertain.

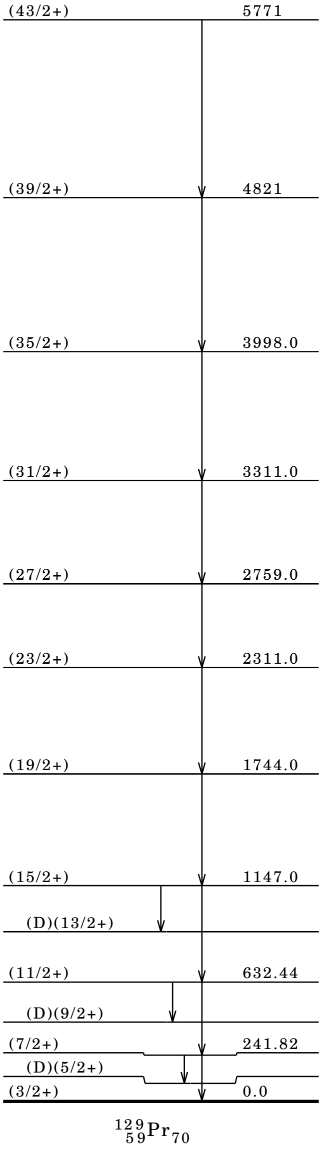
Adopted Levels, Gammas (continued)



CITATION:
Nuclear Data Sheets (1996)

Adopted Levels, Gammas (continued)

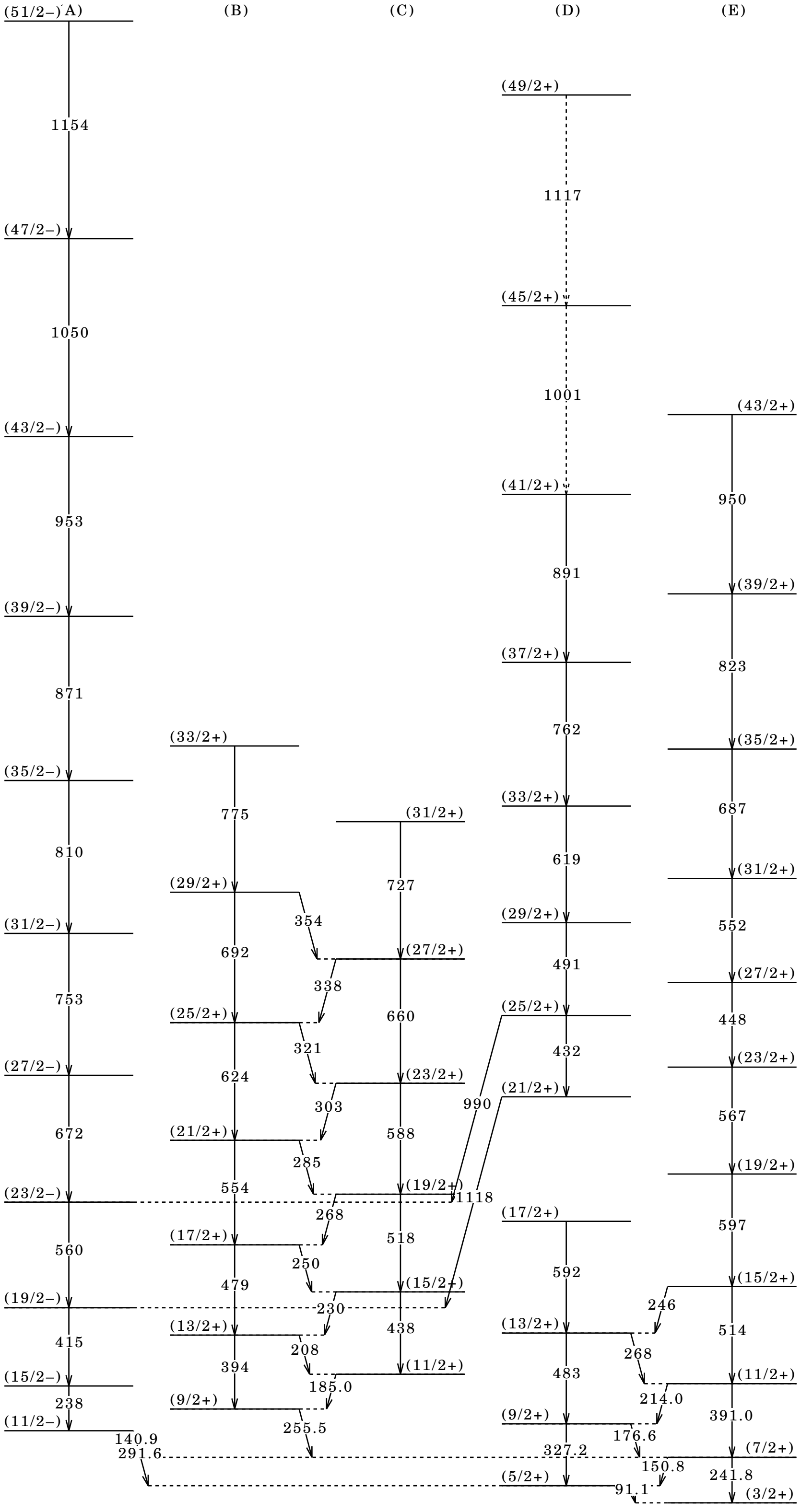
(E) The g.s. band,α=−1/2



CITATION:
Nuclear Data Sheets (1996)

Adopted Levels, Gammas (continued)

Bands for ^{129}Pr



$^{129}_{59}\mathrm{Pr}_{70}$

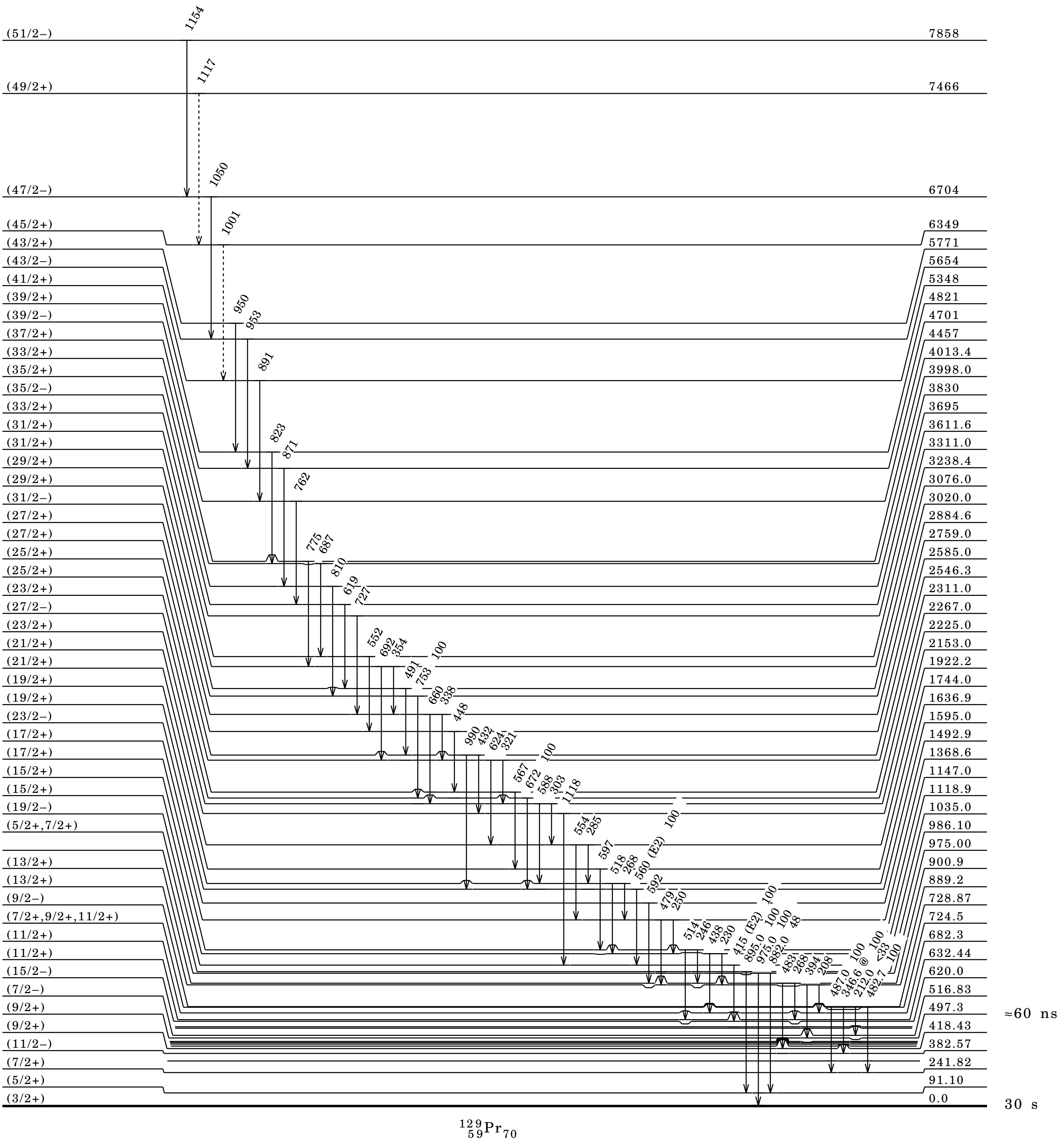
CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

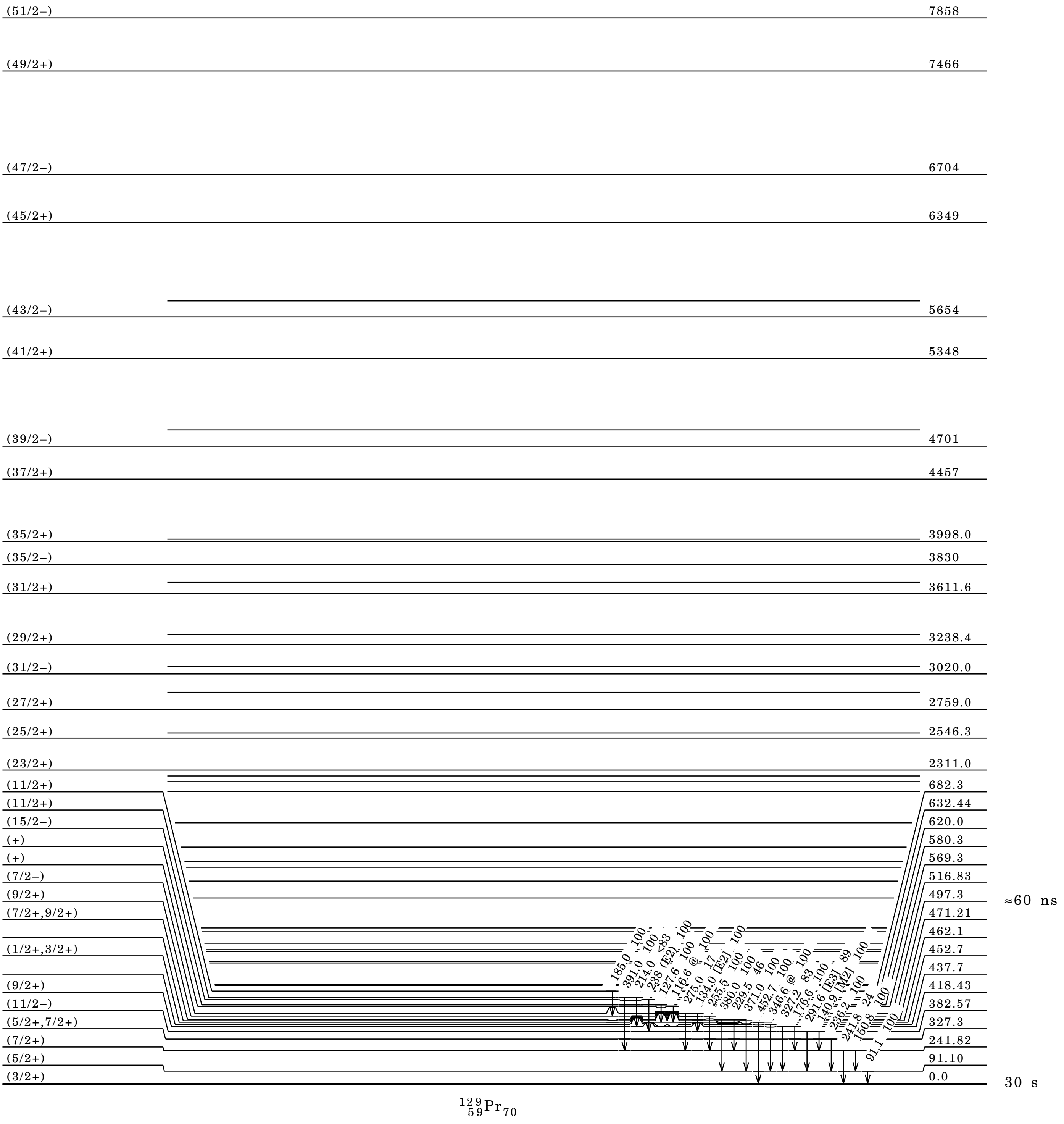
Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level
@ Multiply placed; intensity suitably divided



CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

^{129}Nd ε Decay: Mixed 1997Gi07,2010Xu12

Parent ^{129}Nd: E=0+Z; Jπ=(1/2+); $T_{1/2}$=2.6 s *4*; Q(g.s.)=7460 syst; %ε+%β^+ decay=100.
Parent ^{129}Nd: E=0; Jπ=(5/2+); $T_{1/2}$=6.7 s *4*; Q(g.s.)=7460 syst; %ε+%β^+ decay=?
Parent ^{129}Nd: E=0+x; Jπ=(7/2–); $T_{1/2}$≈7 s; Q(g.s.)=7460 syst; %ε+%β^+ decay=?
^{129}Nd(0+Z)–J,$T_{1/2}$: From Adopted Levels for all the three activities.
^{129}Nd(0+Z)–Q(ε): 7460 *200* (syst,2012Wa38).
1997Gi07: ^{129}Nd activity produced in bombardment of ^{92}Mo and ^{94}Mo targets by E=210, 255 MeV ^{40}Ca beam at Grenoble, IGISOL technique to identify A=129 isotopes. Measured Eγ, Iγ, Iβ, γγ(t) and (x ray)(γ)(t), half-life of ^{129}Nd g.s. This work is a short note; complete details of the level scheme are not available.
2010Xu12: ^{129}Nd formed in ^{96}Ru(^{36}Ar,3p) at 220 MeV and ^{92}Mo(^{40}Ca,3p) at 173 MeV; tape transport system, measured Eγ, Iγ, γγ, (x ray)γ coin, (proton)γ coin, decay curves for half-life determination.
Other:

^{129}Pr Levels

E(level)†	Jπ	$T_{1/2}$	Comments
0.0‡	(3/2+)		
91.10‡ *10*	(5/2+)		
241.82‡ *16*	(7/2+)		
327.3 *4*	(5/2+,7/2+)		
382.57 *24*	(11/2–)		E(level): proposed by 1997Gi07 to be an isomer but no half-life data are available.
418.43‡ *23*	(9/2+)		
437.7 *4*			
452.7 *3*	(1/2+,3/2+)		
462.1 *4*			
471.21 *24*	(7/2+,9/2+)		
497.3 *4*	(9/2+)	≈60 ns	
516.83 *18*	(7/2–)		
569.3 *4*	(+)		
580.3 *4*	(+)		
632.44‡ *25*	(11/2+)		
682.3 *4*	(11/2+)		
724.5 *4*	(7/2+,9/2+,11/2+)		
728.87 *20*	(9/2–)		
975.00 *10*			
986.10 *14*	(5/2+,7/2+)		

† From least–squares fit to Eγ data. Due to poor fit, the 882γ was omitted in this procedure.
‡ (A): g.s. band.

γ(^{129}Pr)

Eγ	E(level)	Iγ	Mult.	α	Comments
91.1‡ *1*	91.10	100			
^{x}116.6§ *1*		80§ *10*			
116.6‡§ *2*	569.3	15§ *1*			
127.6 *2*	580.3	8 *4*			
134.0‡ *4*	516.83	35 *5*	[E2]	0.752 *14*	α(K)=0.502 *9*; α(L)=0.195 *4*; α(M)=0.0437 *9*. α(N)=0.00948 *18*; α(O)=0.00135 *3*; α(P)=2.79×10^{-5} *5*. Eγ: 2010Xu12 assign this γ to 2.6–s activity of ^{129}Nd, and in coin with a 399.0γ.
140.9 *4*	382.57	9 *3*	[M2]	3.64 *7*	α(K)=2.90 *5*; α(L)=0.583 *11*; α(M)=0.1283 *23*. α(N)=0.0287 *6*; α(O)=0.00454 *9*; α(P)=0.000298 *6*.
150.8‡ *2*	241.82	43 *5*			
176.6‡ *3*	418.43	18 *3*			
185.0 *1*	682.3	<5			
212.0 *1*	728.87	<5			
214.0 *1*	632.44	<5			
229.5 *3*	471.21	6 *2*			
236.2‡ *3*	327.3	17 *3*			
241.8‡ *3*	241.82	11 *3*			
255.5‡ *3*	497.3	20 *4*			
275.0 *1*	516.83	6 *2*			
291.6 *4*	382.57	8 *3*	[E3]	0.220	α(K)=0.1437 *22*; α(L)=0.0598 *10*; α(M)=0.01355 *21*. α(N)=0.00295 *5*; α(O)=0.000423 *7*; α(P)=9.55×10^{-6} *14*.

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^{129}Nd ε Decay: Mixed 1997Gi07,2010Xu12 (continued)

γ(^{129}Pr) (continued)

Eγ	E(level)	Iγ	Comments
327.2[‡] *3*	418.43	15 *3*	
346.6[‡][§] *3*	437.7	35[†][§] *5*	
	728.87	15[†][§] *3*	
371.0[‡] *3*	462.1	13 *3*	
380.0[‡] *3*	471.21	13 *3*	
391.0 *5*	632.44	6 *2*	
[x]399.0			Eγ: from 2010Xu12, in coin with 134.0γ, both assigned to the decay of 2.6–s activity.
452.7[‡] *3*	452.7	30 *4*	
482.7[‡] *3*	724.5	13 *3*	
487.0 *5*	728.87	<5	
882.0 *1*	975.00	12 *2*	Eγ: poor fit, level–energy difference=883.9.
895.0 *1*	986.10	12 *2*	
975.0 *1*	975.00	25 *4*	

[†] 346.6γ is a doublet with separate intensities given in 1997Gi07, but the authors did not specify these intensities with levels. The evaluators have arbitrarily assigned higher intensity to the decay of the low–lying level.

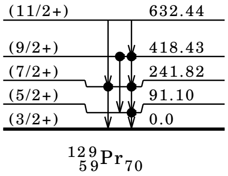
[‡] γ also reported in 2010Xu12 with the same energy as in 1997Gi07. No intensity is given.

[§] Multiply placed; intensity suitably divided.

[x] γ ray not placed in level scheme.

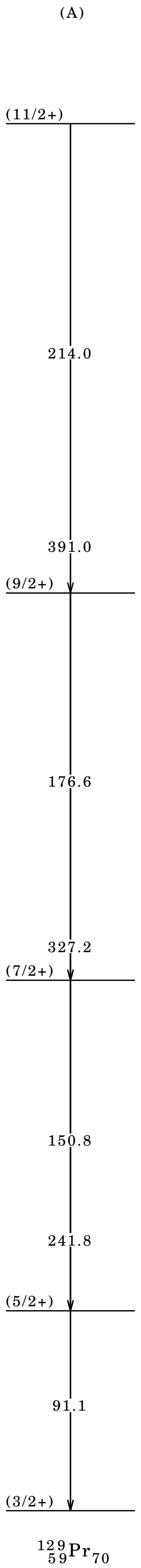
^{129}Nd ε Decay: Mixed 1997Gi07,2010Xu12 (continued)

(A) g.s. band



^{129}Nd ε Decay: Mixed 1997Gi07,2010Xu12 (continued)

Bands for ^{129}Pr

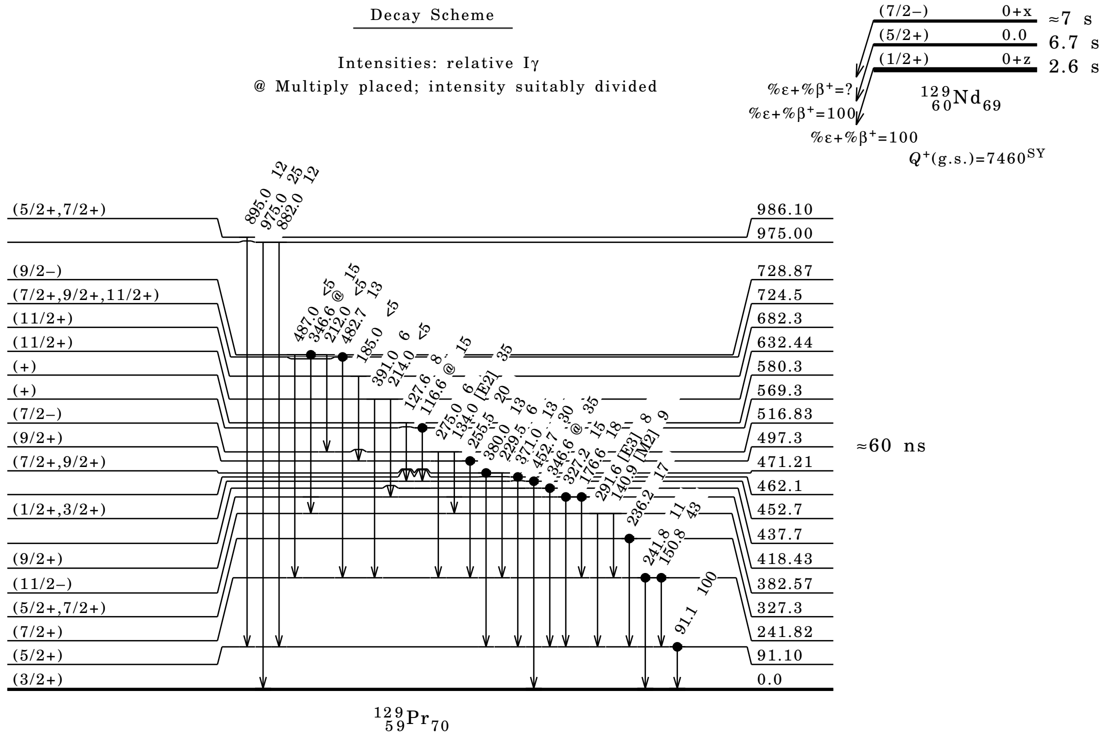


^{129}Nd ε Decay: Mixed 1997Gi07,2010Xu12 (continued)

Decay Scheme

Intensities: relative Iγ

@ Multiply placed; intensity suitably divided



^{94}Mo(^{40}Ca,3p2nγ) 1998Sm08,1998SmZX

Includes ^{58}Ni(^{74}Se,2pnγ) and ^{107}Ag(^{28}Si,2p2nγ).

1998Sm08 (also 1998SmZX thesis): E=180 MeV. Measured Eγ, Iγ, γγ, γγ(θ), particle–γ coin using GAMMASPHERE array with 92 detectors and MICROBALL array of particle detectors. The ground state band is shown only in figure 4.19 in 1998SmZX thesis 1998SmZX also quote A. Galindo–Uribarri et al., Report AECL–11132, p3.1.15 (1994), for transitions in bands 2 and 3.

1993We05: ^{107}Ag(^{28}Si,2p2nγ) E=93 MeV; BGO shielded Ge array, measured Eγ, Iγ, γγ, γ(θ). The 237–414–559–672–754–811–906–991 γ cascade assigned to the $\pi h_{11/2}$ and 3/2[541] Nilsson configuration was found in this work. The last two γ rays of 906 and 991 keV were not confirmed in 1998Sm08 or 1987WaZK.

Others:

1987WaZK (also 1986JaZP): ^{58}Ni(^{74}Se,2pnγ); BGO shielded Ge Polytessa array, Eγ, γγ. Level scheme figure lists energies for two bands and spins for one band, no intensities are given. The $h_{11/2}$ band established with γ cascade: 238–416–561–674–755–812– 874–954–1056–1157, from 11/2− to 51/2−. Other two cross linked bands, not connected to $h_{11/2}$ band, were defined by ΔJ=1 γ cascade: 186–210–230–250–266–286–304–322–339–355–374, and all the cross over quadrupole transitions: 396–481–556–626–695 and 440–519–591–661–730 γ cascades. All these structures are verified in 1998Sm08.

1990JaZU: ^{92,94}Mo(^{40}Ca,X), measured γγ(t). An isomer of 60–ns lifetime is reported.

^{129}Pr Levels

E(level)[†]	Jπ	$T_{1/2}$	Comments
0.0[a]	3/2+		
90.4[&] *8*	5/2+		
241.6[a] *8*	7/2+		
361[‡§] *3*	11/2−		
417.8[&] *10*	9/2+		
495.6[#] *13*	9/2+	≈60 ns	$T_{1/2}$: from γγ(t) (1990JaZU) in high–spin studies, not clear whether the value listed by the authors is the mean lifetime or half–life. It is assumed as half–life here.
599.0[‡§] *23*	15/2−		
633.1[a] *11*	11/2+		
680.9[@] *15*	11/2+		

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^{94}Mo(^{40}Ca,3p2nγ) 1998Sm08,1998SmZX (continued)

^{129}Pr Levels (continued)

E(level)[†]	Jπ	E(level)[†]	Jπ	E(level)[†]	Jπ
889.2[#] *15*	13/2+	2246.0[‡][§] *22*	27/2−	3998.0[a] *24*	35/2+
900.9[&] *12*	13/2+	2311.0[a] *19*	23/2+	4013.4[#] *23*	33/2+
1014.0[‡][§] *21*	19/2−	2546.3[#] *19*	25/2+	4436[‡][&] *3*	37/2+
1118.9[@] *16*	15/2+	2564.0[‡][&] *23*	25/2+	4680[‡][§] *3*	39/2−
1147.0[a] *13*	15/2+	2759.0[a] *21*	27/2+	4821[a] *3*	39/2+
1368.6[#] *17*	17/2+	2884.6[@] *20*	27/2+	5327[‡][&] *3*	41/2+
1492.9[&] *16*	17/2+	2999.0[‡][§] *24*	31/2−	5633[‡][§] *3*	43/2−
1574.0[‡][§] *21*	23/2−	3055.0[‡][&] *25*	29/2+	5771[a] *3*	43/2+
1636.9[@] *17*	19/2+	3238.4[#] *20*	29/2+	6328[‡][&] *4*	45/2+
1744.0[a] *16*	19/2+	3311.0[a] *22*	31/2+	6683[‡][§] *3*	47/2−
1922.2[#] *18*	21/2+	3611.6[@] *22*	31/2+	7445[‡][&] *4*	49/2+
2132.0[‡][&] *22*	21/2+	3674[‡][&] *3*	33/2+	7837[‡][§] *4*	51/2−
2225.0[@] *19*	23/2+	3809[‡][§] *3*	35/2−		

[†] From least-squares fit to Eγ data, assuming 1 keV uncertainty for each γ ray.

[‡] Note that the level energy is 382.57 for 11/2− bandhead in Adopted Levels based on ^{129}Nd ε decay (1997Gi07), thus all level energies based on the 11/2− state have been adjusted upwards by ≈21 keV in Adopted Levels.

[§] (A): $\pi h_{11/2}$ band. Possible Nilsson configuration=3/2[541] (1993We05).

[#] (B): $\pi g_{9/2}$, α=+1/2.

[@] (C): $\pi g_{9/2}$, α=−1/2.

[&] (D): The g.s. band,α=+1/2. Band from 1998SmZX thesis.

[a] (E): The g.s. band,α=−1/2.

γ(^{129}Pr)

A_2 and A_4 coefficients are from 1993We05.

Eγ	E(level)	Iγ[†]	Mult.[‡]	α	Comments
90	90.4				
151	241.6				
176	417.8				
185	680.9				
208	889.2				
215	633.1				
230	1118.9				
238	599.0	67.8 *22*	(E2)	0.1064	A_2=+0.51 *10*; A_4=−0.18 *14*. α(K)=0.0823 *12*; α(L)=0.0189 *3*; α(M)=0.00415 *6*. α(N)=0.000908 *13*; α(O)=0.0001344 *19*; α(P)=5.16×10^{-6} *8*.
242	241.6				
246	1147.0				
250	1368.6				
254	495.6				
268	900.9				
	1636.9				
285	1922.2				
303	2225.0				
321	2546.3				
327	417.8				
338	2884.6				
354	3238.4				
392	633.1				
394	889.2				
415	1014.0	100 *2*	(E2)	0.0190	α(K)=0.01559 *22*; α(L)=0.00267 *4*; α(M)=0.000574 *8*. α(N)=0.0001268 *18*; α(O)=1.95×10^{-5} *3*; α(P)=1.064×10^{-6} *15*. A_2=+0.45 *17*; A_4=−0.09 *10*.
432	2564.0				
438	1118.9				
448	2759.0				
479	1368.6				
483	900.9				
491	3055.0				
514	1147.0				

Continued on next page (footnotes at end of table)

$^{94}Mo(^{40}Ca,3p2n\gamma)$ 1998Sm08,1998SmZX (continued)

$\gamma(^{129}Pr)$ (continued)

Eγ	E(level)	Iγ†	Mult.‡	α	Comments
518	1636.9				
552	3311.0				
554	1922.2				
560	1574.0	80 *3*	(E2)	0.00834	α(K)=0.00697 *10*; α(L)=0.001077 *15*; α(M)=0.000229 *4*. α(N)=5.09×10^{-5} *8*; α(O)=7.95×10^{-6} *12*; α(P)=4.90×10^{-7} *7*. A_2=+0.34 *7*; A_4=−0.06 *10*.
567	2311.0				
588	2225.0				
592	1492.9				
597	1744.0				
619	3674				
624	2546.3				
660	2884.6				
672	2246.0	36.5 *12*			
687	3998.0				
692	3238.4				
727	3611.6				
753	2999.0	15.9 *9*			
762	4436				
775	4013.4				
810	3809				
823	4821				
871	4680				
891	5327				
950	5771				
953	5633				
990	2564.0				
999§	3998.0				
1001#	6328				
1050	6683				
1065§	3311.0				
1117#	7445				
1118	2132.0				
1154	7837				
1185§	2759.0				
1297§	2311.0				

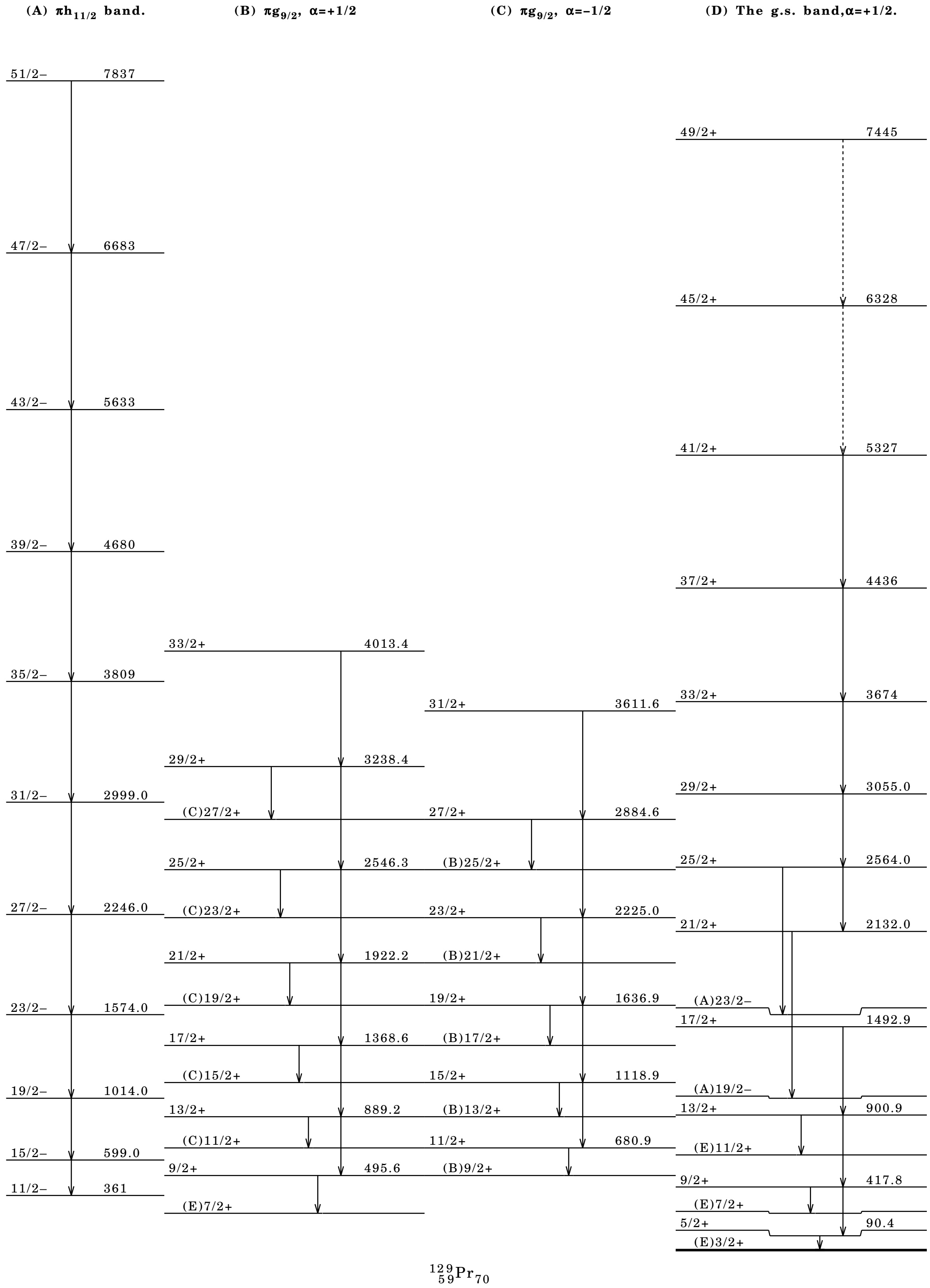
† From 1993We05 in $^{107}Ag(^{28}Si,2p2n\gamma)$.

‡ From γ(θ) data of 1993We05. Mult=Q refers to ΔJ=2, quadrupole. 1993We05 assign E2, also supported by RUL assuming ≈10 ns coincidence resolving time.

§ The γ not listed in Adopted Levels, Gammas due to energy mismatch.

Placement of transition in the level scheme is uncertain.

^{94}Mo(^{40}Ca,3p2nγ) 1998Sm08,1998SmZX (continued)

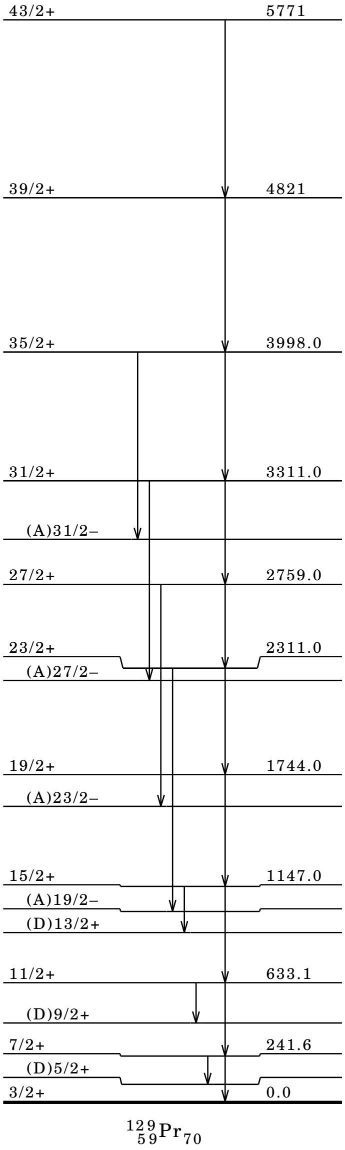


CITATION:
Nuclear Data Sheets (1996)

From NNDC(BNL)
program ENSDAT

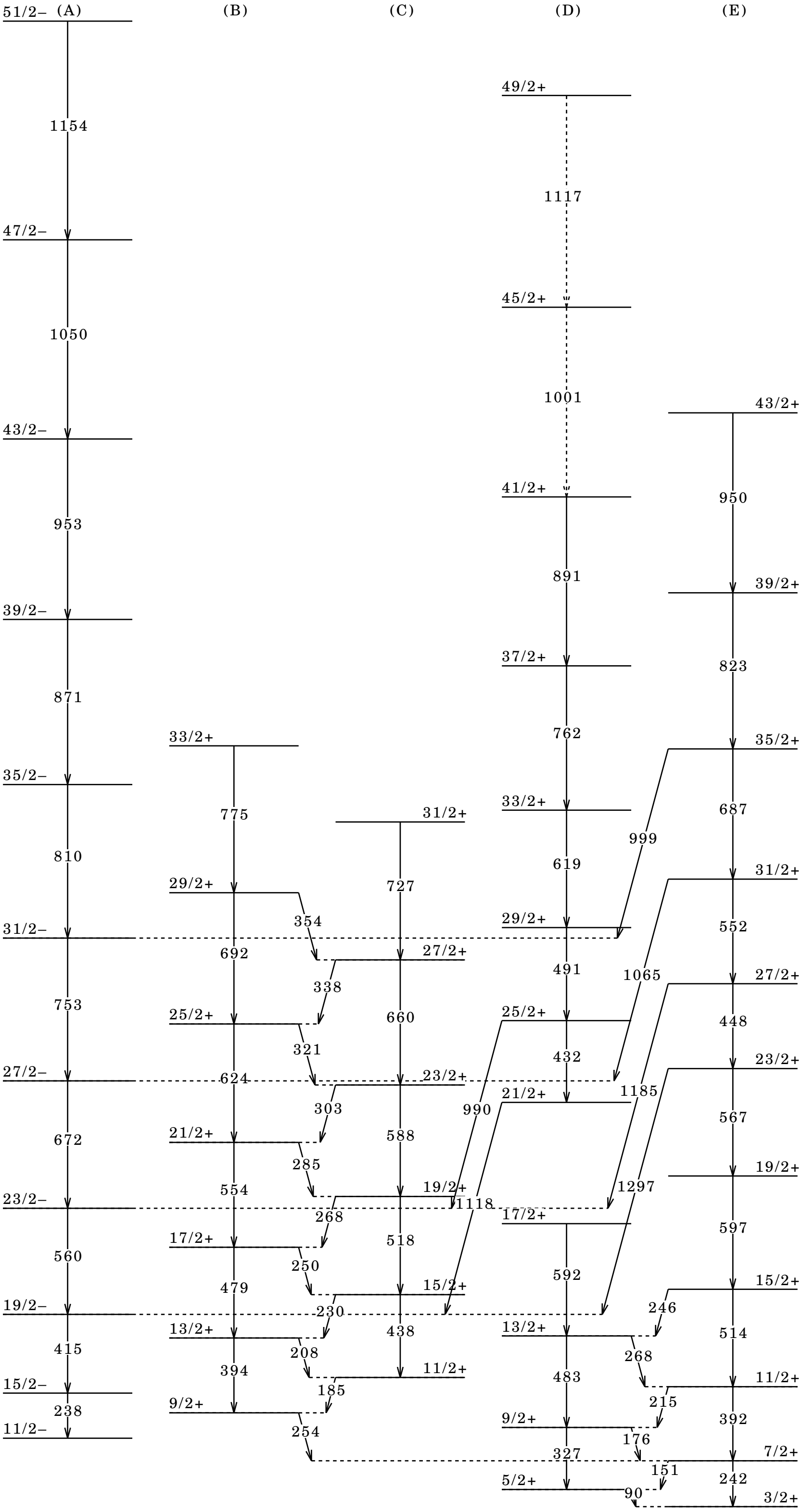
^{94}Mo(^{40}Ca,3p2nγ) 1998Sm08,1998SmZX (continued)

(E) The g.s. band,α=–1/2



$^{94}Mo(^{40}Ca,3p2n\gamma)$ 1998Sm08,1998SmZX (continued)

Bands for ^{129}Pr

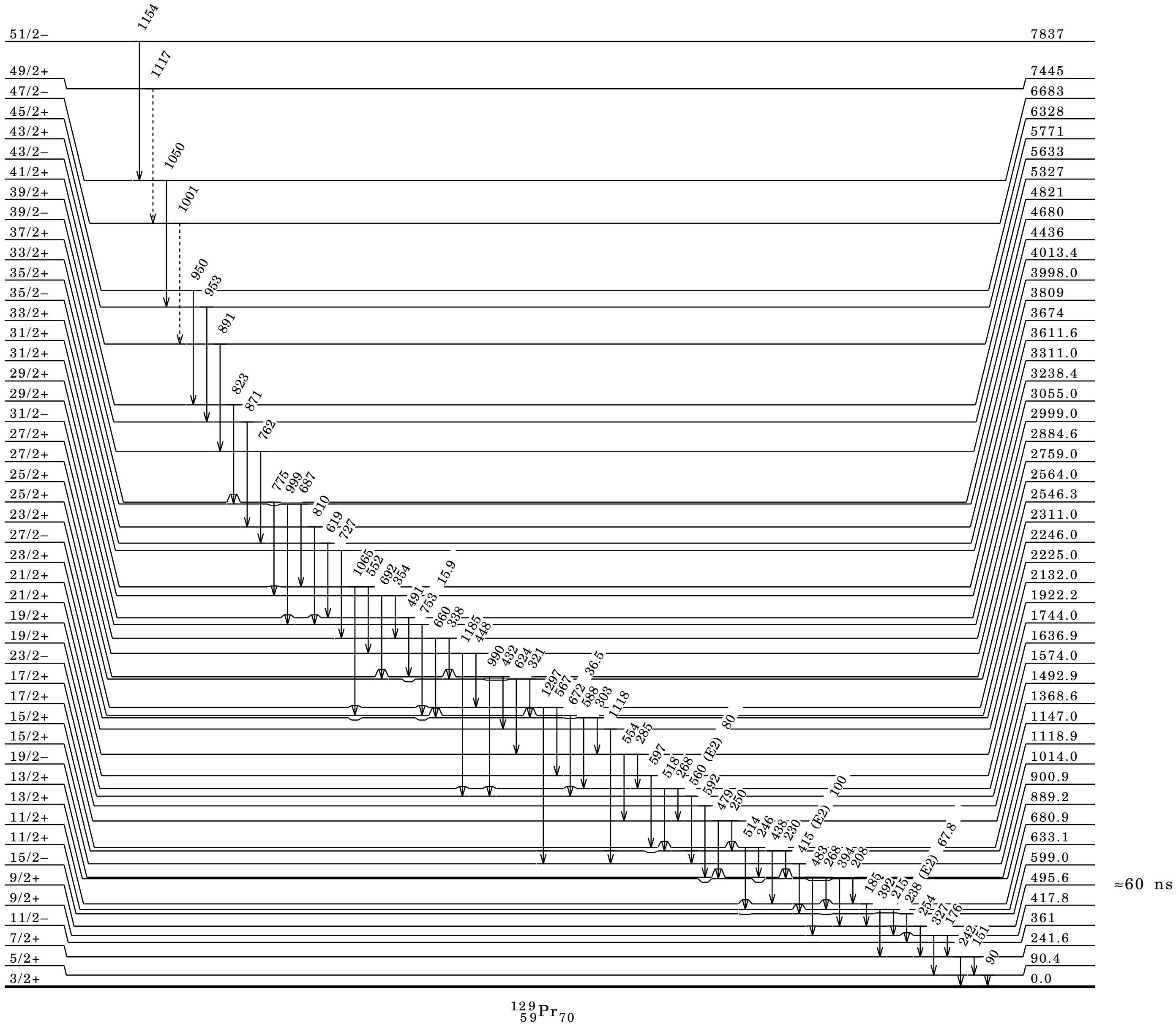


$^{129}_{59}Pr_{70}$

^{94}Mo(^{40}Ca,3p2nγ) 1998Sm08,1998SmZX (continued)

Level Scheme

Intensities: relative Iγ



Adopted Levels, Gammas

Q(β^-)=–9430 *SY*; S(n)=10070 *SY*; S(p)=3270 *SY*; Q(α)=1920 *SY* 2012Wa38.

Estimated (2012Wa38) uncertainties: 360 for Q(β^-), 280 for S(n) and Q(α), 200 for S(p).

Q(εp)=5930 *200*, S(2n)=22920 *360*, S(2p)=4910 *200* (syst,2012Wa38).

1977Bo02: ^{129}Nd produced and identified, measured half–life, delayed protons.

1985Wi07: assignment: ^{92}Mo,^{96}Ru(^{40}Ca,X), on–line mass spectrometer; measured delayed protons, x–rays, px–, pγ–coin.

1997Gi07: ^{129}Nd activity produced in bombardment of ^{92}Mo and ^{94}Mo targets by E=210, 255 MeV ^{40}Ca beam at Grenoble, IGISOL technique to identify A=129 isotopes. Measured Eγ, Iγ, Iβ, γγ(t) and (x ray)(γ)(t), half–life of ^{129}Nd g.s.

All γ–ray data (energies, intensities, multipolarities) and the level scheme are from ^{92}Mo(^{40}Ca,2pnγ) reaction. In ^{129}Pm decay only one γ ray of 99 keV is reported.

^{129}Nd Levels

Cross Reference (XREF) Flags

A 129Pm ε Decay (2.4 s)
B ^{92}Mo(^{40}Ca,2pnγ)

E(level)	Jπ[†]	XREF	T$_{1/2}$	Comments
0.0	(5/2+)		6.7 s *4*	%ε+%β$^+$=100; %εp>0. T$_{1/2}$: weighted average of 7 s *1* (1997Gi07) and 6.7 s *4* (weighted average of 4 measurements in 2010Xu12); both from decay curves of γ rays. Others: 4.9 s *2* (1985Wi07), 5.9 s *6* (1977Bo02), both from decay curve of delayed protons. Jπ: from statistical model prediction (1985Wi07). 7/2– proposed in theoretical calculations (1997Mo25); 5/2+ from systematics in 2012Au07.
0+x[§]	(7/2–)	B	≈7 s	%ε+%β$^+$=? T$_{1/2}$: assumed by the evaluators to be comparable to that for g.s. See also discussion in 2010Xu12.
0+y[#]	(1/2–)	AB		
0+z[&]	(1/2+)	B	2.6 s *4*	%ε+%β$^+$=? ; %εp=? Jπ: possible configuration=1/2[411]. T$_{1/2}$: from decay curves for 134.0γ and 399.0γ (2010Xu12); 134γ and 399γ seen in coincidence.
21.7+z[a] *3*	(3/2+)	B		
53.8+y[@] *4*	(3/2–)	B		
91.0+z[b] *4*	(5/2+)	B		
99.0+y[#] *2*	(5/2–)	AB		
130.4+x[‡] *2*	(9/2–)	B		
178.8+z[&] *2*	(5/2+)	B		
229.9+z[a] *3*	(7/2+)	B		
232.6+y[@] *3*	(7/2–)	B		
236.9+z[c] *4*	(7/2+)	B		
292.6+x[§] *2*	(11/2–)	B		
308.5+y[#] *3*	(9/2–)	B		
415.7+z[b] *4*	(9/2+)	B		
491.0+x[‡] *2*	(13/2–)	B		
497.3+z[&] *3*	(9/2+)	B		
530.1+y[@] *3*	(11/2–)	B		
581.7+z[a] *3*	(11/2+)	B		
629.3+z[c] *4*	(11/2+)	B		
630.8+y[#] *3*	(13/2–)	B		
710.7+x[§] *2*	(15/2–)	B		
868.4+z[b] *4*	(13/2+)	B		
936.3+z[&] *3*	(13/2+)	B		
942.8+y[@] *4*	(15/2–)	B		
969.7+x[‡] *2*	(17/2–)	B		
1054.2+z[a] *4*	(15/2+)	B		
1064.7+y[#] *4*	(17/2–)	B		
1136.9+z[c] *4*	(15/2+)	B		
1235.1+x[§] *3*	(19/2–)	B		
1419.4+z[b] *4*	(17/2+)	B		
1461.8+y[@] *4*	(19/2–)	B		
1471.8+z[&] *4*	(17/2+)	B		
1543.0+x[‡] *3*	(21/2–)	B		
1603.7+y[#] *4*	(21/2–)	B		
1620.6+z[a] *4*	(19/2+)	B		
1730.3+z[c] *4*	(19/2+)	B		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Nd Levels (continued)

E(level)	Jπ[†]	XREF
1843.9+x[§] *3*	(23/2−)	B
2034.7+z[b] *4*	(21/2+)	B
2067.6+y[@] *4*	(23/2−)	B
2076.6+z[&] *4*	(21/2+)	B
2187.3+x[‡] *3*	(25/2−)	B
2236.8+y[#] *5*	(25/2−)	B
2248.4+z[a] *4*	(23/2+)	B
2379.2+z[c] *4*	(23/2+)	B
2516.2+x[§] *3*	(27/2−)	B
2666.0+z[b] *4*	(25/2+)	B
2734.9+z[&] *4*	(25/2+)	B
2739.3+y[@] *5*	(27/2−)	B
2881.7+x[‡] *4*	(29/2−)	B
2909.7+z[a] *5*	(27/2+)	B
2949.2+y[#] *5*	(29/2−)	B
3053.8+z[c] *4*	(27/2+)	B
3232.5+x[§] *4*	(31/2−)	B
3292.6+z[b] *4*	(29/2+)	B
3418.6+z[&] *7*	(29/2+)	B
3459.3+y[@] *5*	(31/2−)	B
3594.4+z[a] *5*	(31/2+)	B
3609.8+x[‡] *4*	(33/2−)	B
3712.9+z[c] *5*	(31/2+)	B
3730.4+y[#] *6*	(33/2−)	B
3960.5+z[b] *5*	(33/2+)	B
3978.6+x[§] *4*	(35/2−)	B
4214.4+y[@] *6*	(35/2−)	B
4321.2+z[a] *5*	(35/2+)	B
4374.5+x[‡] *4*	(37/2−)	B
4413.4+z[c] *5*	(35/2+)	B
4575.7+y[#] *6*	(37/2−)	B
4703.9+z[b] *5*	(37/2+)	B
4772.2+x[§] *4*	(39/2−)	B
5032.4+y[@] *6*	(39/2−)	B
5115.8+z[a] *6*	(39/2+)	B
5192.8+z[c] *6*	(39/2+)	B
5210.8+x[‡] *4*	(41/2−)	B
5487.5+y[#] *6*	(41/2−)	B
5522.2+z[b] *6*	(41/2+)	B
5644.3+x[§] *4*	(43/2−)	B
5935.3+y[@] *6*	(43/2−)	B
5973.6+z[a] *6*	(43/2+)	B
6079.2+z[c] *6*	(43/2+)	B
6142.9+x[‡] *4*	(45/2−)	B
6415.4+z[b] *6*	(45/2+)	B
6472.1+y[#] *7*	(45/2−)	B
6606.4+x[§] *5*	(47/2−)	B
6901.2+z[a] *7*	(47/2+)	B
6927.2+y[@] *7*	(47/2−)	B
7078.2+z[c] *12*	(47/2+)	B
7176.0+x[‡] *5*	(49/2−)	B
7395.6+z[b] *6*	(49/2+)	B
7528.1+y[#] *7*	(49/2−)	B
7658.3+x[§] *5*	(51/2−)	B
7916.4+z[a] *7*	(51/2+)	B
8010.9+y[@] *7*	(51/2−)	B
8178.2+z[c] *16*	(51/2+)	B
8307.3+x[‡] *5*	(53/2−)	B
8471.7+z[b] *7*	(53/2+)	B
8636.1+y[#] *12*	(53/2−)	B
8796.7+x[§] *6*	(55/2−)	B
9024.0+z[a] *7*	(55/2+)	B
9176.9+y[@] *7*	(55/2−)	B
9337.2+z[c] *19*	(55/2+)	B
9535.6+x[‡] *6*	(57/2−)	B
9643.5+z[b] *7*	(57/2+)	B
9796.1+y[#] *16*	(57/2−)	B
10019.4+x[§] *6*	(59/2−)	B
10222.2+z[a] *7*	(59/2+)	B
10416.0+y[@] *8*	(59/2−)	B
10857.6+x[‡] *6*	(61/2−)	B
10902.5+z[b] *12*	(61/2+)	B
11009.1+y[#] *19*	(61/2−)	B
11326.4+x[§] *6*	(63/2−)	B
11511.1+z[a] *8*	(63/2+)	B
11721.0+y[@] *13*	(63/2−)	B
12221.5+z[b] *16*	(65/2+)	B
12263.5+x[‡] *6*	(65/2−)	B
12265.1+y[#] *21*	(65/2−)	B
12720.4+x[§] *7*	(67/2−)	B
12892.1+z[a] *13*	(67/2+)	B
13090.1+y[@] *16*	(67/2−)	B
13575.5+z[b] *19*	(69/2+)	B
13746.5+x[‡] *12*	(69/2−)	B
14202.4+x[§] *12*	(71/2−)	B
14365.1+z[a] *16*	(71/2+)	B
14528.1+y[@] *19*	(71/2−)	B
15765.4+x[§] *16*	(75/2−)	B

[†] Assignments for excited states are from ^{92}Mo(^{40}Ca,2pnγ), based on γ–ray multipolarities from angular correlation data, band assignments and comparisons with cranked–shell model calculations. All assignments have been taken from 2002Ze01, except parentheses have been added by the evaluators due to lack of strong supporting arguments, including those for the g.s. and isomers. For levels populated in high–spin studies, ascending order of spins with excitation energy is assumed based on yrast pattern of population.

[‡] (A): v7/2[523],α=+1/2.

[§] (B): v7/2[523],α=−1/2.

[#] (C): v1/2[541],α=+1/2.

[@] (D): v1/2[541],α=−1/2.

[&] (E): v1/2[411],α=+1/2.

[a] (F): v1/2[411],α=−1/2.

[b] (G): v5/2[402],α=+1/2.

[c] (H): v5/2[402],α=−1/2.

γ(^{129}Nd)

E(level)	Eγ	Iγ	Mult.[†]	α[‡]	Comments
99.0+y	99.0 *2*	100	(E2)	2.27	α(K)=1.241 *19*; α(L)=0.801 *14*; α(M)=0.182 *3*. α(N)=0.0394 *7*; α(O)=0.00508 *9*; α(P)=5.42×10^{-5} *9*.
130.4+x	130.5 *2*		(M1+E2)	0.680 *19*	α(K)=0.564 *9*; α(L)=0.091 *13*; α(M)=0.020 *3*. α(N)=0.0044 *7*; α(O)=0.00064 *8*; α(P)=3.57×10^{-5} *11*.
178.8+z	157.0 *2*	100 *14*	(M1+E2)	0.400 *8*	α(K)=0.335 *6*; α(L)=0.052 *5*; α(M)=0.0111 *12*. α(N)=0.0025 *3*; α(O)=0.00037 *3*; α(P)=2.12×10^{-5} *7*.
	178.8 *2*	43 *7*			
229.9+z	138.8 *2*	25 *8*	(M1+E2)	0.569 *14*	α(K)=0.474 *8*; α(L)=0.075 *10*; α(M)=0.0162 *23*. α(N)=0.0036 *5*; α(O)=0.00053 *6*; α(P)=3.00×10^{-5} *9*.
	208.2 *2*	100 *17*	(E2)	0.1713	α(K)=0.1278 *19*; α(L)=0.0340 *5*; α(M)=0.00755 *11*. α(N)=0.001649 *24*; α(O)=0.000225 *4*; α(P)=6.55×10^{-6} *10*.
232.6+y	133.6 *2*	100 *64*	(M1+E2)	0.636 *17*	α(K)=0.528 *8*; α(L)=0.085 *12*; α(M)=0.018 *3*. α(N)=0.0041 *6*; α(O)=0.00060 *7*; α(P)=3.34×10^{-5} *10*.

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Adopted Levels, Gammas (continued)

γ(^{129}Nd) (continued)

E(level)	Eγ	Iγ	Mult.†	α‡	Comments
232.6+y	178.8 *2*	86 *14*	(E2)	0.286	α(K)=0.206 *3*; α(L)=0.0626 *10*; α(M)=0.01399 *21*. α(N)=0.00305 *5*; α(O)=0.000411 *6*; α(P)=1.023×10^{-5} *15*.
236.9+z	146.1 *2*	100	(M1+E2)	0.492 *11*	α(K)=0.410 *7*; α(L)=0.064 *8*; α(M)=0.0138 *18*. α(N)=0.0031 *4*; α(O)=0.00046 *5*; α(P)=2.60×10^{-5} *8*.
292.6+x	162.5 *2*	100 *6*	(M1+E2)	0.363 *6*	α(K)=0.304 *5*; α(L)=0.046 *5*; α(M)=0.0100 *10*. α(N)=0.00222 *21*; α(O)=0.00033 *3*; α(P)=1.93×10^{-5} *6*.
	292.5 *2*	24.2 *16*	(E2)	0.0567	α(K)=0.0447 *7*; α(L)=0.00939 *14*; α(M)=0.00206 *3*. α(N)=0.000452 *7*; α(O)=6.35×10^{-5} *9*; α(P)=2.45×10^{-6} *4*.
308.5+y	76.0 *2*	11 *3*			
	209.5 *2*	100 *19*	(E2)	0.1677	α(K)=0.1254 *18*; α(L)=0.0332 *5*; α(M)=0.00736 *11*. α(N)=0.001609 *24*; α(O)=0.000220 *4*; α(P)=6.44×10^{-6} *10*.
415.7+z	179.1 *2*	100 *9*	(M1+E2)	0.276	α(K)=0.232 *4*; α(L)=0.035 *3*; α(M)=0.0074 *6*. α(N)=0.00166 *13*; α(O)=0.000247 *15*; α(P)=1.47×10^{-5} *5*.
	324.5 *2*	88 *6*	(E2)	0.0411	α(K)=0.0328 *5*; α(L)=0.00649 *10*; α(M)=0.001417 *20*. α(N)=0.000312 *5*; α(O)=4.42×10^{-5} *7*; α(P)=1.82×10^{-6} *3*.
491.0+x	198.6 *2*	100 *5*	(M1+E2)	0.207	α(K)=0.174 *4*; α(L)=0.0256 *15*; α(M)=0.0055 *4*. α(N)=0.00122 *8*; α(O)=0.000183 *9*; α(P)=1.11×10^{-5} *4*.
	360.5 *2*	55 *3*	(E2)	0.0298	α(K)=0.0241 *4*; α(L)=0.00452 *7*; α(M)=0.000983 *14*. α(N)=0.000217 *3*; α(O)=3.09×10^{-5} *5*; α(P)=1.361×10^{-6} *20*.
497.3+z	267.5 *2*	58 *7*	(M1+E2)	0.0912 *20*	α(K)=0.0773 *20*; α(L)=0.01095 *25*; α(M)=0.00233 *6*. α(N)=0.000521 *13*; α(O)=7.85×10^{-5} *14*; α(P)=4.92×10^{-6} *18*.
	318.4 *2*	100 *7*	(E2)	0.0435	α(K)=0.0347 *5*; α(L)=0.00694 *10*; α(M)=0.001516 *22*. α(N)=0.000334 *5*; α(O)=4.71×10^{-5} *7*; α(P)=1.92×10^{-6} *3*.
530.1+y	221.5 *2*	50 *6*			
	297.5 *2*	100 *11*	(E2)	0.0538	α(K)=0.0425 *6*; α(L)=0.00883 *13*; α(M)=0.00193 *3*. α(N)=0.000425 *6*; α(O)=5.98×10^{-5} *9*; α(P)=2.33×10^{-6} *4*.
581.7+z	344.8 *2*	7.6 *8*	(E2)	0.0341	α(K)=0.0274 *4*; α(L)=0.00526 *8*; α(M)=0.001146 *17*. α(N)=0.000253 *4*; α(O)=3.59×10^{-5} *5*; α(P)=1.539×10^{-6} *22*.
	351.6 *2*	100 *5*	(E2)	0.0322	α(K)=0.0259 *4*; α(L)=0.00492 *7*; α(M)=0.001071 *16*. α(N)=0.000236 *4*; α(O)=3.36×10^{-5} *5*; α(P)=1.458×10^{-6} *21*.
629.3+z	213.7 *2*	100 *7*	(M1+E2)	0.169 *3*	α(K)=0.142 *3*; α(L)=0.0207 *10*; α(M)=0.00442 *23*. α(N)=0.00099 *5*; α(O)=0.000148 *6*; α(P)=9.0×10^{-6} *3*.
	392.3 *2*	72 *3*	(E2)	0.0233	α(K)=0.0189 *3*; α(L)=0.00341 *5*; α(M)=0.000740 *11*. α(N)=0.0001634 *23*; α(O)=2.35×10^{-5} *4*; α(P)=1.080×10^{-6} *16*.
630.8+y	322.4 *2*	100	(E2)	0.0419	α(K)=0.0334 *5*; α(L)=0.00664 *10*; α(M)=0.001450 *21*. α(N)=0.000319 *5*; α(O)=4.52×10^{-5} *7*; α(P)=1.86×10^{-6} *3*.
710.7+x	219.8 *2*	100 *5*	(M1+E2)	0.156 *3*	α(K)=0.132 *3*; α(L)=0.0191 *8*; α(M)=0.00407 *19*. α(N)=0.00091 *4*; α(O)=0.000137 *5*; α(P)=8.4×10^{-6} *3*.
	418.1 *2*	97 *5*	(E2)	0.0193	α(K)=0.01582 *23*; α(L)=0.00277 *4*; α(M)=0.000601 *9*. α(N)=0.0001328 *19*; α(O)=1.91×10^{-5} *3*; α(P)=9.11×10^{-7} *13*.
868.4+z	239.3 *2*	69 *6*	(M1+E2)	0.1234 *23*	α(K)=0.1044 *25*; α(L)=0.0150 *5*; α(M)=0.00319 *12*. α(N)=0.000713 *25*; α(O)=0.000107 *3*; α(P)=6.64×10^{-6} *23*.
	452.7 *2*	100 *6*	(E2)	0.01546	α(K)=0.01271 *18*; α(L)=0.00216 *3*; α(M)=0.000466 *7*. α(N)=0.0001032 *15*; α(O)=1.496×10^{-5} *21*; α(P)=7.38×10^{-7} *11*.
936.3+z	354.3 *2*	36 *4*			
	439.1 *2*	100 *8*	(E2)	0.01684	α(K)=0.01382 *20*; α(L)=0.00237 *4*; α(M)=0.000513 *8*. α(N)=0.0001135 *16*; α(O)=1.643×10^{-5} *24*; α(P)=8.00×10^{-7} *12*.
942.8+y	312.0 *5*	<20			
	412.6 *2*	100 *10*	(E2)	0.0201	α(K)=0.01642 *23*; α(L)=0.00289 *4*; α(M)=0.000627 *9*. α(N)=0.0001386 *20*; α(O)=2.00×10^{-5} *3*; α(P)=9.43×10^{-7} *14*.
969.7+x	259.0 *2*	74 *4*	(M1+E2)	0.0995 *21*	α(K)=0.0843 *22*; α(L)=0.0120 *3*; α(M)=0.00255 *8*. α(N)=0.000570 *15*; α(O)=8.59×10^{-5} *17*; α(P)=5.36×10^{-6} *19*.
	478.6 *2*	100 *5*	(E2)	0.01326	α(K)=0.01095 *16*; α(L)=0.00182 *3*; α(M)=0.000392 *6*. α(N)=8.69×10^{-5} *13*; α(O)=1.264×10^{-5} *18*; α(P)=6.39×10^{-7} *9*.
1054.2+z	472.7 *2*	100	(E2)	0.01372	α(K)=0.01131 *16*; α(L)=0.00189 *3*; α(M)=0.000407 *6*. α(N)=9.02×10^{-5} *13*; α(O)=1.312×10^{-5} *19*; α(P)=6.60×10^{-7} *10*.
1064.7+y	434.0 *2*	100	(E2)	0.01740	α(K)=0.01427 *20*; α(L)=0.00246 *4*; α(M)=0.000533 *8*. α(N)=0.0001178 *17*; α(O)=1.703×10^{-5} *24*; α(P)=8.25×10^{-7} *12*.
1136.9+z	268.5 *2*	47 *3*	(M1+E2)	0.0903 *20*	α(K)=0.0765 *20*; α(L)=0.01084 *24*; α(M)=0.00230 *6*. α(N)=0.000515 *12*; α(O)=7.77×10^{-5} *14*; α(P)=4.87×10^{-6} *18*.
	507.4 *2*	100 *7*	(E2)	0.01132	α(K)=0.00938 *14*; α(L)=0.001526 *22*; α(M)=0.000328 *5*. α(N)=7.28×10^{-5} *11*; α(O)=1.063×10^{-5} *15*; α(P)=5.50×10^{-7} *8*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Nd) (continued)

E(level)	Eγ	Iγ	Mult.†	α‡	Comments
1235.1+x	265.6 *2*	47 *2*	(M1+E2)	0.0930 *20*	α(K)=0.0788 *21*; α(L)=0.0112 *3*; α(M)=0.00238 *6*. α(N)=0.000531 *13*; α(O)=8.01×10^{-5} *15*; α(P)=5.01×10^{-6} *18*.
	524.3 *2*	100	(E2)	0.01037	α(K)=0.00861 *12*; α(L)=0.001385 *20*; α(M)=0.000298 *5*. α(N)=6.61×10^{-5} *10*; α(O)=9.66×10^{-6} *14*; α(P)=5.07×10^{-7} *8*.
1419.4+z	282.1 *2*	47 *3*	(M1+E2)	0.0790 *18*	α(K)=0.0670 *18*; α(L)=0.00945 *18*; α(M)=0.00201 *5*. α(N)=0.000449 *9*; α(O)=6.78×10^{-5} *11*; α(P)=4.26×10^{-6} *16*.
	482.6 *5*	<11	(E2)	0.01296	α(K)=0.01071 *16*; α(L)=0.00177 *3*; α(M)=0.000382 *6*. α(N)=8.47×10^{-5} *13*; α(O)=1.233×10^{-5} *18*; α(P)=6.25×10^{-7} *9*.
	551.3 *2*	100 *8*	(E2)	0.00909	α(K)=0.00757 *11*; α(L)=0.001197 *17*; α(M)=0.000257 *4*. α(N)=5.70×10^{-5} *8*; α(O)=8.37×10^{-6} *12*; α(P)=4.47×10^{-7} *7*.
1461.8+y	397.2 *2*	20 *4*			
	518.8 *2*	100 *8*	(E2)	0.01066	α(K)=0.00885 *13*; α(L)=0.001429 *20*; α(M)=0.000307 *5*. α(N)=6.81×10^{-5} *10*; α(O)=9.96×10^{-6} *14*; α(P)=5.20×10^{-7} *8*.
1471.8+z	535.4 *2*	100	(E2)	0.00981	α(K)=0.00816 *12*; α(L)=0.001303 *19*; α(M)=0.000280 *4*. α(N)=6.21×10^{-5} *9*; α(O)=9.10×10^{-6} *13*; α(P)=4.81×10^{-7} *7*.
1543.0+x	308.1 *2*	55 *3*	(M1+E2)	0.0624 *16*	α(K)=0.0530 *16*; α(L)=0.00741 *11*; α(M)=0.00157 *3*. α(N)=0.000352 *6*; α(O)=5.32×10^{-5} *8*; α(P)=3.37×10^{-6} *13*.
	573.2 *2*	100 *5*	(E2)	0.00822	α(K)=0.00686 *10*; α(L)=0.001072 *15*; α(M)=0.000230 *4*. α(N)=5.10×10^{-5} *8*; α(O)=7.50×10^{-6} *11*; α(P)=4.06×10^{-7} *6*.
1603.7+y	539.1 *2*	100	(E2)	0.00964	α(K)=0.00801 *12*; α(L)=0.001277 *18*; α(M)=0.000274 *4*. α(N)=6.09×10^{-5} *9*; α(O)=8.92×10^{-6} *13*; α(P)=4.73×10^{-7} *7*.
1620.6+z	566.6 *2*	100	(E2)	0.00847	α(K)=0.00706 *10*; α(L)=0.001107 *16*; α(M)=0.000238 *4*. α(N)=5.27×10^{-5} *8*; α(O)=7.75×10^{-6} *11*; α(P)=4.18×10^{-7} *6*.
1730.3+z	311.0 *2*	27 *3*			
	593.4 *2*	100 *7*	(E2)	0.00752	α(K)=0.00629 *9*; α(L)=0.000972 *14*; α(M)=0.000208 *3*. α(N)=4.63×10^{-5} *7*; α(O)=6.82×10^{-6} *10*; α(P)=3.73×10^{-7} *6*.
1843.9+x	300.9 *2*	35.2 *22*	(M1+E2)	0.0665 *17*	α(K)=0.0564 *16*; α(L)=0.00791 *13*; α(M)=0.00168 *3*. α(N)=0.000376 *6*; α(O)=5.68×10^{-5} *8*; α(P)=3.59×10^{-6} *13*.
	608.8 *2*	100 *6*	Q		
2034.7+z	304.7 *2*	29.2 *24*	(M1+E2)	0.0643 *16*	α(K)=0.0546 *16*; α(L)=0.00764 *12*; α(M)=0.00162 *3*. α(N)=0.000363 *6*; α(O)=5.49×10^{-5} *8*; α(P)=3.47×10^{-6} *13*.
	615.1 *2*	100 *9*	Q		
2067.6+y	464.0 *5*	<18			
	605.8 *2*	100 *9*			
2076.6+z	604.7 *2*	100	Q		
2187.3+x	343.4 *2*	39 *3*	(M1+E2)	0.0468 *13*	α(K)=0.0398 *13*; α(L)=0.00552 *8*; α(M)=0.001171 *17*. α(N)=0.000262 *4*; α(O)=3.97×10^{-5} *7*; α(P)=2.53×10^{-6} *10*.
	644.2 *2*	100 *5*	Q		
2236.8+y	633.1 *2*	100	Q		
2248.4+z	628.0 *2*	100	Q		
2379.2+z	344.8 *2*	28 *3*			
	648.7 *2*	100 *6*	Q		
2516.2+x	329.0 *2*	28.6 *12*			
	672.3 *2*	100 *6*	Q		
2666.0+z	286.9 *2*	14.5 *19*	(M1+E2)	0.0755 *18*	α(K)=0.0641 *18*; α(L)=0.00902 *16*; α(M)=0.00192 *4*. α(N)=0.000428 *8*; α(O)=6.47×10^{-5} *10*; α(P)=4.08×10^{-6} *15*.
	417.8 *2*	13.2 *24*	(M1+E2)	0.0281 *9*	α(K)=0.0239 *8*; α(L)=0.00327 *7*; α(M)=0.000693 *13*. α(N)=0.000155 *3*; α(O)=2.35×10^{-5} *6*; α(P)=1.52×10^{-6} *6*.
	589.2 *2*	23.7 *26*	(E2)	0.00766	α(K)=0.00640 *9*; α(L)=0.000992 *14*; α(M)=0.000213 *3*. α(N)=4.72×10^{-5} *7*; α(O)=6.95×10^{-6} *10*; α(P)=3.80×10^{-7} *6*.
	631.1 *2*	100 *8*	Q		
2734.9+z	658.3 *2*	100			
2739.3+y	671.7 *2*	100			
2881.7+x	365.6 *2*	32.4 *14*			
	694.4 *2*	100 *6*	Q		
2909.7+z	661.3 *2*	100	Q		
2949.2+y	712.3 *2*	100	Q		
3053.8+z	674.6 *2*	100			
3232.5+x	351.0 *2*	33 *3*			
	716.2 *2*	100 *6*	Q		
3292.6+z	626.6 *2*	100	Q		
3418.6+z	683.7 *5*	100			
3459.3+y	720.0 *2*	100			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{129}Nd) (continued)

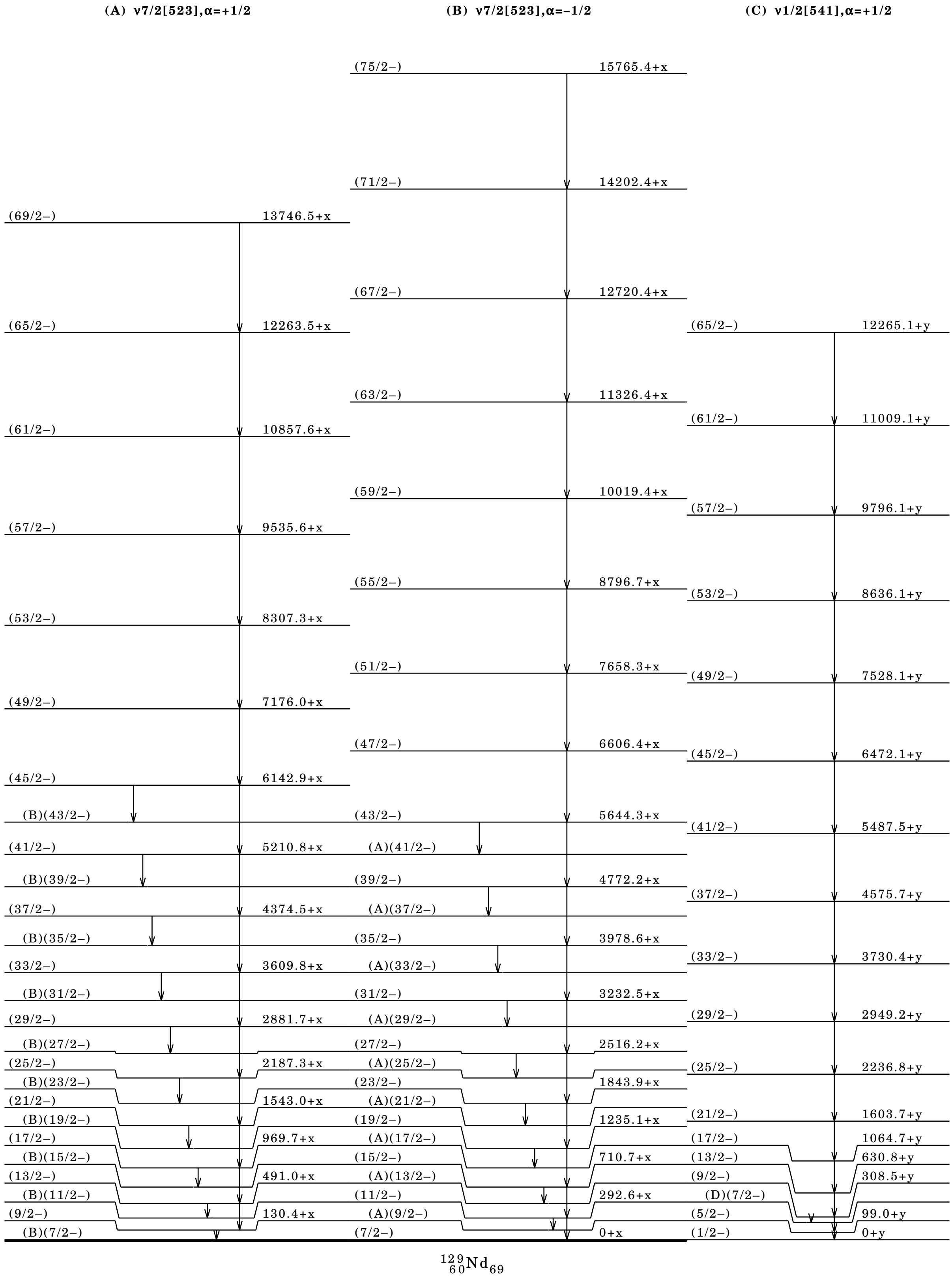
E(level)	Eγ	Iγ	Mult.†
3594.4+z	684.7 *2*	100	Q
3609.8+x	377.1 *2*	37.3 *17*	
	728.1 *2*	100 *7*	Q
3712.9+z	659.1 *2*	100	
3730.4+y	781.2 *2*	100	Q
3960.5+z	667.9 *2*	100	Q
3978.6+x	368.6 *2*	41.2 *20*	
	746.3 *2*	100 *6*	Q
4214.4+y	755.1 *2*	100	
4321.2+z	726.8 *2*	100	Q
4374.5+x	396.0 *2*	36.0 *16*	
	764.6 *2*	100 *5*	Q
4413.4+z	700.5 *2*	100	
4575.7+y	845.3 *2*	100	Q
4703.9+z	743.4 *2*	100	Q
4772.2+x	398.0 *2*	34 *3*	
	793.5 *2*	100 *5*	Q
5032.4+y	818.0 *2*	100	
5115.8+z	794.6 *2*	100	Q
5192.8+z	779.4 *2*	100	
5210.8+x	438.3 *2*	27 *3*	
	836.2 *2*	100 *6*	Q
5487.5+y	911.8 *2*	100	Q
5522.2+z	818.3 *2*	100	Q
5644.3+x	433.0 *2*	28 *3*	
	872.5 *2*	100 *8*	Q
5935.3+y	902.9 *2*	100	
5973.6+z	857.8 *2*	100	Q
6079.2+z	886.4 *2*	100	
6142.9+x	498.5 *2*	27 *5*	
	932.1 *2*	100 *9*	
6415.4+z	893.2 *2*	100	
6472.1+y	984.6 *2*	100	Q
6606.4+x	962.1 *2*	100	Q
6901.2+z	927.6 *2*	100	
6927.2+y	991.9 *2*	100	
7078.2+z	999 *1*	100	
7176.0+x	1033.1 *2*	100	
7395.6+z	980.2 *2*	100	
7528.1+y	1056.0 *2*	100	Q
7658.3+x	1051.9 *2*	100	
7916.4+z	1015.2 *2*	100	
8010.9+y	1083.7 *2*	100	
8178.2+z	1100 *1*	100	
8307.3+x	1131.3 *2*	100	
8471.7+z	1076.1 *2*	100	
8636.1+y	1108 *1*	100	
8796.7+x	1138.4 *2*	100	
9024.0+z	1107.6 *2*	100	
9176.9+y	1166.0 *2*	100	
9337.2+z	1159 *1*	100	
9535.6+x	1228.3 *2*	100	
9643.5+z	1171.8 *2*	100	
9796.1+y	1160 *1*	100	
10019.4+x	1222.7 *2*	100	
10222.2+z	1198.2 *2*	100	
10416.0+y	1239.1 *2*	100	
10857.6+x	1322.0 *2*	100	
10902.5+z	1259 *1*	100	
11009.1+y	1213 *1*	100	
11326.4+x	1307.0 *2*	100	
11511.1+z	1288.9 *2*	100	
11721.0+y	1305 *1*	100	
12221.5+z	1319 *1*	100	
12263.5+x	1405.9 *2*	100	
12265.1+y	1256 *1*	100	
12720.4+x	1394.0 *2*	100	
12892.1+z	1381 *1*	100	
13090.1+y	1369 *1*	100	
13575.5+z	1354§ *1*	100	
13746.5+x	1483 *1*	100	
14202.4+x	1482 *1*	100	
14365.1+z	1473 *1*	100	
14528.1+y	1438 *1*	100	
15765.4+x	1563 *1*	100	

† From γγ(θ)(DCO) data in ^{92}Mo(^{40}Ca,2pnγ). The mult=Q indicates ΔJ=2, quadrupole (most likely E2) and D+Q indicates ΔJ=1, dipole+quadrupole (most likely M1+E2). Mult=(E2) or (M1+E2) assigned based on RUL for E2 and M2 with the assumption of ≈10 ns resolving time in γγ coincidence experiments.

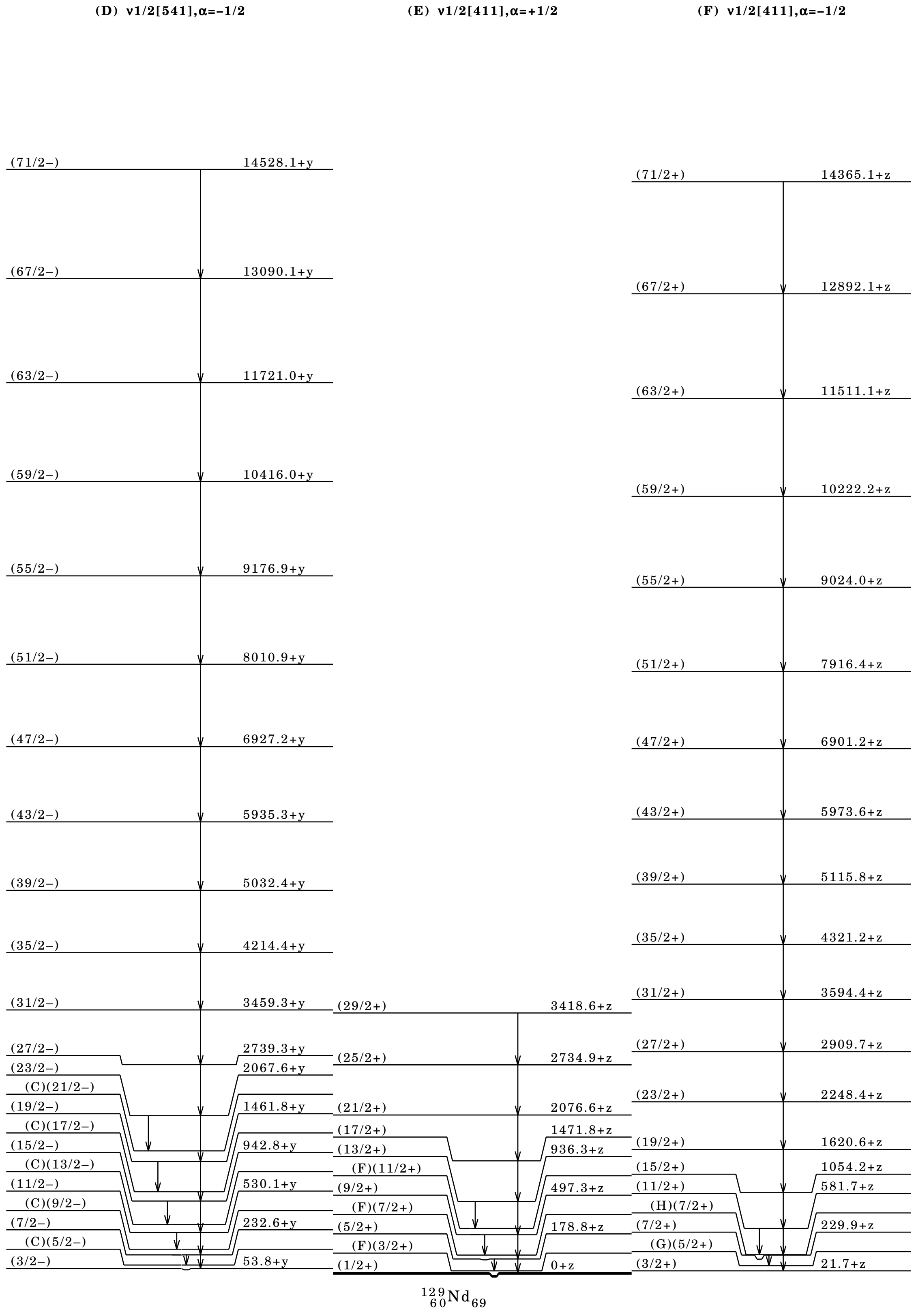
‡ δ(E2/M1)=0.30 assumed for M1+E2 transitions.

§ Placement of transition in the level scheme is uncertain.

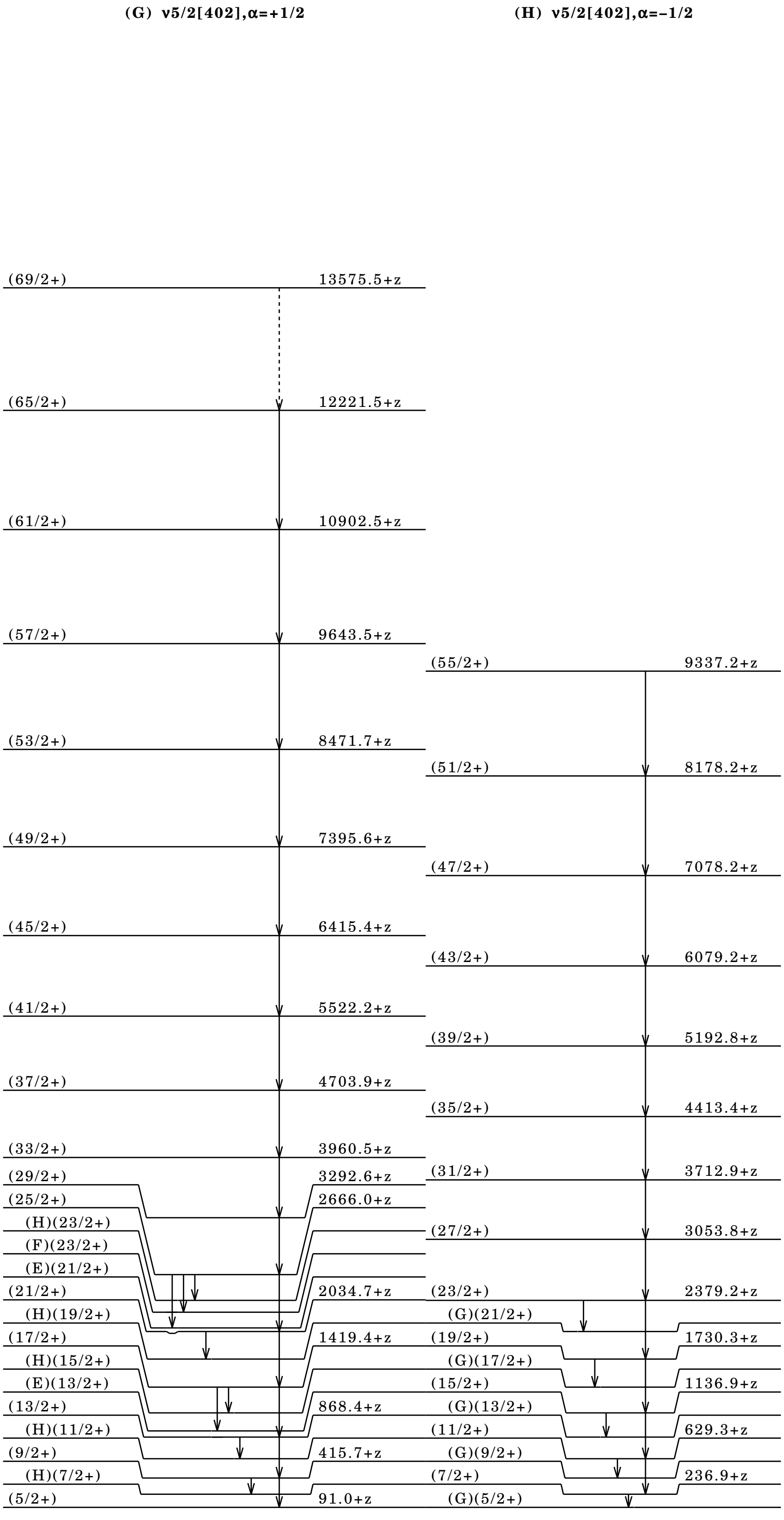
Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)



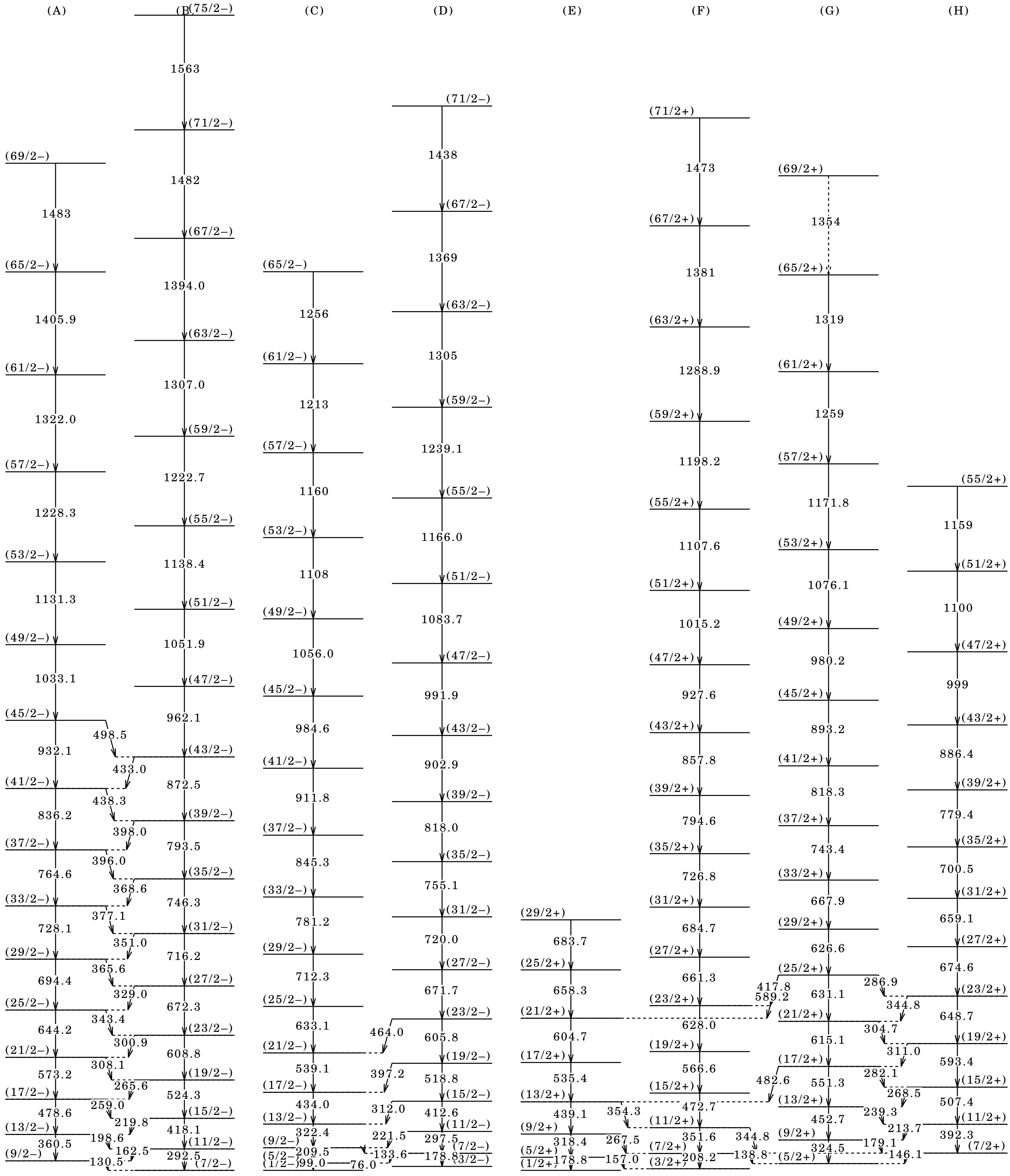
Adopted Levels, Gammas (continued)



$^{129}_{60}$Nd$_{69}$

Adopted Levels, Gammas (continued)

Bands for ^{129}Nd



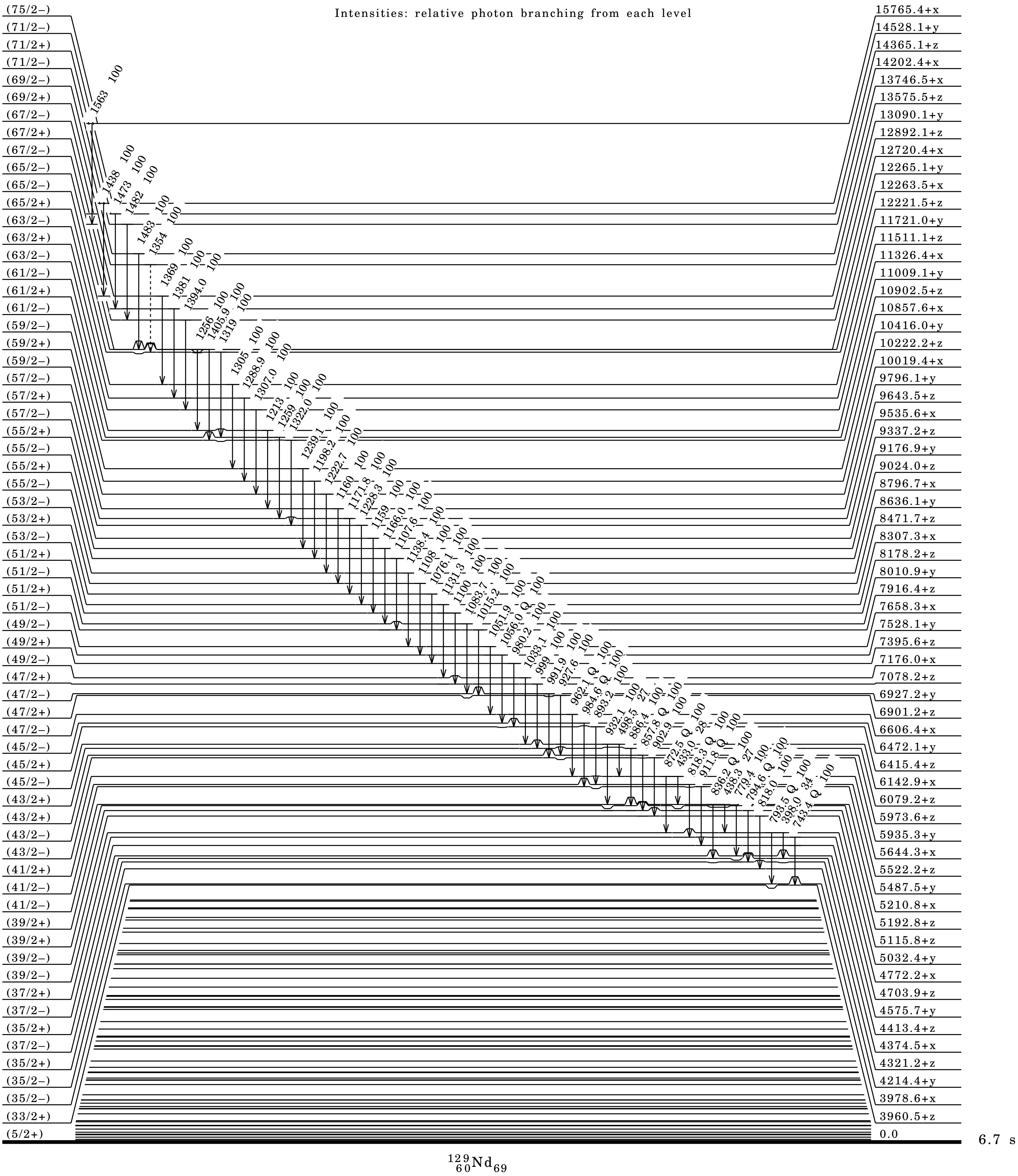
$^{129}_{60}$Nd$_{69}$

From NNDC(BNL)
program ENSDAT

Adopted Levels, Gammas (continued)

Level Scheme

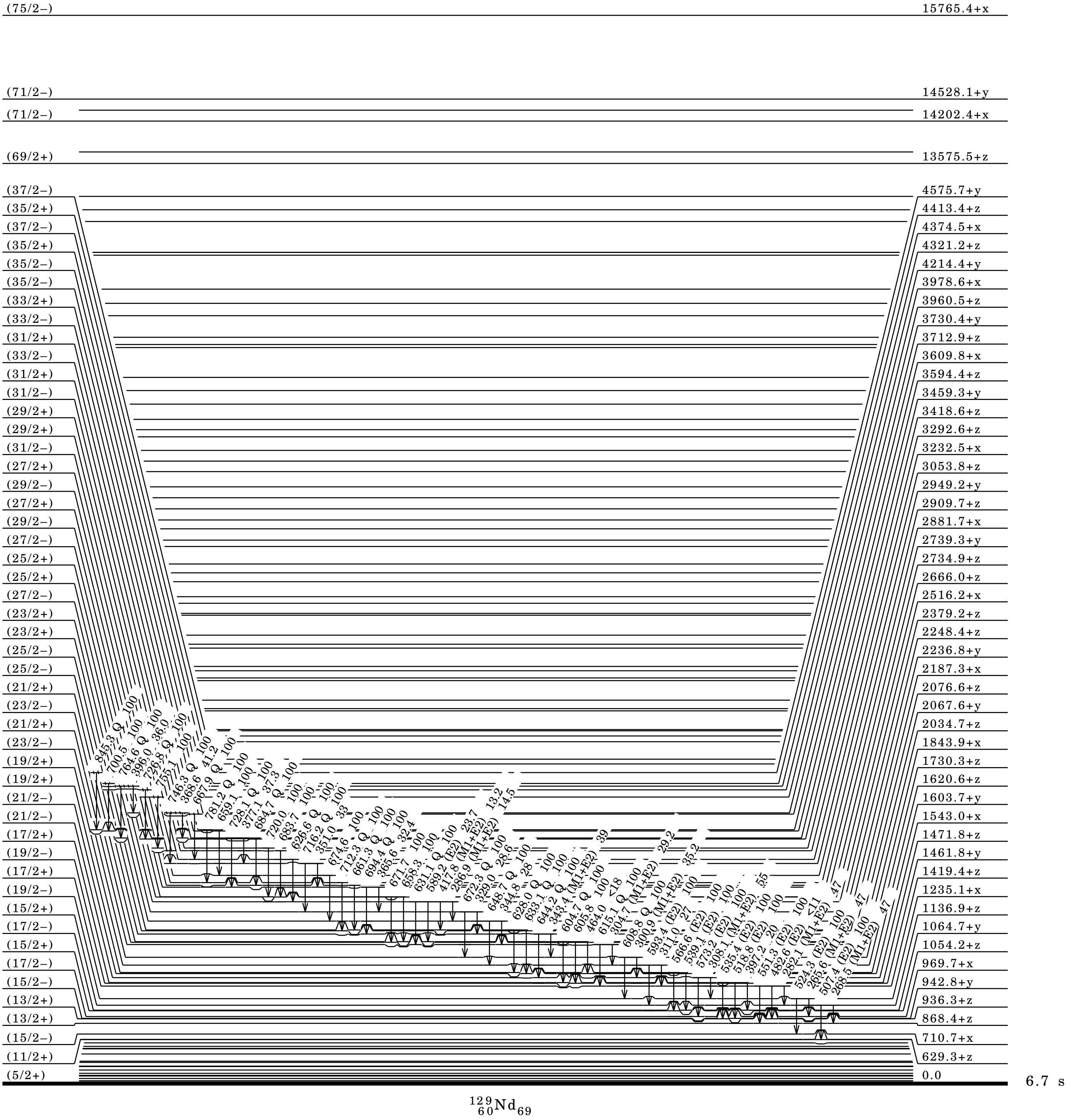
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

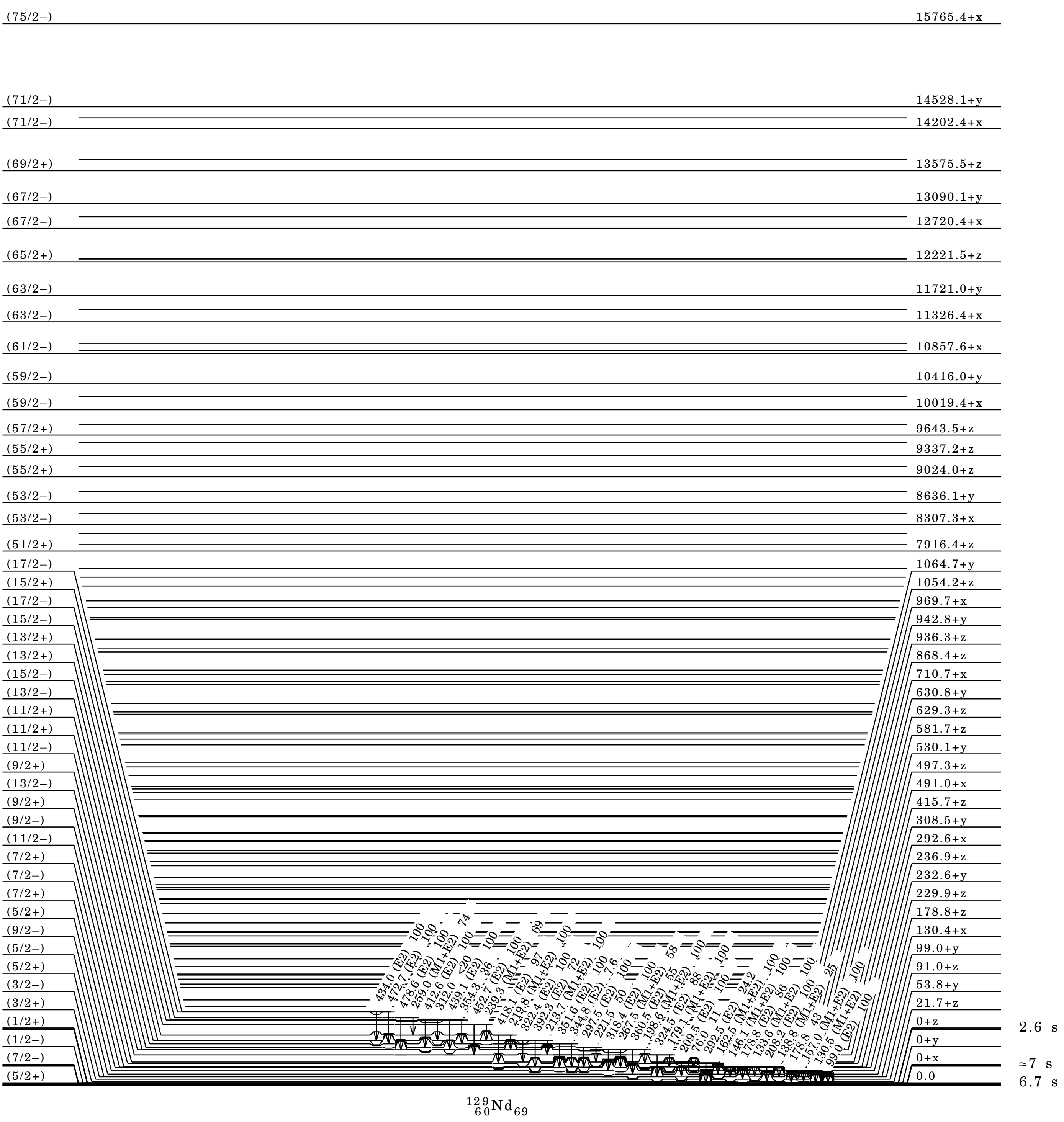
Intensities: relative photon branching from each level



Adopted Levels, Gammas (continued)

Level Scheme (continued)

Intensities: relative photon branching from each level



129Pm ε Decay (2.4 s) 2004Xu05

Parent 129Pm: E=0.0; Jπ=(5/2–); $T_{1/2}$=2.4 s *9*; Q(g.s.)=9430 syst; %ε+%β^+ decay=100.

129Pm–J,$T_{1/2}$: From ^{129}Pm Adopted Levels.

129Pm–Q(ε): 9430 *360* (syst,2012Wa38).

2004Xu05: The ^{129}Pm isotope was obtained by bombarding a ^{92}Mo target with a ^{40}Ca^{12+} beam at E=232 MeV. The beam energy at target center could be varied from 164–190 MeV. Measured Eγ, γγ(t), (charged particle)γ (coin), (x ray)γ (coin) with two coaxial HPGe(GMX) detectors for γ–rays and a HPGe planar detector for x–ray spectroscopy. In order to improve the energy resolution for low–energy γ–rays, in some runs a second HPGe planar detector was used instead of one of the two coaxial HPGe(GM–X) detectors.

2000So11: First identification of ^{129}Pm isotope in ^{90}Zr(^{197}Au,X) reaction at 30 MeV/nucleon; MSU A1200 fragment separator used.

^{129}Nd Levels

E(level)	Jπ†
0+y	(1/2–)
99+y	(5/2–)

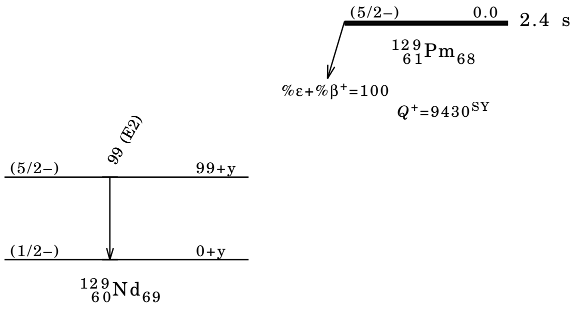
† As quoted by 2004Xu05 based on results in 2002Ze01.

γ(^{129}Nd)

Eγ	E(level)	Mult.	α	Comments
99	99+y	(E2)	2.27	α(K)=1.241 *19*; α(L)=0.801 *14*; α(M)=0.182 *3*. α(N)=0.0394 *7*; α(O)=0.00508 *9*; α(P)=5.42×10^{-5} *9*. Eγ: from 2004Xu05. α(exp)=2.0 (2004Xu05).

129Pm ε Decay (2.4 s) 2004Xu05 (continued)

Decay Scheme



^{92}Mo(^{40}Ca,2pnγ) 2002Ze01

2002Ze01: E=170, 184 MeV. Measured Eγ, Iγ, γγ, γγ(θ)(DCO) using CLARION array of 11 segmented Clover Ge spectrometers within BGO anti–Compton shields, and ten single–volume Ge detectors. DCO=1 and approximately 0.5 is expected for stretched quadrupole and stretched dipole transitions, respectively. Charged particles were detected by HyBall array of 95 CsI scintillators in a 4π geometry.

1987WaZK: ^{58}Ni(^{74}Se,2pnγ). BGO shielded Ge array, γ, γγ–coin. Level scheme from 1987WaZK is a short note giving no details. A strongly–coupled band proposed by 1987WaZK is the same as 7/2[523] band proposed by 2002Ze01, but in 1987WaZK no spin–parity assignments were made and the cascade was known up to Eγ=794 keV, i.e. up to 39/2–.

^{129}Nd Levels

E(level)†	Jπ‡
0+x[#]	7/2–
0+y[@]	1/2–
0+z[a]	1/2+
21.7+z[b] *3*	3/2+
53.8+y[&] *4*	3/2–
91.0+z[c] *4*	5/2+
99.0+y[@] *2*	5/2–
130.4+x[§] *2*	9/2–
178.8+z[a] *2*	5/2+
229.9+z[b] *3*	7/2+
232.6+y[&] *3*	7/2–
236.9+z[d] *4*	7/2+
292.6+x[#] *2*	11/2–
308.5+y[@] *3*	9/2–
415.7+z[c] *4*	9/2+
491.0+x[§] *2*	13/2–
497.3+z[a] *3*	9/2+
530.1+y[&] *3*	11/2–
581.7+z[b] *3*	11/2+
629.3+z[d] *4*	11/2+
630.8+y[@] *3*	13/2–
710.7+x[#] *2*	15/2–
868.4+z[c] *4*	13/2+
936.3+z[a] *3*	13/2+
942.8+y[&] *4*	15/2–
969.7+x[§] *2*	17/2–
1054.2+z[b] *4*	15/2+
1064.7+y[@] *4*	17/2–
1136.9+z[d] *4*	15/2+
1235.1+x[#] *3*	19/2–
1419.4+z[c] *4*	17/2+
1461.8+y[&] *4*	19/2–
1471.8+z[a] *4*	17/2+
1543.0+x[§] *3*	21/2–
1603.7+y[@] *4*	21/2–
1620.6+z[b] *4*	19/2+
1730.3+z[d] *4*	19/2+
1843.9+x[#] *3*	23/2–
2034.7+z[c] *4*	21/2+
2067.6+y[&] *4*	(23/2–)
2076.6+z[a] *4*	21/2+
2187.3+x[§] *3*	25/2–
2236.8+y[@] *5*	25/2–
2248.4+z[b] *4*	23/2+
2379.2+z[d] *4*	23/2+
2516.2+x[#] *3*	27/2–
2666.0+z[c] *4*	25/2+
2734.9+z[a] *4*	(25/2+)
2739.3+y[&] *5*	(27/2–)
2881.7+x[§] *4*	29/2–
2909.7+z[b] *5*	27/2+
2949.2+y[@] *5*	29/2–
3053.8+z[d] *4*	(27/2+)
3232.5+x[#] *4*	31/2–
3292.6+z[c] *4*	29/2+
3418.6+z[a] *7*	(29/2+)
3459.3+y[&] *5*	(31/2–)
3594.4+z[b] *5*	31/2+
3609.8+x[§] *4*	33/2–
3712.9+z[d] *5*	(31/2+)
3730.4+y[@] *6*	33/2–
3960.5+z[c] *5*	33/2+
3978.6+x[#] *4*	35/2–
4214.4+y[&] *6*	(35/2–)
4321.2+z[b] *5*	35/2+
4374.5+x[§] *4*	37/2–
4413.4+z[d] *5*	(35/2+)
4575.7+y[@] *6*	37/2–
4703.9+z[c] *5*	37/2+
4772.2+x[#] *4*	39/2–
5032.4+y[&] *6*	(39/2–)
5115.8+z[b] *6*	39/2+
5192.8+z[d] *6*	(39/2+)
5210.8+x[§] *4*	41/2–
5487.5+y[@] *6*	41/2–
5522.2+z[c] *6*	41/2+
5644.3+x[#] *4*	43/2–
5935.3+y[&] *6*	(43/2–)
5973.6+z[b] *6*	43/2+
6079.2+z[d] *6*	(43/2+)
6142.9+x[§] *4*	(45/2–)
6415.4+z[c] *6*	(45/2+)
6472.1+y[@] *7*	45/2–
6606.4+x[#] *5*	47/2–
6901.2+z[b] *7*	(47/2+)
6927.2+y[&] *7*	(47/2–)
7078.2+z[d] *12*	(47/2+)
7176.0+x[§] *5*	(49/2–)
7395.6+z[c] *6*	(49/2+)
7528.1+y[@] *7*	49/2–
7658.3+x[#] *5*	(51/2–)
7916.4+z[b] *7*	(51/2+)
8010.9+y[&] *7*	(51/2–)
8178.2+z[d] *16*	(51/2+)
8307.3+x[§] *5*	(53/2–)
8471.7+z[c] *7*	(53/2+)
8636.1+y[@] *12*	(53/2–)
8796.7+x[#] *6*	(55/2–)
9024.0+z[b] *7*	(55/2+)
9176.9+y[&] *7*	(55/2–)
9337.2+z[d] *19*	(55/2+)
9535.6+x[§] *6*	(57/2–)
9643.5+z[c] *7*	(57/2+)
9796.1+y[@] *16*	(57/2–)
10019.4+x[#] *6*	(59/2–)

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^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

^{129}Nd Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
10222.2+z[b] *7*	(59/2+)	11721.0+y[&] *13*	(63/2−)	13575.5+z[c] *19*	(69/2+)
10416.0+y[&] *8*	(59/2−)	12221.5+z[c] *16*	(65/2+)	13746.5+x[§] *12*	(69/2−)
10857.6+x[§] *6*	(61/2−)	12263.5+x[§] *6*	(65/2−)	14202.4+x[#] *12*	(71/2−)
10902.5+z[c] *12*	(61/2+)	12265.1+y[@] *21*	(65/2−)	14365.1+z[b] *16*	(71/2+)
11009.1+y[@] *19*	(61/2−)	12720.4+x[#] *7*	(67/2−)	14528.1+y[&] *19*	(71/2−)
11326.4+x[#] *6*	(63/2−)	12892.1+z[b] *13*	(67/2+)	15765.4+x[#] *16*	(75/2−)
11511.1+z[b] *8*	(63/2+)	13090.1+y[&] *16*	(67/2−)		

[†] From least-squares fit to Eγ data. It should be noted that level energies for band #2: 1/2[541], α=−1/2 as quoted by by 2002Ze01 in Table I should be adjusted upwards by 54 keV above the 3/2− level. Similarly, for band #3, 1/2[411], α=−1/2, energies quoted by 2002Ze01 should be adjusted upwards by 22 keV above the 3/2+ level. (An e-mail reply on Jan 16/02 from one of the authors D.J. Hartley confirms this change.).

[‡] Assignments are as proposed by 2002Ze01, based on γ-ray multipolarities from angular correlation data, band assignments and comparisons with cranked-shell model calculations. All assignments are the same in Adopted Levels, except that parentheses have been added there due to lack of strong supporting arguments.

[§] (A): ν7/2[523], α=+1/2.

[#] (B): ν7/2[523], α=−1/2.

[@] (C): ν1/2[541], α=+1/2.

[&] (D): ν1/2[541], α=−1/2.

[a] (E): ν1/2[411], α=+1/2.

[b] (F): ν1/2[411], α=−1/2.

[c] (G): ν5/2[402], α=+1/2.

[d] (H): ν5/2[402], α=−1/2.

γ(^{129}Nd)

Eγ[†]	E(level)	Iγ	Mult.[‡]	α[§]	Comments
76.0 *2*	308.5+y	4 *1*			
99.0 *2*	99.0+y	18 *9*	(E2)	2.27	DCO=1.0 *1*. α(K)=1.241 *19*; α(L)=0.801 *14*; α(M)=0.182 *3*. α(N)=0.0394 *7*; α(O)=0.00508 *9*; α(P)=5.42×10^{-5} *9*.
130.5 *2*	130.4+x		(M1+E2)	0.680 *19*	DCO=0.63 *4*. α(K)=0.564 *9*; α(L)=0.091 *13*; α(M)=0.020 *3*. α(N)=0.0044 *7*; α(O)=0.00064 *8*; α(P)=3.57×10^{-5} *11*.
133.6 *2*	232.6+y	14 *9*	(M1+E2)	0.636 *17*	α(K)=0.528 *8*; α(L)=0.085 *12*; α(M)=0.018 *3*. α(N)=0.0041 *6*; α(O)=0.00060 *7*; α(P)=3.34×10^{-5} *10*. DCO=0.9 *2*.
138.8 *2*	229.9+z	13 *4*	(M1+E2)	0.569 *14*	α(K)=0.474 *8*; α(L)=0.075 *10*; α(M)=0.0162 *23*. α(N)=0.0036 *5*; α(O)=0.00053 *6*; α(P)=3.00×10^{-5} *9*. DCO=0.43 *6*.
146.1 *2*	236.9+z	38 *13*	(M1+E2)	0.492 *11*	α(K)=0.410 *7*; α(L)=0.064 *8*; α(M)=0.0138 *18*. α(N)=0.0031 *4*; α(O)=0.00046 *5*; α(P)=2.60×10^{-5} *8*. DCO=0.47 *2*.
157.0 *2*	178.8+z	14 *2*	(M1+E2)	0.400 *8*	α(K)=0.335 *6*; α(L)=0.052 *5*; α(M)=0.0111 *12*. α(N)=0.0025 *3*; α(O)=0.00037 *3*; α(P)=2.12×10^{-5} *7*. DCO=0.55 *5*.
162.5 *2*	292.6+x	124 *7*	(M1+E2)	0.363 *6*	α(K)=0.304 *5*; α(L)=0.046 *5*; α(M)=0.0100 *10*. α(N)=0.00222 *21*; α(O)=0.00033 *3*; α(P)=1.93×10^{-5} *6*. DCO=0.51 *3*.
178.8 *2*	178.8+z	6 *1*			
	232.6+y	12 *2*	(E2)	0.286	α(K)=0.206 *3*; α(L)=0.0626 *10*; α(M)=0.01399 *21*. α(N)=0.00305 *5*; α(O)=0.000411 *6*; α(P)=1.023×10^{-5} *15*. DCO=1.0 *2*.
179.1 *2*	415.7+z	32 *3*	(M1+E2)	0.276	α(K)=0.232 *4*; α(L)=0.035 *3*; α(M)=0.0074 *6*. α(N)=0.00166 *13*; α(O)=0.000247 *15*; α(P)=1.47×10^{-5} *5*. DCO=0.43 *7*.
198.6 *2*	491.0+x	96 *5*	(M1+E2)	0.207	α(K)=0.174 *4*; α(L)=0.0256 *15*; α(M)=0.0055 *4*. α(N)=0.00122 *8*; α(O)=0.000183 *9*; α(P)=1.11×10^{-5} *4*. DCO=0.56 *3*.

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^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

γ(^{129}Nd) (continued)

Eγ†	E(level)	Iγ	Mult.‡	α§	Comments
208.2 *2*	229.9+z	53 *9*	(E2)	0.1713	α(K)=0.1278 *19*; α(L)=0.0340 *5*; α(M)=0.00755 *11*. α(N)=0.001649 *24*; α(O)=0.000225 *4*; α(P)=6.55$\times10^{-6}$ *10*. DCO=0.95 *5*.
209.5 *2*	308.5+y	37 *7*	(E2)	0.1677	α(K)=0.1254 *18*; α(L)=0.0332 *5*; α(M)=0.00736 *11*. α(N)=0.001609 *24*; α(O)=0.000220 *4*; α(P)=6.44$\times10^{-6}$ *10*. DCO=0.96 *7*.
213.7 *2*	629.3+z	29 *2*	(M1+E2)	0.169 *3*	α(K)=0.142 *3*; α(L)=0.0207 *10*; α(M)=0.00442 *23*. α(N)=0.00099 *5*; α(O)=0.000148 *6*; α(P)=9.0$\times10^{-6}$ *3*. DCO=0.65 *3*.
219.8 *2*	710.7+x	77 *4*	(M1+E2)	0.156 *3*	α(K)=0.132 *3*; α(L)=0.0191 *8*; α(M)=0.00407 *19*. α(N)=0.00091 *4*; α(O)=0.000137 *5*; α(P)=8.4$\times10^{-6}$ *3*. DCO=0.47 *4*.
221.5 *2*	530.1+y	9 *1*			
239.3 *2*	868.4+z	22 *2*	(M1+E2)	0.1234 *23*	α(K)=0.1044 *25*; α(L)=0.0150 *5*; α(M)=0.00319 *12*. α(N)=0.000713 *25*; α(O)=0.000107 *3*; α(P)=6.64$\times10^{-6}$ *23*. DCO=0.72 *5*.
259.0 *2*	969.7+x	58 *3*	(M1+E2)	0.0995 *21*	α(K)=0.0843 *22*; α(L)=0.0120 *3*; α(M)=0.00255 *8*. α(N)=0.000570 *15*; α(O)=8.59$\times10^{-5}$ *17*; α(P)=5.36$\times10^{-6}$ *19*. DCO=0.47 *5*.
265.6 *2*	1235.1+x	47 *2*	(M1+E2)	0.0930 *20*	α(K)=0.0788 *21*; α(L)=0.0112 *3*; α(M)=0.00238 *6*. α(N)=0.000531 *13*; α(O)=8.01$\times10^{-5}$ *15*; α(P)=5.01$\times10^{-6}$ *18*. DCO=0.40 *7*.
267.5 *2*	497.3+z	8 *1*	(M1+E2)	0.0912 *20*	α(K)=0.0773 *20*; α(L)=0.01095 *25*; α(M)=0.00233 *6*. α(N)=0.000521 *13*; α(O)=7.85$\times10^{-5}$ *14*; α(P)=4.92$\times10^{-6}$ *18*. DCO=0.9 *1*.
268.5 *2*	1136.9+z	14 *1*	(M1+E2)	0.0903 *20*	α(K)=0.0765 *20*; α(L)=0.01084 *24*; α(M)=0.00230 *6*. α(N)=0.000515 *12*; α(O)=7.77$\times10^{-5}$ *14*; α(P)=4.87$\times10^{-6}$ *18*. DCO=0.57 *5*.
282.1 *2*	1419.4+z	17 *1*	(M1+E2)	0.0790 *18*	α(K)=0.0670 *18*; α(L)=0.00945 *18*; α(M)=0.00201 *5*. α(N)=0.000449 *9*; α(O)=6.78$\times10^{-5}$ *11*; α(P)=4.26$\times10^{-6}$ *16*. DCO=0.72 *9*.
286.9 *2*	2666.0+z	5.5 *7*	(M1+E2)	0.0755 *18*	α(K)=0.0641 *18*; α(L)=0.00902 *16*; α(M)=0.00192 *4*. α(N)=0.000428 *8*; α(O)=6.47$\times10^{-5}$ *10*; α(P)=4.08$\times10^{-6}$ *15*. DCO=0.5 *1*.
292.5 *2*	292.6+x	30 *2*	(E2)	0.0567	DCO=0.72 *6*. α(K)=0.0447 *7*; α(L)=0.00939 *14*; α(M)=0.00206 *3*. α(N)=0.000452 *7*; α(O)=6.35$\times10^{-5}$ *9*; α(P)=2.45$\times10^{-6}$ *4*.
297.5 *2*	530.1+y	18 *2*	(E2)	0.0538	α(K)=0.0425 *6*; α(L)=0.00883 *13*; α(M)=0.00193 *3*. α(N)=0.000425 *6*; α(O)=5.98$\times10^{-5}$ *9*; α(P)=2.33$\times10^{-6}$ *4*. DCO=1.1 *1*.
300.9 *2*	1843.9+x	32 *2*	(M1+E2)	0.0665 *17*	α(K)=0.0564 *16*; α(L)=0.00791 *13*; α(M)=0.00168 *3*. α(N)=0.000376 *6*; α(O)=5.68$\times10^{-5}$ *8*; α(P)=3.59$\times10^{-6}$ *13*. DCO=0.43 *5*.
304.7 *2*	2034.7+z	9.9 *8*	(M1+E2)	0.0643 *16*	α(K)=0.0546 *16*; α(L)=0.00764 *12*; α(M)=0.00162 *3*. α(N)=0.000363 *6*; α(O)=5.49$\times10^{-5}$ *8*; α(P)=3.47$\times10^{-6}$ *13*. DCO=0.69 *9*.
308.1 *2*	1543.0+x	42 *2*	(M1+E2)	0.0624 *16*	α(K)=0.0530 *16*; α(L)=0.00741 *11*; α(M)=0.00157 *3*. α(N)=0.000352 *6*; α(O)=5.32$\times10^{-5}$ *8*; α(P)=3.37$\times10^{-6}$ *13*. DCO=0.45 *2*.
311.0 *2*	1730.3+z	8 *1*			
312.0 *5*	942.8+y	<4			
318.4 *2*	497.3+z	13.7 *9*	(E2)	0.0435	α(K)=0.0347 *5*; α(L)=0.00694 *10*; α(M)=0.001516 *22*. α(N)=0.000334 *5*; α(O)=4.71$\times10^{-5}$ *7*; α(P)=1.92$\times10^{-6}$ *3*. DCO=1.02 *9*.
322.4 *2*	630.8+y	38 *3*	(E2)	0.0419	α(K)=0.0334 *5*; α(L)=0.00664 *10*; α(M)=0.001450 *21*. α(N)=0.000319 *5*; α(O)=4.52$\times10^{-5}$ *7*; α(P)=1.86$\times10^{-6}$ *3*. DCO=0.87 *7*.
324.5 *2*	415.7+z	28 *2*	(E2)	0.0411	α(K)=0.0328 *5*; α(L)=0.00649 *10*; α(M)=0.001417 *20*. α(N)=0.000312 *5*; α(O)=4.42$\times10^{-5}$ *7*; α(P)=1.82$\times10^{-6}$ *3*. DCO=0.97 *6*.
329.0 *2*	2516.2+x	24 *1*			

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^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

γ(^{129}Nd) (continued)

Eγ[†]	E(level)	Iγ	Mult.[‡]	α[§]	Comments
343.4 *2*	2187.3+x	29 *2*	(M1+E2)	0.0468 *13*	α(K)=0.0398 *13*; α(L)=0.00552 *8*; α(M)=0.001171 *17*. α(N)=0.000262 *4*; α(O)=3.97×10^{-5} *7*; α(P)=2.53×10^{-6} *10*. DCO=0.57 *3*.
344.8 *2*	581.7+z	5.7 *6*	(E2)	0.0341	α(K)=0.0274 *4*; α(L)=0.00526 *8*; α(M)=0.001146 *17*. α(N)=0.000253 *4*; α(O)=3.59×10^{-5} *5*; α(P)=1.539×10^{-6} *22*. DCO=0.71 *9*.
	2379.2+z	9 *1*			
351.0 *2*	3232.5+x	24 *2*			
351.6 *2*	581.7+z	75 *4*	(E2)	0.0322	α(K)=0.0259 *4*; α(L)=0.00492 *7*; α(M)=0.001071 *16*. α(N)=0.000236 *4*; α(O)=3.36×10^{-5} *5*; α(P)=1.458×10^{-6} *21*. DCO=0.94 *5*.
354.3 *2*	936.3+z	9 *1*			
360.5 *2*	491.0+x	53 *3*	(E2)	0.0298	α(K)=0.0241 *4*; α(L)=0.00452 *7*; α(M)=0.000983 *14*. α(N)=0.000217 *3*; α(O)=3.09×10^{-5} *5*; α(P)=1.361×10^{-6} *20*. DCO=1.0 *1*.
365.6 *2*	2881.7+x	23 *1*			
368.6 *2*	3978.6+x	21 *1*			
377.1 *2*	3609.8+x	22 *1*			
392.3 *2*	629.3+z	21 *1*	(E2)	0.0233	α(K)=0.0189 *3*; α(L)=0.00341 *5*; α(M)=0.000740 *11*. α(N)=0.0001634 *23*; α(O)=2.35×10^{-5} *4*; α(P)=1.080×10^{-6} *16*. DCO=1.09 *9*.
396.0 *2*	4374.5+x	13.7 *6*			
397.2 *2*	1461.8+y	5 *1*			
398.0 *2*	4772.2+x	13 *1*			
412.6 *2*	942.8+y	20 *2*	(E2)	0.0201	α(K)=0.01642 *23*; α(L)=0.00289 *4*; α(M)=0.000627 *9*. α(N)=0.0001386 *20*; α(O)=2.00×10^{-5} *3*; α(P)=9.43×10^{-7} *14*. DCO=1.0 *1*.
417.8 *2*	2666.0+z	5.0 *9*	(M1+E2)	0.0281 *9*	α(K)=0.0239 *8*; α(L)=0.00327 *7*; α(M)=0.000693 *13*. α(N)=0.000155 *3*; α(O)=2.35×10^{-5} *6*; α(P)=1.52×10^{-6} *6*. DCO=0.63 *7*.
418.1 *2*	710.7+x	75 *4*	(E2)	0.0193	α(K)=0.01582 *23*; α(L)=0.00277 *4*; α(M)=0.000601 *9*. α(N)=0.0001328 *19*; α(O)=1.91×10^{-5} *3*; α(P)=9.11×10^{-7} *13*. DCO=0.94 *7*.
433.0 *2*	5644.3+x	6.7 *7*			
434.0 *2*	1064.7+y	30 *2*	(E2)	0.01740	α(K)=0.01427 *20*; α(L)=0.00246 *4*; α(M)=0.000533 *8*. α(N)=0.0001178 *17*; α(O)=1.703×10^{-5} *24*; α(P)=8.25×10^{-7} *12*. DCO=1.01 *7*.
438.3 *2*	5210.8+x	8.8 *9*			
439.1 *2*	936.3+z	25 *2*	(E2)	0.01684	α(K)=0.01382 *20*; α(L)=0.00237 *4*; α(M)=0.000513 *8*. α(N)=0.0001135 *16*; α(O)=1.643×10^{-5} *24*; α(P)=8.00×10^{-7} *12*. DCO=0.91 *7*.
452.7 *2*	868.4+z	32 *2*	(E2)	0.01546	α(K)=0.01271 *18*; α(L)=0.00216 *3*; α(M)=0.000466 *7*. α(N)=0.0001032 *15*; α(O)=1.496×10^{-5} *21*; α(P)=7.38×10^{-7} *11*. DCO=0.88 *6*.
464.0 *5*	2067.6+y	<4			
472.7 *2*	1054.2+z	65 *4*	(E2)	0.01372	α(K)=0.01131 *16*; α(L)=0.00189 *3*; α(M)=0.000407 *6*. α(N)=9.02×10^{-5} *13*; α(O)=1.312×10^{-5} *19*; α(P)=6.60×10^{-7} *10*. DCO=1.09 *7*.
478.6 *2*	969.7+x	78 *4*	(E2)	0.01326	α(K)=0.01095 *16*; α(L)=0.00182 *3*; α(M)=0.000392 *6*. α(N)=8.69×10^{-5} *13*; α(O)=1.264×10^{-5} *18*; α(P)=6.39×10^{-7} *9*. DCO=0.91 *8*.
482.6 *5*	1419.4+z	<4	(E2)	0.01296	α(K)=0.01071 *16*; α(L)=0.00177 *3*; α(M)=0.000382 *6*. α(N)=8.47×10^{-5} *13*; α(O)=1.233×10^{-5} *18*; α(P)=6.25×10^{-7} *9*. DCO=0.9 *1*.
498.5 *2*	6142.9+x	6 *1*			
507.4 *2*	1136.9+z	30 *2*	(E2)	0.01132	α(K)=0.00938 *14*; α(L)=0.001526 *22*; α(M)=0.000328 *5*. α(N)=7.28×10^{-5} *11*; α(O)=1.063×10^{-5} *15*; α(P)=5.50×10^{-7} *8*. DCO=0.92 *9*.
518.8 *2*	1461.8+y	25 *2*	(E2)	0.01066	α(K)=0.00885 *13*; α(L)=0.001429 *20*; α(M)=0.000307 *5*. α(N)=6.81×10^{-5} *10*; α(O)=9.96×10^{-6} *14*; α(P)=5.20×10^{-7} *8*. DCO=1.0 *3*.

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^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

γ(^{129}Nd) (continued)

Eγ†	E(level)	Iγ	Mult.‡	α§	Comments
524.3 *2*	1235.1+x	100	(E2)	0.01037	α(K)=0.00861 *12*; α(L)=0.001385 *20*; α(M)=0.000298 *5*. α(N)=6.61×10^{-5} *10*; α(O)=9.66×10^{-6} *14*; α(P)=5.07×10^{-7} *8*. DCO=0.99 *9*.
535.4 *2*	1471.8+z	25 *2*	(E2)	0.00981	α(K)=0.00816 *12*; α(L)=0.001303 *19*; α(M)=0.000280 *4*. α(N)=6.21×10^{-5} *9*; α(O)=9.10×10^{-6} *13*; α(P)=4.81×10^{-7} *7*. DCO=0.9 *1*.
539.1 *2*	1603.7+y	28 *2*	(E2)	0.00964	α(K)=0.00801 *12*; α(L)=0.001277 *18*; α(M)=0.000274 *4*. α(N)=6.09×10^{-5} *9*; α(O)=8.92×10^{-6} *13*; α(P)=4.73×10^{-7} *7*. DCO=1.12 *4*.
551.3 *2*	1419.4+z	36 *3*	(E2)	0.00909	α(K)=0.00757 *11*; α(L)=0.001197 *17*; α(M)=0.000257 *4*. α(N)=5.70×10^{-5} *8*; α(O)=8.37×10^{-6} *12*; α(P)=4.47×10^{-7} *7*. DCO=1.00 *8*.
566.6 *2*	1620.6+z	57 *3*	(E2)	0.00847	α(K)=0.00706 *10*; α(L)=0.001107 *16*; α(M)=0.000238 *4*. α(N)=5.27×10^{-5} *8*; α(O)=7.75×10^{-6} *11*; α(P)=4.18×10^{-7} *6*. DCO=0.97 *6*.
573.2 *2*	1543.0+x	76 *4*	(E2)	0.00822	α(K)=0.00686 *10*; α(L)=0.001072 *15*; α(M)=0.000230 *4*. α(N)=5.10×10^{-5} *8*; α(O)=7.50×10^{-6} *11*; α(P)=4.06×10^{-7} *6*. DCO=0.96 *7*.
589.2 *2*	2666.0+z	9 *1*	Q		DCO=0.9 *1*.
593.4 *2*	1730.3+z	30 *2*	(E2)	0.00752	α(K)=0.00629 *9*; α(L)=0.000972 *14*; α(M)=0.000208 *3*. α(N)=4.63×10^{-5} *7*; α(O)=6.82×10^{-6} *10*; α(P)=3.73×10^{-7} *6*. DCO=1.1 *1*.
604.7 *2*	2076.6+z	23 *2*	Q		DCO=1.1 *2*.
605.8 *2*	2067.6+y	22 *2*			
608.8 *2*	1843.9+x	91 *5*	Q		DCO=0.98 *5*.
615.1 *2*	2034.7+z	34 *3*	Q		DCO=1.15 *9*.
626.6 *2*	3292.6+z	36 *3*	Q		DCO=0.88 *5*.
628.0 *2*	2248.4+z	54 *3*	Q		DCO=0.95 *6*.
631.1 *2*	2666.0+z	38 *3*	Q		DCO=1.01 *6*.
633.1 *2*	2236.8+y	26 *2*	Q		DCO=0.93 *7*.
644.2 *2*	2187.3+x	75 *4*	Q		DCO=1.14 *8*.
648.7 *2*	2379.2+z	32 *2*	Q		DCO=1.0 *1*.
658.3 *2*	2734.9+z	16 *2*			
659.1 *2*	3712.9+z	14 *2*			
661.3 *2*	2909.7+z	48 *3*	Q		DCO=1.10 *5*.
667.9 *2*	3960.5+z	25 *2*	Q		DCO=0.87 *3*.
671.7 *2*	2739.3+y	21 *3*			
672.3 *2*	2516.2+x	84 *5*	Q		DCO=1.04 *7*.
674.6 *2*	3053.8+z	22 *2*			
683.7 *5*	3418.6+z	<4			
684.7 *2*	3594.4+z	33 *2*	Q		DCO=0.93 *5*.
694.4 *2*	2881.7+x	71 *4*	Q		DCO=0.99 *4*.
700.5 *2*	4413.4+z	10 *1*			
712.3 *2*	2949.2+y	25 *2*	Q		DCO=0.94 *7*.
716.2 *2*	3232.5+x	72 *4*	Q		DCO=0.94 *4*.
720.0 *2*	3459.3+y	19 *2*			
726.8 *2*	4321.2+z	32 *2*	Q		DCO=1.05 *5*.
728.1 *2*	3609.8+x	59 *4*	Q		DCO=1.04 *4*.
743.4 *2*	4703.9+z	20 *2*	Q		DCO=0.89 *8*.
746.3 *2*	3978.6+x	51 *3*	Q		DCO=0.92 *6*.
755.1 *2*	4214.4+y	16 *1*			
764.6 *2*	4374.5+x	38 *2*	Q		DCO=1.1 *1*.
779.4 *2*	5192.8+z	7 *1*			
781.2 *2*	3730.4+y	17 *1*	Q		DCO=1.09 *7*.
793.5 *2*	4772.2+x	38 *2*	Q		DCO=0.91 *7*.
794.6 *2*	5115.8+z	21 *1*	Q		DCO=1.10 *6*.
818.0 *2*	5032.4+y	10 *1*			
818.3 *2*	5522.2+z	20 *2*	Q		DCO=1.03 *5*.
836.2 *2*	5210.8+x	33 *2*	Q		DCO=0.9 *1*.
845.3 *2*	4575.7+y	12 *1*	Q		DCO=1.05 *6*.
857.8 *2*	5973.6+z	15 *1*	Q		DCO=1.05 *6*.
872.5 *2*	5644.3+x	24 *2*	Q		DCO=0.92 *3*.
886.4 *2*	6079.2+z	4 *1*			

Continued on next page (footnotes at end of table)

^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

γ(^{129}Nd) (continued)

Eγ[†]	E(level)	Iγ	Mult.[‡]	Comments
893.2 *2*	6415.4+z	15 *1*		
902.9 *2*	5935.3+y	9 *1*		
911.8 *2*	5487.5+y	9 *1*	Q	DCO=1.06 *5*.
927.6 *2*	6901.2+z	9.9 *4*		
932.1 *2*	6142.9+x	22 *2*		
962.1 *2*	6606.4+x	19 *2*	Q	DCO=0.91 *6*.
980.2 *2*	7395.6+z	11 *1*		
984.6 *2*	6472.1+y	8 *1*	Q	DCO=0.99 *8*.
991.9 *2*	6927.2+y	8 *1*		
999 *1*	7078.2+z	<4		
1015.2 *2*	7916.4+z	8.7 *9*		
1033.1 *2*	7176.0+x	18 *2*		
1051.9 *2*	7658.3+x	13 *1*		
1056.0 *2*	7528.1+y	6 *1*	Q	DCO=1.1 *1*.
1076.1 *2*	8471.7+z	7 *1*		
1083.7 *2*	8010.9+y	7 *1*		
1100 *1*	8178.2+z	<4		
1107.6 *2*	9024.0+z	7.1 *8*		
1108 *1*	8636.1+y	<4		
1131.3 *2*	8307.3+x	12 *1*		
1138.4 *2*	8796.7+x	12 *1*		
1159 *1*	9337.2+z	<4		
1160 *1*	9796.1+y	<4		
1166.0 *2*	9176.9+y	5 *1*		
1171.8 *2*	9643.5+z	4 *1*		
1198.2 *2*	10222.2+z	4.9 *7*		
1213 *1*	11009.1+y	<4		
1222.7 *2*	10019.4+x	9 *1*		
1228.3 *2*	9535.6+x	8 *1*		
1239.1 *2*	10416.0+y	4 *1*		
1256 *1*	12265.1+y	<4		
1259 *1*	10902.5+z	<4		
1288.9 *2*	11511.1+z	4.5 *2*		
1305 *1*	11721.0+y	<4		
1307.0 *2*	11326.4+x	7 *1*		
1319 *1*	12221.5+z	<4		
1322.0 *2*	10857.6+x	6 *1*		
1354[#] *1*	13575.5+z	<4		
1369 *1*	13090.1+y	<4		
1381 *1*	12892.1+z	<4		Eγ: from figure 1 of 2002Ze01, and also from an e–mail reply on Jan 16, 2002 from D.J. Hartley. Eγ=13801 in table I of 2002Ze01 is a misprint.
1394.0 *2*	12720.4+x	5 *1*		
1405.9 *2*	12263.5+x	5 *1*		
1438 *1*	14528.1+y	<4		
1473 *1*	14365.1+z	<4		
1482 *1*	14202.4+x	<4		
1483 *1*	13746.5+x	<4		
1563 *1*	15765.4+x	<4		

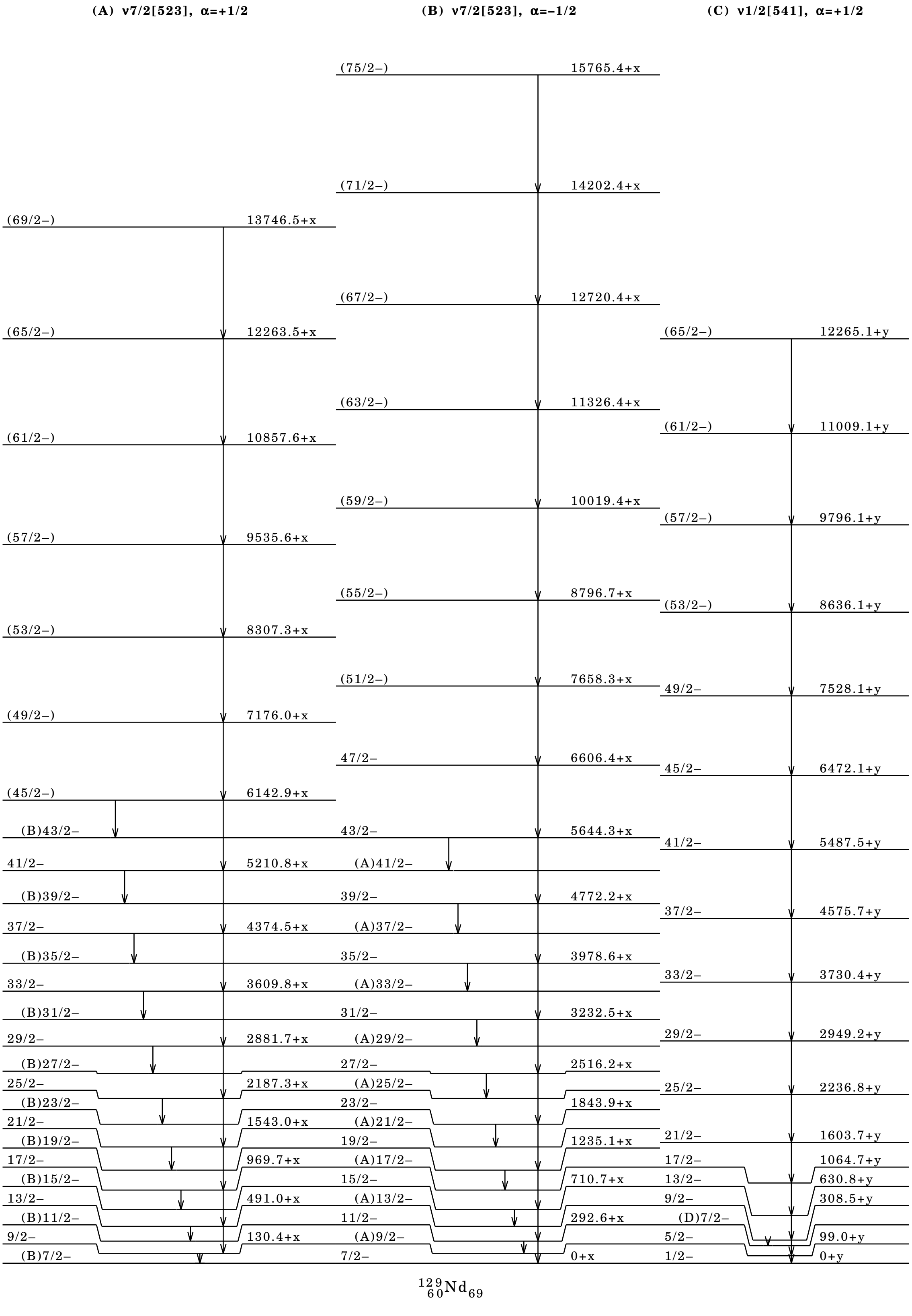
[†] Some of the Eγ values given in figure 1 differ by 1 keV or more, but the values given in Table I are correct (as per e–mail reply on Jan 22, 2002 from one of the authors D.J. Hartley). Based on a general comment by 2002Ze01, uncertainty of 0.2 keV is assigned for most γ rays, 0.5 keV for weak transitions, and 1 keV when Eγ is quoted to nearest keV.

[‡] From γγ(θ)(DCO) data. The mult=Q indicates ΔJ=2, quadrupole (most likely E2) and D+Q indicates ΔJ=1, dipole+quadrupole (most likely M1+E2). Mult=(E2) or (M1+E2) assigned based on RUL for E2 and M2 with the assumption of ≈10 ns resolving time in γγ coincidence experiments.

[§] δ(E2/M1)=0.30 assumed for M1+E2 transitions.

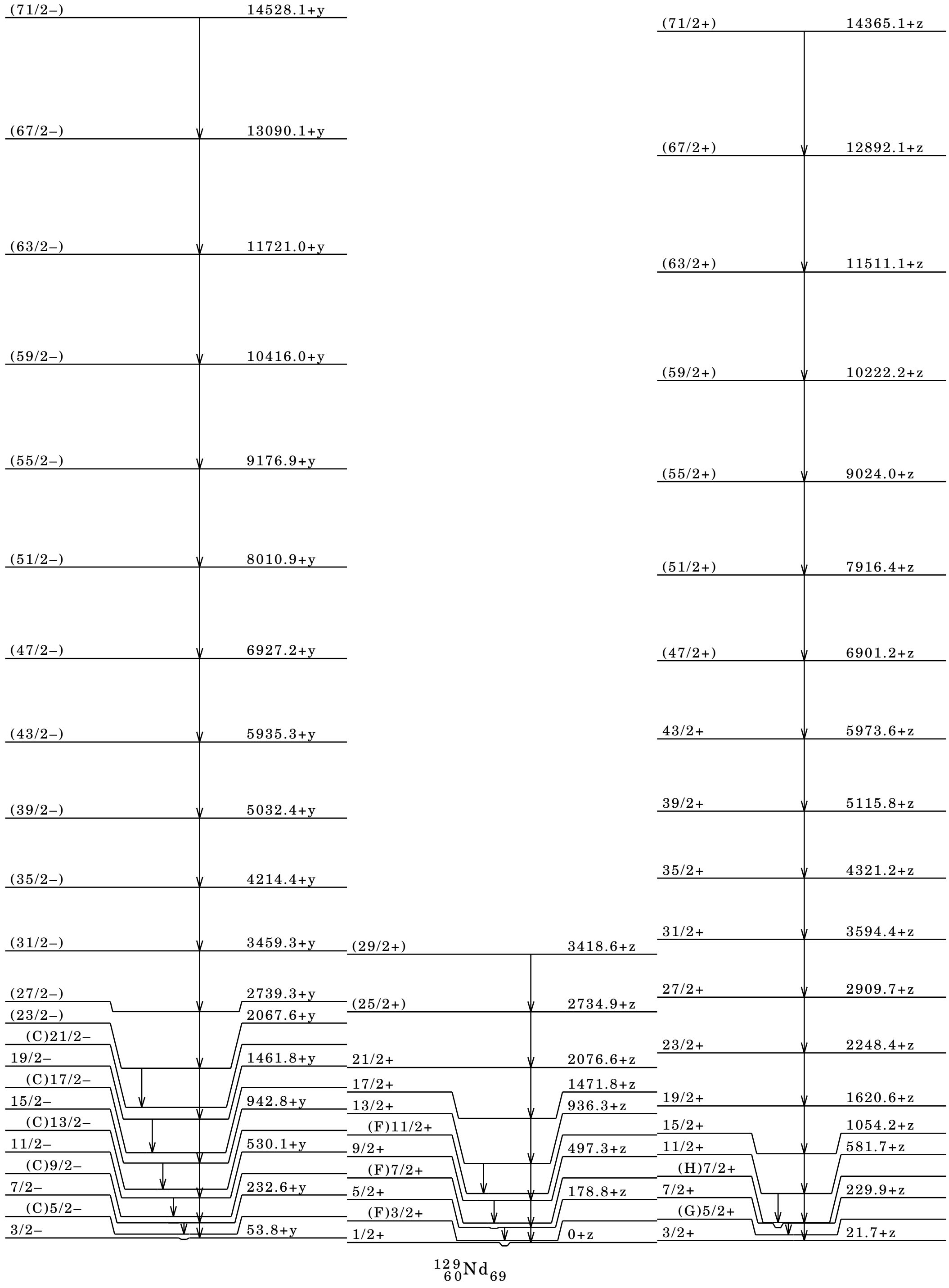
[#] Placement of transition in the level scheme is uncertain.

^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

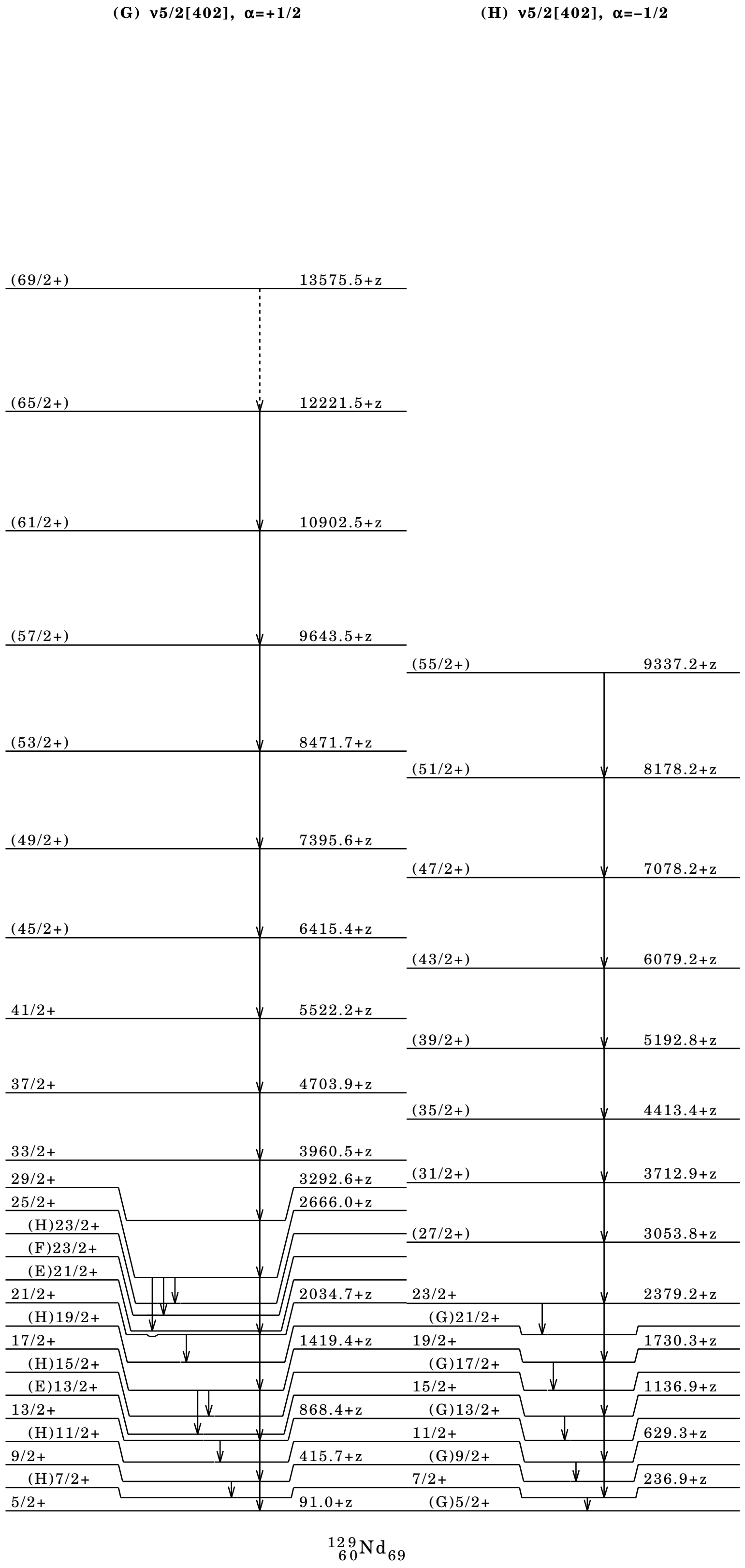


^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

(D) ν1/2[541], α=–1/2 **(E) ν1/2[411], α=+1/2** **(F) ν1/2[411], α=–1/2**

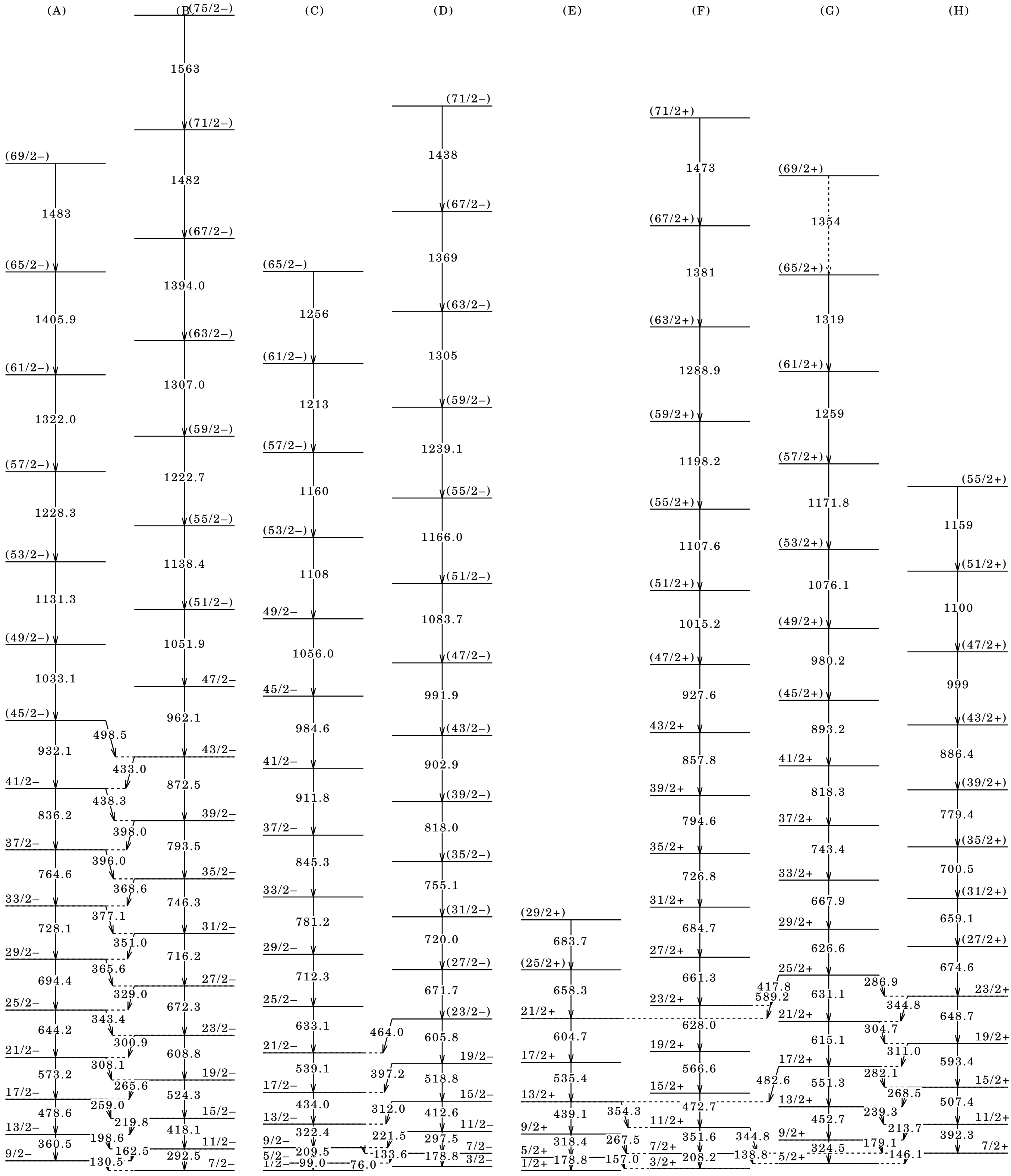


^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)



^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

Bands for ^{129}Nd

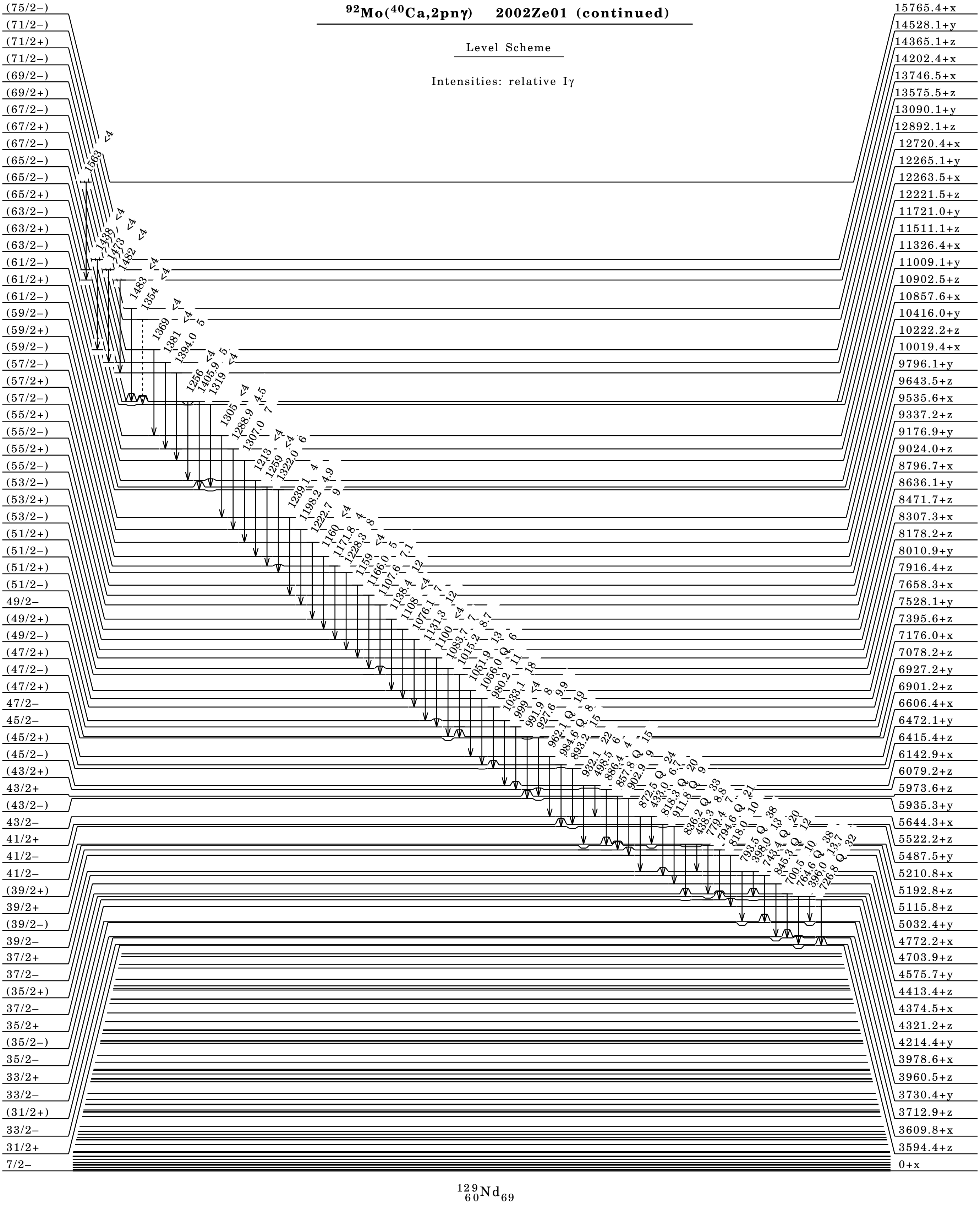


$^{129}_{60}$Nd$_{69}$

^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

Level Scheme

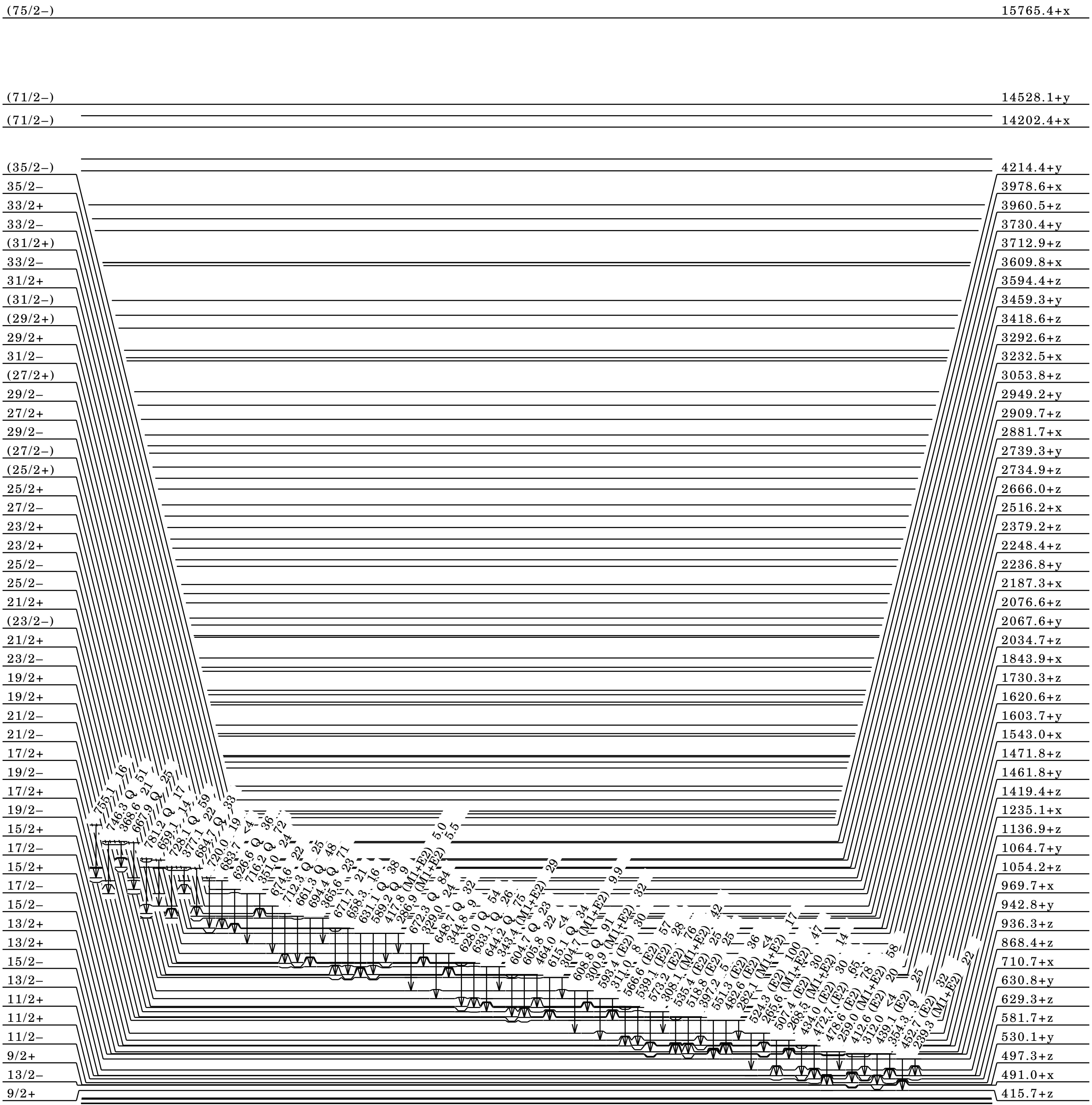
Intensities: relative Iγ



^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

Level Scheme (continued)

Intensities: relative Iγ



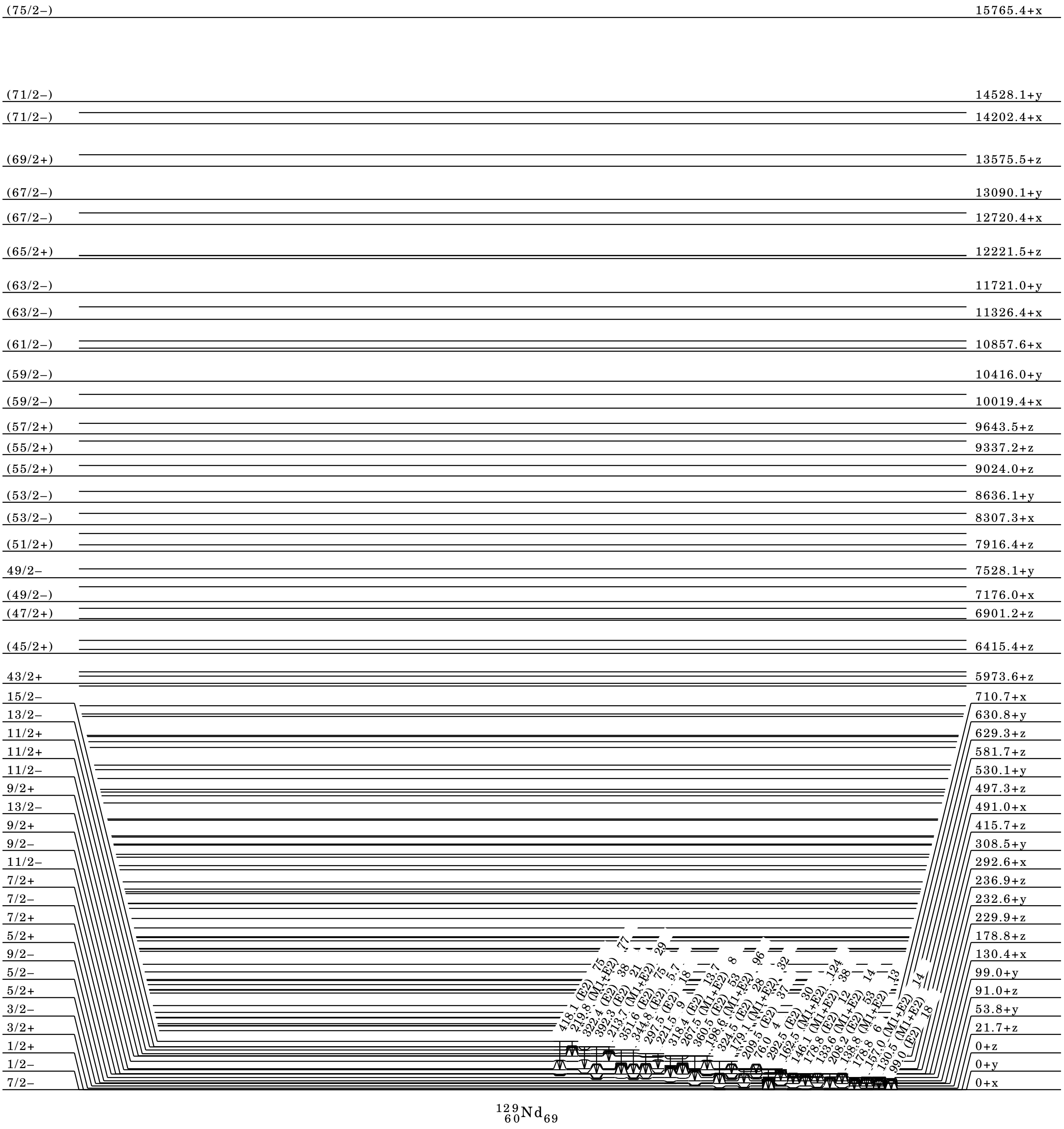
$^{129}_{60}$Nd$_{69}$

From NNDC(BNL)
program ENSDAT

^{92}Mo(^{40}Ca,2pnγ) 2002Ze01 (continued)

Level Scheme (continued)

Intensities: relative Iγ



Adopted Levels

Q(β^-)=–10740 *SY*; S(n)=13170 *SY*; S(p)=–140 *SY*; Q(α)=2730 *SY* 2012Wa38.

Estimated (2012Wa38) uncertainties: 590 for Q(β^-), 420 for S(n) and Q(α), 360 for S(p).

Q(εp)=6160 *300*, S(2n)=24240 *500*, S(2p)=2920 *360* (syst,2012Wa38).

2000So11: identification of ^{129}Pm isotope in ^{90}Zr(^{197}Au,X) reaction at 30 MeV/nucleon; MSU A1200 fragment separator used.

2004Xu05: ^{129}Pm isotope was obtained by bombarding a ^{92}Mo target with a ^{40}Ca^{12+} beam at E=232 MeV. The beam energy at target center could vary from 164–190 MeV. Measured Eγ, $\gamma\gamma$(t), (charged particle)γ coin, xγ coin with two coaxial HpGe detectors for γ rays and a HPGe planar detector for x rays.

2008StZX: ^{58}Ni(^{76}Kr,X), E=4.34 MeV/nucleon; measured Eγ, Iγ, $\gamma\gamma$–coin using EXOGAM array and SPIRAL facility at GANIL. Four γ rays were assigned to ^{129}Pm in the energy range of 250–680 keV, but no other details are available.

^{129}Pm Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	(5/2–)	2.4 s *9*	%ε+%β^+≈100; %εp=? ; %p=? No delayed–proton activity has been reported. $T_{1/2}$: from timing of 99γ assigned to the decay of ^{129}Pm to ^{129}Nd (2004Xu05). Jπ: possible π5/2[532] orbital (2004Xu05). 5/2– proposed in theoretical calculations (1997Mo25).

Adopted Levels

S(n)=11480 *SY*; S(p)=1640 *SY*; Q(α)=3030 *SY* 2012Wa38.
Estimated (2012Wa38) uncertainties: 710 for S(n), 590 for S(p), 640 for Q(α) (2012Wa38).
S(2p)=1180 *590*, Q(εp)=10880 *540* (syst,2012Wa38). S(2n)=25290 (1997Mo25,theory).
1999Xu05 (also 2005Xu04): ^{129}Sm produced in ^{96}Ru(^{36}Ar,3n) reaction at E(^{36}Ar)=165 MeV at NLHIAL, China. Helium–jet transport system. Measured pγ coin, half–life using silicon and HPGe detectors. Statistical model calculations.

^{129}Sm Levels

Cross Reference (XREF) Flags

A p Decay (0.90 ms)

E(level)	Jπ	XREF	$T_{1/2}$	Comments
0.0	(1/2+,3/2+)	A	0.55 s *10*	%ε+%β$^+$=100; %εp>0. E(level): it is assumed that the observed events corresponds to the g.s. Jπ: from fitting of experimental delayed–proton spectrum with statistical–model calculations (1999Xu05). 1/2+ proposed in theoretical calculations (1997Mo25). $T_{1/2}$: from timing of 134γ in ^{128}Nd (1999Xu05,2005Xu04). Average proton energy of a wide peak=3.7 MeV. Measured production cross section ≈ 70 nb.

p Decay (0.90 ms) 2004Da04

Parent 130Eu: E=0; Jπ=(1+); $T_{1/2}$=0.90 ms *+49–29*; Q(g.s.)=1028 *15*; %p decay≈100.
130Eu–E: It is assumed that the observed activity corresponds to the g.s.
130Eu–$T_{1/2}$: From timing of proton spectra (2004Da04).
130Eu–J: Proposed configuration=π3/2[411]⊗ν1/2[411], Kπ=1+,2+ with preference for Kπ=1+ from Gallagher–Moszkowski rules.
130Eu–Q(g.s.): From E(p)=1020 *15* (2012Wa38).
130Eu–%p decay: %p≈100 from half–life measured by 2004Da04 and calculated β decay half–life of 49 ms (1997Mo25).
2004Da04 (also 2005Se21,2002Ma61): ^{130}Eu produced in ^{58}Ni(^{78}Kr,p5n) reaction at E(^{78}Kr)=425 MeV, ATLAS accelerator facility. Recoil fragments were analyzed using Argonne Fragment Mass Analyzer (FMA) and implanted into a double–sided silicon strip (DSSD) detector. Other detectors used were a large silicon detector to veto positron and β delayed proton events and an array of four silicon detectors to veto events for particles emerging from the front surface of the DSSD detector. Measured proton spectra, isotopic half–life and production cross section. Structure calculations were used to deduce deformation and probable configuration.
1983La27: search for ^{130}Eu proved negative in ^{92}Mo(^{58}Ni,X) reaction.

^{129}Sm Levels

E(level)	Jπ	$T_{1/2}$	Comments
0.0	(1/2+,3/2+)	0.55 ms *10*	Jπ,$T_{1/2}$: from Adopted Levels.

Protons

E(p)	E(to)	I(p)[†]	Comments
1020 *15*	0.0	100	E(p): measured by 2004Da04.

[†] Absolute intensity per 100 decays.

KEYNUMBERS

1934Jo01
1934Ko02
1935Am01
1939Ab02
1939Se05
1940Se01
1948Wa13
1949Li09
1949Pa19
1950Fi11
1950Fi16
1950Ko09
1950Th02
1950Th08
1951Co34
1951Ka16
1951Wa12
1953Li16
1953Pa25
1954De17
1954Th18
1955Da37
1955Ma54
1955Ni21
1955St94
1956Gr10
1956Ni16
1957Ru65
1958Al98
1958Ni27
1959He45
1960Al03
1960Jh02
1961Ar05
1962De18
1962Dr01
1962Ge09
1962Ha16
1962Uh01
1963Br18
1963Fr13
1963Go17
1963Ha23
1963La03
1963Ma20
1963Pr02
1963Ra11
1963Ya05
1964De10
1964Jh02
1964Jo12
1964Ka09
1964Pe06
1964Ra04
1965An05
1965Bo12
1965Br34
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1965Pa04
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1967Ha27
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1970Bo22
1970Bu01
1970Ca23
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1970Re01
1970SaZI
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1974Gr29
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1974Ro32
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2006Si40
2006Vo04
2007ChZX
2007Cu03
2007Ki06
2008Ki07
2008Lo07
2008Sa36
2008StZX
2009Ar04
2009Li67
2009Pa40
2009Re03
2009Si08
2009Zh20
2010Bh03
2010Wa01
2010Xu12
2011Pi05
2011StZZ
2012Au07
2012Ha25
2012Ka36
2012Wa38
2013An02
2013De02
2013In03
2013Ka04
2013Ka08
2013Ka27
2013KaZZ
2013StZZ
2013Yo02
2014AsAA
2014StZZ