EUR 5117 e

COMMISSION OF THE EUROPEAN COMMUNITIES

GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS

by

G. GUZZI and J. CUYPERS

1974

Joint Nuclear Research Centre
Ispra Establishment - Italy

Chemistry Division

LEGAL NOTICE

This report is on sale at the addresses listed on cover page 4

at the price of B.Fr. 100.—

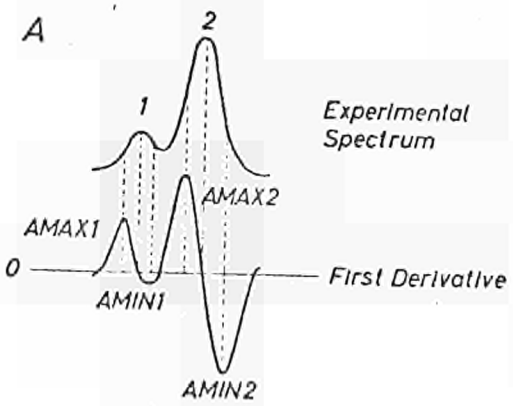
Commission of the
European Communities
D.G. XIII - C.I.D.
29, rue Aldringen
L u x e m b o u r g

April 1974

CORRIGENDUM

EUR 5117e GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS

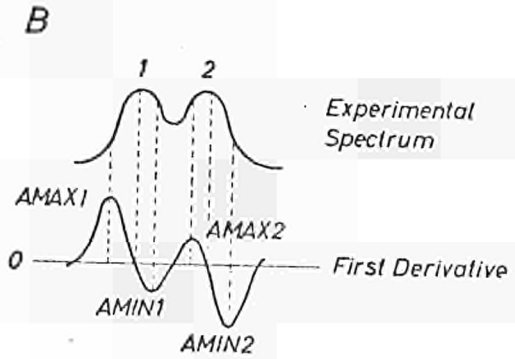
Please substitude the enclosed page for page 17 of the original publication



VALIDITY TESTS

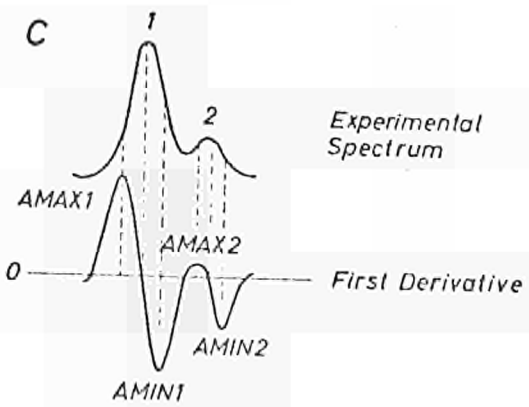
(1) FIRST PEAK OF A DOUBLET
- AMAX1 / AMIN1 > 1.5
- AMAX2 / AMIN2 ≤ 1.5

(2) NORMAL PEAK



(1) FIRST PEAK OF A DOUBLET
- AMAX1 / AMIN1 > 1.5
- AMIN2 / AMAX2 > 1.5

(2) SECOND PEAK OF A DOUBLET



(1) NORMAL PEAK
- AMIN1 / AMAX1 < 1.5
- AMAX2 / AMIN2 ≤ 1.5

(2) SECOND PEAK OF A DOUBLET

EUR 5117 e

GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS by G. GUZZI and J. CUYPERS

Commission of the European Communities
Joint Nuclear Research Centre - Ispra Establishment (Italy)
Chemistry Division
Luxembourg, April 1974 - 74 Pages - 4 Figures - B.Fr. 100.—

A computer program set up for routine batchwise processing of spectrometric data, is presented.

The program performs the quantitative analysis of gamma-ray spectra obtained by Ge(Li) detectors, using special "oriented libraries", which are prepared for each particular problem. The computer routines which detect and evaluate peak areas perform the following operations:

— local smoothing of the spectrum;
— first derivative of the smoothed spectrum;
— peak location according to the change of sign of the first derivative
— computation of the net area of each peak found.

—

EUR 5117 e

GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS by G. GUZZI and J. CUYPERS

Commission of the European Communities
Joint Nuclear Research Centre - Ispra Establishment (Italy)
Chemistry Division
Luxembourg, April 1974 - 74 Pages - 4 Figures - B.Fr. 100.—

A computer program set up for routine batchwise processing of spectrometric data, is presented.

The program performs the quantitative analysis of gamma-ray spectra obtained by Ge(Li) detectors, using special "oriented libraries," which are prepared for each particular problem. The computer routines which detect and evaluate peak areas perform the following operations:

— local smoothing of the spectrum;
— first derivative of the smoothed spectrum;
— peak location according to the change of sign of the first derivative
— computation of the net area of each peak found.

—

EUR 5117 e

GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS by G. GUZZI and J. CUYPERS

Commission of the European Communities
Joint Nuclear Research Centre - Ispra Establishment (Italy)
Chemistry Division
Luxembourg, April 1974 - 74 Pages - 4 Figures - B.Fr. 100.—

A computer program set up for routine batchwise processing of spectrometric data, is presented.

The program performs the quantitative analysis of gamma-ray spectra obtained by Ge(Li) detectors, using special "oriented libraries," which are prepared for each particular problem. The computer routines which detect and evaluate peak areas perform the following operations:

— local smoothing of the spectrum;
— first derivative of the smoothed spectrum;
— peak location according to the change of sign of the first derivative
— computation of the net area of each peak found.

The possibility of detecting and computing also double peaks is one of the features of the program.

Results in PPM are obtained in the form of digital lists. On request a drawing of the spectrum can also be produced, showing the way in which the spectrum has been processed.

The possibility of detecting and computing also double peaks is one of the features of the program.

Results in PPM are obtained in the form of digital lists. On request a drawing of the spectrum can also be produced, showing the way in which the spectrum has been processed.

The possibility of detecting and computing also double peaks is one of the features of the program.

Results in PPM are obtained in the form of digital lists. On request a drawing of the spectrum can also be produced, showing the way in which the spectrum has been processed.

EUR 5117 e

COMMISSION OF THE EUROPEAN COMMUNITIES

GRETEL, A COMPUTER PROGRAM FOR GAMMA RAY SPECTROMETRY WITH Ge (Li) DETECTORS

by

G. GUZZI and J. CUYPERS

1974

Joint Nuclear Research Centre
Ispra Establishment - Italy

Chemistry Division

ABSTRACT

A computer program set up for routine batchwise processing of spectrometric data, is presented.

The program performs the quantitative analysis of gamma-ray spectra obtained by Ge(Li) detectors, using special "oriented libraries", which are prepared for each particular problem. The computer routines which detect and evaluate peak areas perform the following operations:
— local smoothing of the spectrum;
— first derivative of the smoothed spectrum;
— peak location according to the change of sign of the first derivative
— computation of the net area of each peak found.

The possibility of detecting and computing also double peaks is one of the features of the program.

Results in PPM are obtained in the form of digital lists. On request a drawing of the spectrum can also be produced, showing the way in which the spectrum has been processed.

KEYWORDS

PROGRAMMING
GAMMA SPECTROMETERS
Li-DRIFTED GE DETECTORS
GAMMA SPECTRA
QUANTITATIVE CHEMICAL ANALYSIS

The computer program for the processing of gamma ray spectra obtained by Ge(Li) detectors, which was set up in this laboratory in 1966[1] has been completely revised and rewritten to follow the continuous development of the analytical instrumentation.

This new program, called GRETEL, is in use now for some years, for the routine batchwise processing of spectrometric data. It also operates, with minor modifications, within the framework of a teleprocessing system shared among several laboratories[2].

The counting equipment consists of a 4096 channel analyser for high resolution spectrometry with Ge(Li) detectors, equipped with sample changers to allow the automated acquisition of data from successive specimens. The raw spectrometric data are collected on punched tapes which are then processed at the Scientific Information Processing Center, by an IBM 370/165 computer.

The scheme of the GRETEL program is the following: an energy calibration source is counted as the first spectrum of the series, then the unknown neutron activated samples are successively counted.

The analysis is carried out by the single comparator method[3]. Irradiation and decay times, weight of samples and neutron flux are manually assigned by the operator by means of punched cards.

Peaks in the gamma spectrum are searched, identified and measured by following the instructions of special "oriented" libraries which are prepared for each particular problem.

These libraries are prepared by the analyst himself who takes into account the various interferences which can be expected for that particular

kind of specimen, and introduces all the control features that he might estimate necessary to obtain the highest reliability.

Table I shows a typical library for the determination of trace elements giving rise to long-lived radioisotopes. The necessary data for the preparation of libraries are taken from a tabulation of gamma emitting radioelements formed by (n,γ) reaction[4].

The computer routines which detect and evaluate peak areas in the gamma spectra, perform the following operations:

a) First, on the experimental spectrum a local smoothing using 5, 7 or 9 points, is performed[5]. Given the content of the nth channel (c_n), the corresponding smoothed value (s_n) is represented by:

$$s_n = f_o c_n + f_1(c_{n-1} + c_{n+1}) + f_2(c_{n-2} + c_{n+2}) + f_3(c_{n-3} + c_{n+3}) + f_4(c_{n-4} + c_{n+4})$$

$$s_n = s_n / F$$

where f_o, f_1, f_2, f_3, f_4 are the smoothing coefficients and F is the normalizing factor. These constants are calculated according to the number of points chosen for the operation.

b) The smoothed spectrum is then derived following the formula

$$d_n = \frac{s_{n-1} + s_{n+1}}{2}$$

where d_n is the derived value of the content of the nth channel.

The shape of the derived spectrum is analyzed in each interval calculated from the FWHM, given in the "oriented library" and the

TABLE 1 - EXAMPLE OF "ORIENTED LIBRARY" FOR LONG LIVED RADIOISOTOPES

Radioisotope	Energy (keV)	Resolution (keV) FWHM	Decay Constant (minutes)	Specific Activity[1] (cpm)	Molecular Weight
Ag 110 M	657.8	3.0	1.85×10^{-6}	6.911×10^{8}	107.87
Ca 47	489.5	2.9	1.01×10^{-4}	5.761×10^{13}	40.08
Ca 47	807.4	3.1	1.01×10^{-4}	9.274×10^{13}	40.08
Ca 47	1296.4	4.2	1.01×10^{-4}	1.13×10^{14}	40.08
Co 60	1173.2	4.1	2.497×10^{-7}	2.612×10^{7}	58.9
Co 60	1332.4	4.2	2.497×10^{-7}	2.893×10^{7}	58.9
Cs 134	604.7	3.0	5.98×10^{-7}	4.1×10^{7}	132.91
Cs 134	795.0	3.1	5.98×10^{-7}	5.683×10^{7}	132.91
Hg 203	279.1	2.5	1.035×10^{-5}	1.018×10^{9}	200.61

(1) Calculated from irradiation of one μg of element in a thermal flux of 10^{13} $n/cm^2 \cdot sec$ at saturation and at decay time equal zero.

search of possible photopeaks is performed.

c) A first selection of possible peaks is done by considering the change of sign of the derivative from a positive value to a negative value. The zero point can be considered as the location of a peak. Two conditions must be satisfied at the same time:

1. the absolute values of the maximum and the minimum of the derivative must be larger than a confidence band suitably chosen. This avoids that statistical fluctuations are kept as analytical peaks.

2. the ratio between these two values must be less or equal to 1.5. This avoids unsymmetrical peaks being considered.

d) In the cases in which the above described two conditions are not fulfilled, a further examination of the shape of the derivative is performed to ascertain if a double peak is present in the considered interval.

e) For two successive peaks to be considered as a doublet, two conditions should be satisfied:
- the preceeding point 1,
- the distance between the summit of each peak should be less than 2.5 x FWHM.

According to tests performed on the ratios between the maxima (AMAX) and the minima (AMIN) of the derivatives, three different cases are possible. They are shown in Figure 1.

A. AMAX 1/AMIN 1 $>$ 1.5 AMAX 2/AMIN 2 $\leq$ 1.5
Peak 1 is considered as belonging to a doublet, peak 2 is treated as a single peak.

B. AMAX 1/AMIN 1 $>$ 1.5 AMIN 2/AMAX 2 $>$ 1.5
Both peaks 1 and 2 are treated as a doublet.

C. AMIN 1/AMAX 1 $>$ 1.5 AMAX 2/AMIN 2 $\leq$ 1.5

Peak 1 is considered as a single peak, peak 2 is treated as being a doublet.

f) The area S of a single photopeak having as limits the channels n-k and n+k′ is determined by the relationship:

$$S = \sum_{n=n-k}^{n+k'} c_n - \frac{c_{n-k} + c_{n+k'}}{2}(k + k' + 1)$$

and its standard deviation σ_s, by:

$$\sigma_s = \sqrt{\sum_{n=n-k}^{n+k'} c_n + \frac{c_{n-k} + c_{n+k'}}{4} \cdot n^2}$$

g) The area of a double peak is approximated by considering the left half of the first peak and the right half of the second peak as being symmetrical with respect to the remaining portions of each peak. Therefore, these halves are doubled to obtain the total area. The background is subtracted for each peak as shown in Fig. 2. Standard deviation is approximated by doubling the standard deviation calculated for each half of each peak of the doublet, by using the preceeding formula.
All the preceding operations are performed by the subroutines SMOOS, DERIV, PKF, SURF and SURF2.

From the computed areas, the concentration of stable element and the associate error are calculated by the subroutine ANALYS, by correcting for decay, and using auxiliary input data.

In the case in which no peaks are found, in the interval indicated by the "oriented library", the minimum counting rates that could have had a photopeak to be detected over the existing background, are calculated by the subroutine SENSIT[6].

Results in parts per million or sensitivity limits for the elements not detected, are obtained in the form of digital lists. Analog outputs can be ob-

tained on request on the CALCOMP unit[7]. These drawings allow an immediate visual examination of how the gamma spectrum has been processed: peaks found, energy assigned, interpolation of data for background subtraction, etc. An example is given in Fig. 3.

Acknowledgement

We would like to thank Professor F. Girardi for his continuous participation during the evolution of this work; Messrs. G. Di Cola and A. M. Stein for their suggestions and criticism.

References

(1) G. GUZZI, J. PAULY, F. GIRARDI, B. DORPEMA; Report EUR 3469e (1967)

(2) G. BERTOZZI, F. GIRARDI, G. GUZZI, G. DI COLA; Proc. Intern. Conf. Modern Trends in Activation Analysis, Saclay, October 1972

(3) F. GIRARDI, G. GUZZI, J. PAULY; Anal. Chem. 37, 1085 (1965)

(4) I. M. H. PAGDEN, G. J. PEARSON, J. M. BEWERS; J. Radioanal. Chem., 8 (1971), 127 and 373 ibid. 9 (1971), 101

(5) A. SAVITZKY, M. J. E. GOLAY; Anal. Chem., 36, 8 (1964) 1627

(6) J. PAULY, G. GUZZI, F. GIRARDI, A. BORELLA; Nucl. Instr. and Methods, 42, (1966) 15

(7) P. MOINIL, J. PIRE; Report EUR 2280f (1965)

APPENDIX 1 - Instructions for the Use of the Computing Program GRETEL

1. IDENTIFICATION

a) GRETEL, a computer program for quantitative analysis of trace elements from gamma spectra of neutron activated materials, obtained with Ge(Li) detectors.

b) G. GUZZI - August, 1973

c) EURATOM J.C.R., Ispra - Applied Nuclear Chemistry Laboratory

2. INSTRUMENTS, COMPUTERS AND CODE

a) Ge(Li) detectors. Up to 4096 channels spectrometers with the output of data on punched paper tapes.

b) IBM 370/165

c) Fortran IV level G

3. USE AND COMPOSITION OF THE PROGRAM

A) USE OF THE PROGRAM

INPUT consists of:

i) IME: one card for the computation of decay times (in minutes) of the radioisotopes after irradiation in the reactor.
FORMAT (12I6)

ii) LIBST: one card indicating the number of peaks of the calibration library.
FORMAT (I6)

iii) One card for each gamma peak of the calibration library. This card contains:

EL1 : Symbol of the radioelement

EN1 : Energy in keV

ICAN : Channel in which the calibration peak falls

INT : Interval for the search of the calibration peak (in channels)

DECAY : Decay constant of the radioisotope to which the peak belongs ($\lambda = \frac{0.693}{T\ 1/2}$ in minutes)

VALA : Specific activity for a μg sample irradiated in a thermal flux of 10^{13} neutron/sq. cm. sec.

PESO : weight of the element in grams

FORMAT (A6, F7.2, 2I4, 2E10.4, F12.8)

iv) NLIB : One card indicating the number of peaks of the "oriented analytical library".

FORMAT (I6)

v) One card for each gamma peak of the above mentioned library. This card contains:

ELEM : Energy in keV

FWT : Full width at half maximum in keV

XLAM : Decay constant of the radioisotope in minutes (see DECAY)

AA : Specific activity (see VALA)

PMOL : Molecular weight of the element

FORMAT (A8, 2F10.3, 2E10.4, F10.5)

vi) One card giving irradiation and problem characteristics:

FLUX : Neutron flux during irradiation in neutrons/sq. cm. sec

TIRR : Irradiation duration in minutes

IO : End of the irradiation stating its year, month, day, hour and minute

NIRR : Irradiation number

ANOME: The name of the problem involved

DENS : Density of the sample; to compute atoms/cm^3 for each element.

Put 1 if not requested

FORMAT (E10.4, F10.3, 5I4, I5, 5A4, F7.3)

vii) One card with a set of figures and switches allowing the program to flow in different ways:

NSPT : Number of spectra to elaborate

NCH : Number of channels for each spectrum. In the case in which a partial data-out has been performed, NCH = 2048

NSMO : Number of points to be used for the smoothing of the spectra:

NSMO = 5 five point smoothing

NSMO = 7 seven point smoothing

NSMO = 9 nine point smoothing

IPDO : Indicates if a partial data-out has been used:

IPDO = 0 the whole spectrum has been punched

IPDO = 1 partial data-out

IASCI : Indicates the perforation code used:

IASCI = 1 IBM code

IASCI = 2 ASCII code

IASCI = 3 ASCII code, no parity

FORMAT (6I6)

viii) In the case of PARTIAL DATA-OUT (IPDO = 1) one card for each measurement, containing:

MO = year, month, day, hour and minute of the beginning of the measurement

ASAMPL = identification of the sample

WEIGHT = weight of the sample in grams

TCON = counting duration in minutes

ISTAR = first channel of the partial spectrum

IEND = last channel

ITR = switch indicating whether to elaborate the spectrum or not:

ITR = 1 elaboration

ITR = 0 no elaboration

ICALC = Switch indicating whether to produce Calcomp drawing of the spectrum or not:

ICALC = 1 with Calcomp plotting

ICALC = 0 without Calcomp

IS = Switch indicating whether the area of the peaks must be computed with the original spectrum or with the smoothed one:

IS = 0 original spectrum

IS = 1 smoothed spectrum

FORMAT (5I4, 3A4, F10.6, F10.3, 2I5, 3I2)

ix) According to the values of IASCI, one of the following cards is read for each measurement:

a) IASCI = 1 or 2; the card contains:

MO, ASAMPL, WEIGHT, ITR, ICALC, IS

FORMAT (5I4, 3A4, F10.6, 20X, 3I2)

b) IASCI = 3; the card contains:

MO, ASAMPL, WEIGHT, TCON, ITR, ICALC, IS

FORMAT (5I4, 3A4, F10.6, F10.3, 10X, 3I2)

x) A magnetic tape obtained by transformation of the punched paper tape by means of the IBM 007 Paper Tape Reader Unit. The tape contains all the spectra produced by the gamma spectrometer.

OUTPUT consists of:

1) The following input data:

i) Number of spectra and perforation code

ii) ORIENTED LIBRARY: one sheet where the library is divided into two columns

iii) The calibration spectrum and its parameters: number of channels, counting duration and date, decay time from the end of the irradiation in minutes.

iv) One sheet with the peaks found and used for calibration purposes with their energies, the weight of each element present in the calibration source, the centroids of the peaks, the net area and the zero time area in cpm, the calculated experimental specific activity and the theoretical one, their ratio and the average of the ratios used as a correction factor for counting geometry to the specific activities of the elements belonging to the "oriented library" and finally the calibration line equation.

v) Sheets with the listing of each spectrum to be analyzed with the data of the measurement, the decay time and the indication whether the Calcomp drawing has been done or not.

2) After each spectrum there is:

i) A list of data concerning the irradiation, the measurement and the sample.

ii) A table showing in the first three columns the actual results of the quantitative analysis of the spectrum and in the eight other columns a set of control data to ascertain if the calculations were correctly performed. The table consists of:

ELEM : Symbol of the element

P. P. M. : Parts per million calculated on the basis of the area found and of the values in library. If no peak is found in the indicated interval, the minimum detectable activity is calculated: the figures between brackets represent the P. P. M. 's obtained by using this sensitivity.

ERROR % : Percentage of statistical error on the area evaluation. Asterisks indicate errors greater than 50%.

VALORE A: Specific activity from the input library

KEV(T) : Energy of the peak in keV from the library

KEV(S) : Energy of the peak in keV found according to the calibration line

LS : Left limit of the peak (in channel)

WT : Width of the peak (in channels)

CPM : Net area of the found peak

AREA
ZERO : Zero time area of the peak

UGM : Micrograms of element in the analyzed sample

AT/CC : Atoms/cm^3

3) Optionally, it is possible to obtain the Calcomp drawing of each spectrum, except for the calibration one.

B) COMPOSITION OF THE PROGRAM

The program is composed of a MAIN part which controls the various subroutines and allows the reading of the data and library from punched cards.

The gamma ray spectra of up to 4096 channels coming from the multichannel analyzers, are first punched on paper tapes, then are transferred on magnetic tapes and read by one of the routines TAPE, TAPEAS or TAPEGA, according to the punching code adopted.

These subroutines transform the data in a suitable format, either by the function CONV or CONVB.

FUNCTION TDEC : calculates the decay times in minutes

SUBROUTINE SMOOS : performs the smoothing of the spectrum on five, seven or nine points

SUBROUTINE DERIV : gives the first derivative of the smoothed spectrum

SUBROUTINE FIRST : treats the first spectrum of the series (calibration spectrum), where a certain number of known peaks is present. This spectrum is not plotted by Calcomp

SUBROUTINE KAL : calculates the calibration line by least square

fitting, according to the data given in the calibration library

SUBROUTINE ANALYS: treats all other spectra according to the information given in the "oriented library" and performs the calculation of the concentration of the elements present in the sample in terms of ppm

SUBROUTINE PKF : operates the search of the peaks based on the change of sign of the first derivative. By studying the symmetry of the derivative in the neighbourhood of the peaks, possible double peaks are found

SUBROUTINE SURF : computes the area of the peaks found

SUBROUTINE SURF2 : computes the areas of doublets, when existing and recognized by PKF

SUBROUTINE SENSIT : gives the detection limits in the cases in which the peak is not present in the interval given by the library

SUBROUTINE PRINT : allows the printing out of the results obtained

SUBROUTINE FIGURE : allows the drawing of the spectra with the Calcomp plotter.

The flow sheet of the program is shown in Fig. 4.

4. RESTRICTIONS

The maximum number of calibration peaks (LIBST) is 10.

The maximum number of elements of the "oriented library" (NLIB) is 50.

The maximum number of channels of the spectrometer which can be used, is 4096.

No limitation exists on the number of spectra to be treated.

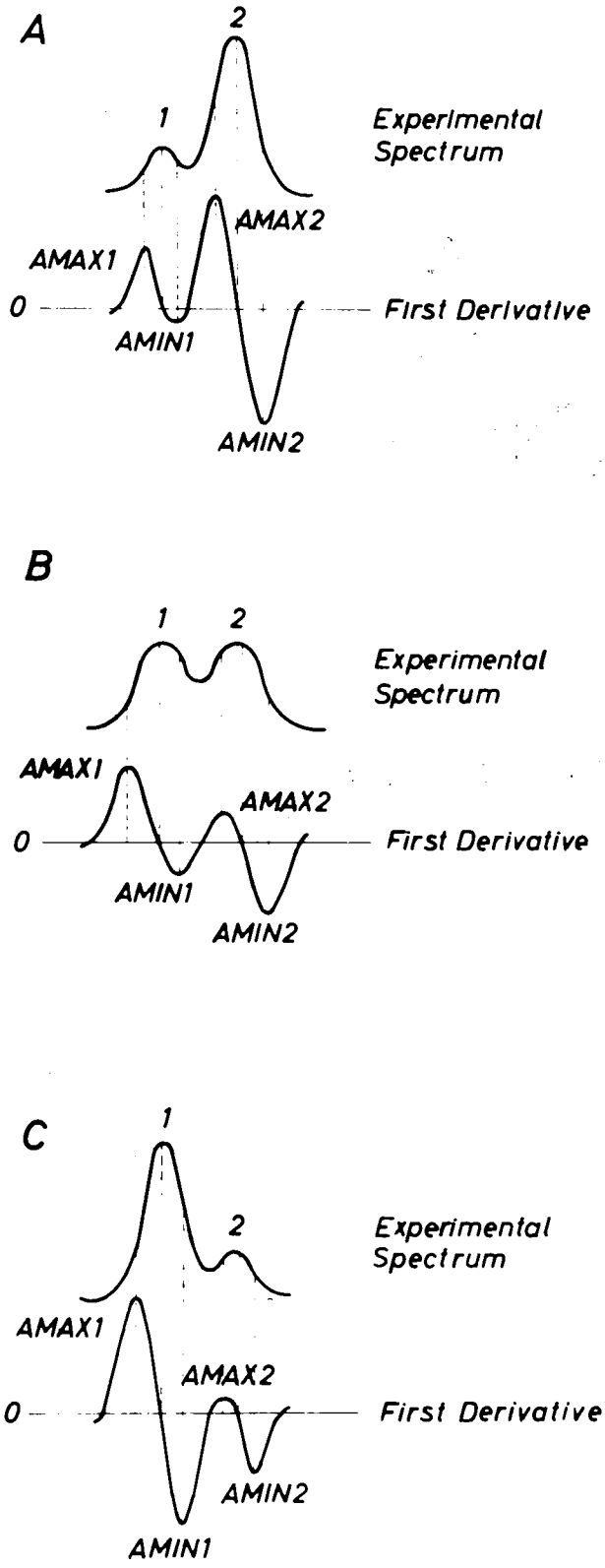
The CALIBRATION SPECTRUM MUST ALWAYS BE THE FIRST OF THE SET.

5. TYPICAL RUNNING TIME

- For a typical analysis of 30 spectra of 2048 channels (calibration spectrum plus 29 unknown), with an "oriented library" of 30 elements, the running time is about 30 seconds (object program).
- Calcomp plotting must be requested separately after the complete running of the program.

6. MATERIAL AVAILABLE

The listing of the program is given in Appendix 2. Upon request, the deck of cards in symbolic code is available to scientists working in this field.



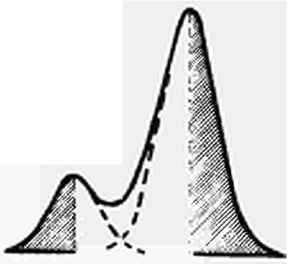
VALIDITY TESTS

$AMAX1 / AMIN1 > 1.5$
$AMAX2 / AMIN2 \leq 1.5$

$AMAX1 / AMIN1 > 1.5$
$AMIN2 / AMAX2 > 1.5$

$AMIN1 / AMAX1 > 1.5$
$AMAX2 / AMIN2 \leq 1.5$

Fig. 1



Area of a doublet obtained by SURF2

Fig. 2

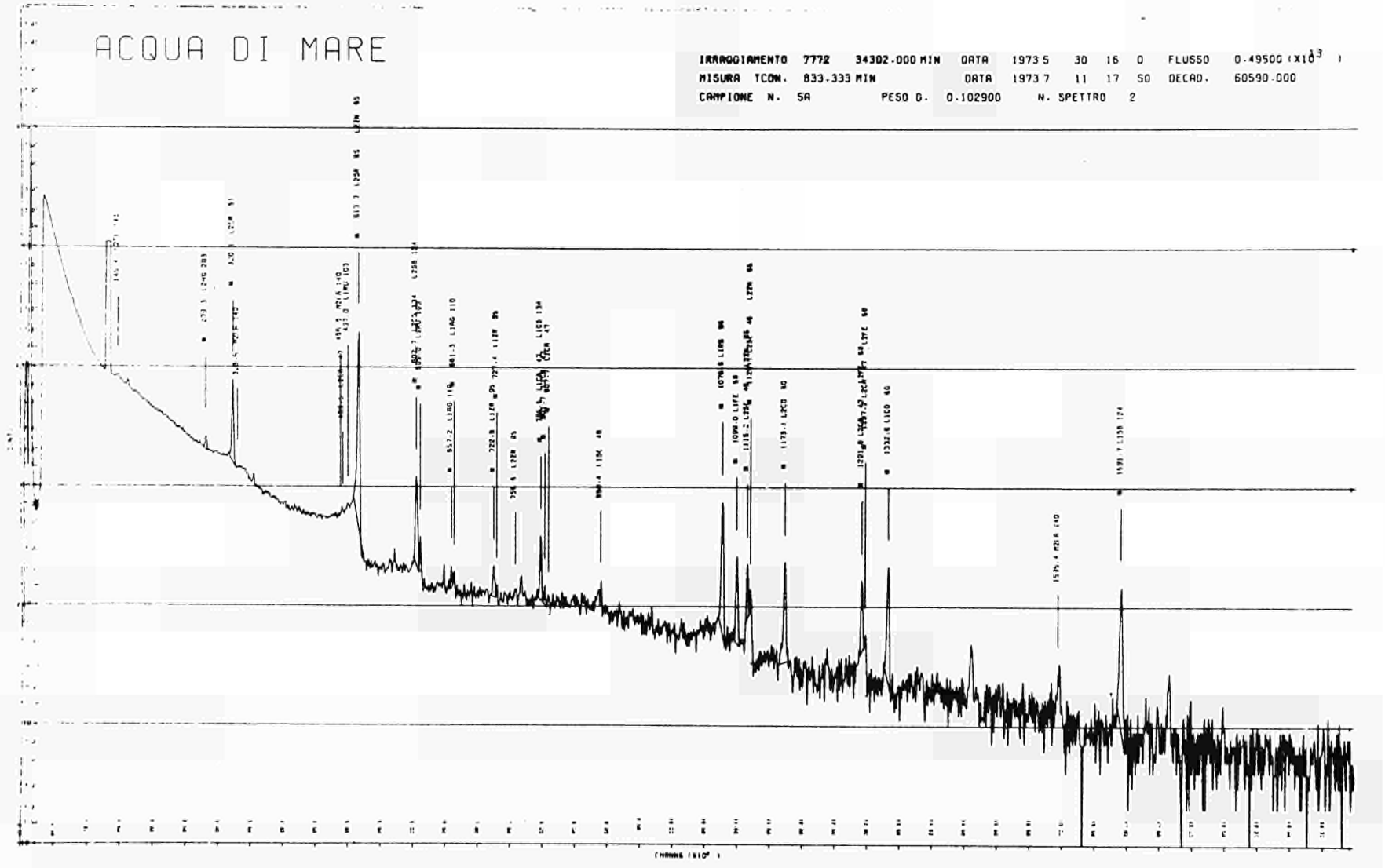

ACQUA DI MARE
IRRAGGIAMENTO 7772 34302.000 MIN DATA 1973 5 30 16 0 FLUSSO 0.49500 (X10^13)
MISURA TCON. 833.333 MIN DATA 1973 7 11 17 50 DECAD. 60590.000
CAMPIONE N. SA PESO G. 0.102900 N. SPETTRO 2

Fig. 3

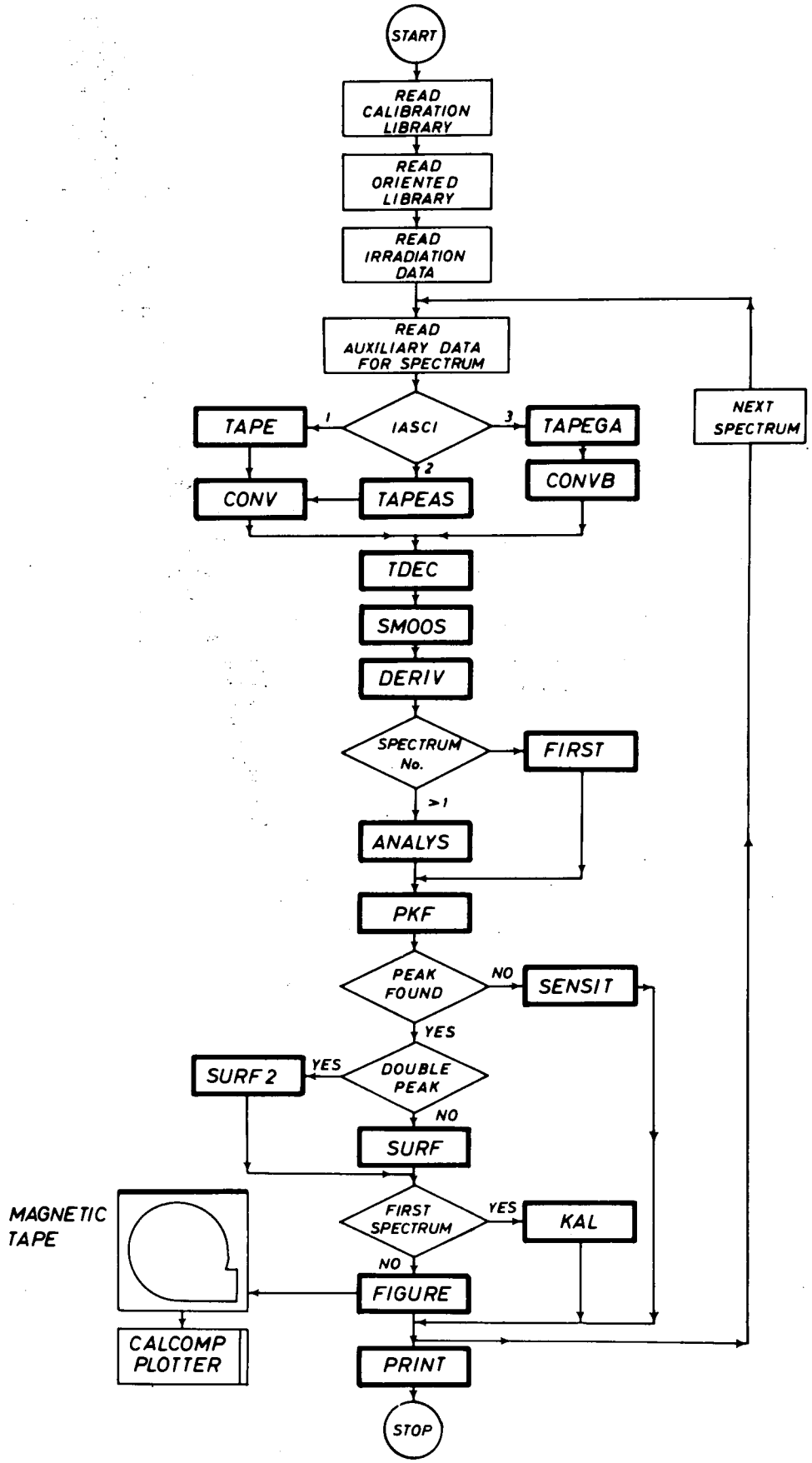

START
READ CALIBRATION LIBRARY
READ ORIENTED LIBRARY
READ IRRADIATION DATA
READ AUXILIARY DATA FOR SPECTRUM
IASCI
1
2
3
TAPE
TAPEAS
TAPEGA
CONV
CONVB
NEXT SPECTRUM
TDEC
SMOOS
DERIV
SPECTRUM No.
FIRST
>1
ANALYS
PKF
PEAK FOUND
NO
SENSIT
YES
DOUBLE PEAK
YES
SURF 2
NO
SURF
MAGNETIC TAPE
FIRST SPECTRUM
YES
KAL
NO
FIGURE
CALCOMP PLOTTER
PRINT
STOP

Fig. 4

APPENDIX 2 - LISTING OF THE PROGRAM GRETEL AND SAMPLE PROBLEM

```
C
C
C     CON QUESTO PROGRAMMA SI TROVANO I PICCHI DOPPI
C
C
C
C
0001          REAL*8 EL1,ELEM
0002          REAL*8 EL2,EL3,EL4,EL2D
C
0003          COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0004          COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0005          COMMON COUNT(4096),SPSM(4096),DER(4096)
0006          COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0007          COMMON AREA(50),ERR(50),FWHM(50)
0008          COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0009          COMMON DECAY(10),VALA(10),PESO(10)
0010          COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
C
0011          COMMON/ET1/NIRR,IO(5),MO(5),ANOME(5),ASAMPL(3)
0012          COMMON /ET4/ EL4(10),CKK(10),VKK(10),VMAX(10),NPK
0013          COMMON /ET5/ EL3(50),VS(50),P2(50),CS(50),VS2(50),VD2(50),CLS2(50)
             1,CLD2(50),ISENS
0014          COMMON /ET6/ EL2(50),VC(50),P1(50),CC(50),VS1(50),VD1(50),CLS1(50)
             1,CLD1(50),IPICK
0015          COMMON/ET8/FDEC,FSAT,DENS
0016          COMMON/ET9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
C
0017          DIMENSION IME(12)
C
0018          READ (5,999) (IME(I),I=1,12)
0019          READ (5,1000) LIBST
0020          DO 9 K=1,LIBST
0021        9 READ (5,998) EL1(K),EN1(K),ICAN(K),INT(K),DECAY(K),VALA(K),PESO(K)
0022          READ (5,1000) NLIB
0023          DO 10 J=1,NLIB
0024       10 READ (5,1001) ELEM(J),EN(J),FWT(J),XLAM(J),AA(J),PMOL(J)
0025          READ (5,1003) FLUX,TIRR,(IO(K),K=1,5),NIRR,(ANOME(K),K=1,5),DENS
C
0026          READ(5,1000) NSPT,NCH,NSMO,IPDO,IASCI
C
0027          CALL FINIM(2.,0.)
0028          WRITE(6,1014) NSPT
0029          IF(IASCI-2) 70,80,60
0030       60 WRITE (6,1012) IASCI
0031          GO TO 90
0032       70 WRITE(6,1015) IASCI
0033          GO TO 90
0034       80 WRITE(6,1016) IASCI
0035       90 WRITE (6,1018)
0036          DO 50  K=1,NLIB,2
0037          K1=K+1
0038       50 WRITE (6,1019) ELEM(K),EN(K),FWT(K),XLAM(K),AA(K),PMOL(K),ELEM(K1)
```

```
     1,EN(K1),FWT(K1),XLAM(K1),AA(K1),PMOL(K1)
C
0039        TCON=1.
0040        DO 1 II=1,NSPT
0041.       III=II
0042        IF(IPDO.EQ.1) GO TO 444
0043        ISTAR=1
0044        IEND=NCH
0045        IF(IASCI-2) 20,30,33
C
C       *** LETTURA CON CODICE ASCII NO PARITY ***
C
0046     33 READ(5,1008)(MO(K),K=1,5),(ASAMPL(K),K=1,3),WEIGHT,TMIS,ITR,ICALC,
     1JS
0047        CALL TAPEGA(NCH,COUNT)
0048        TCON=TMIS
0049        GO TO 40
C
C       *** LETTURA CON CODICE IBM ***
C
0050     20 READ(5,1004)(MO(K),K=1,5),(ASAMPL(K),K=1,3),WEIGHT,ITR,ICALC,JS
0051        CALL TAPE(NCH,COUNT)
0052        IF(COUNT(1).LE.1.) GO TO 40
0053        TCON=COUNT(1)/240.
0054        GO TO 40
C
C       *** LETTURA CON CODICE ASCII ***
C
0055     30 READ(5,1004)(MO(K),K=1,5),(ASAMPL(K),K=1,3),WEIGHT,ITR,ICALC,JS
0056        CALL TAPEAS(NCH,COUNT)
0057        IF(COUNT(1).LE.1.) GO TO 40
0058        TCON=COUNT(1)/60.
C
0059        GO TO 40
0060    444 READ(5,1011)(MO(K),K=1,5),(ASAMPL(K),K=1,3),WEIGHT,TCON,ISTAR,IEND
     1,ITR,ICALC,JS
0061        NCH=IEND-ISTAR+1
0062        IF(IASCI-2) 445,446,447
C
C       *** LETTURA CON CODICE ASCII NO PARITY ***
C
0063    447 CALL TAPEGA(NCH,COUNT)
0064        GO TO 40
C
C       *** LETTURA CON CODICE ASCII ***
C
0065    446 CALL TAPEAS(NCH,COUNT)
0066        GO TO 40
C
C       *** LETTURA CON CODICE IBM ***
C
0067    445 CALL TAPE(NCH,COUNT)
0068     40 CONTINUE
```

```
0069                IF(ITR.EQ.0) GO TO 1
                C
0070                TDEC1=TDEC(MO,IO,IME)
0071                IF(ICALC.EQ.1) GO TO 9999
0072                WRITE (6,1005) II,NCH,TCON,(MO(K),K=1,5),TDEC1
0073                GO TO 9998
0074             9999 WRITE (6,1020) II,NCH,TCON,(MO(K),K=1,5),TDEC1
0075             9998 CONTINUE
                C
                C
0076                IF(IPDO.EQ.1) GO TO 448
0077                WRITE (6,1006) (I,I=1,10)
0078                IMX=NCH/10+1
0079                DO 2 I=1,IMX
0080                IP=I-1
0081                IL=IP*10+1
0082                IH=MINO(I*10,NCH)
0083                2 WRITE (6,1007) IP,(COUNT(J),J=IL,IH)
0084                GO TO 449
                C
0085              448 WRITE (6,1009) (I,I=1,8)
0086                DO 336 J=1,NCH
0087                I=J+ISTAR-1
0088              336 COUNT(I)=COUNT(J)
0089                DO 337 I=ISTAR,IEND,8
0090                IP=I-1
0091                IL=IP+1
0092                IH=IL+7
0093              337 WRITE (6,1010) IP,(COUNT(J),J=IL,IH)
                C
0094              449 WRITE (6,199)
                C
0095                CALL SMOOS(NSMO)
0096                CALL DERIV(NSMO)
0097                IF(II.GT.1) GO TO 11
                C
0098                CALL PRINT(1,0)
                C
0099                CALL FIRST(LIBST,NCH,III,JS)
0100                IF(JMAX.LE.1) GO TO 333
0101                IF(NPK.LE.1) GOTO 333
0102                WRITE (6,1013) ALFA,BETA
0103                GO TO 1
                C
0104               11 CALL PRINT(2,0)
                C
0105                CALL ANALYS(NLIB,NCH,III,JS)
0106                IF(ICALC.EQ.0) GO TO 1
0107                CALL FIGURE(NCH,II)
0108                1 CONTINUE
0109                CALL FINTRA
                C
0110              199 FORMAT (1H1)
```

```
0111           998 FORMAT (A6,F7.2,2I4,2E10.4,F12.8)
0112           999 FORMAT (12I6)
0113          1000 FORMAT (6I6)
0114          1001 FORMAT (A8,2F10.3,2E10.4,F10.5)
0115          1002 FORMAT (10F8.3)
0116          1003 FORMAT (E10.4,F10.3,5I4,I5,5A4,F7.3)
0117          1004 FORMAT(5I4,3A4,F10.6,20X,3I2)
0118          1005 FORMAT (1H1,'SPETTRO N.',I5,'  CANALI',I5,'  TCON',F10.3,' MINUTI
                  1  DATA  ',5I4,'   DECAD',F12.3,'  MIN'/)
0119          1006 FORMAT (1H0,10(8X,I2)/)
0120          1007 FORMAT (1H ,I3,10F10.0)
0121          1008 FORMAT(5I4,3A4,F10.6,F10.3,10X,3I2)
0122          1009 FORMAT (1H0,8(8X,I2)/)
0123          1010 FORMAT (1H ,I4,8F10.0)
0124          1011 FORMAT(5I4,3A4,F10.6,F10.3,2I5,3I2)
0125          1012 FORMAT (1H+,45X,' PERFORATI CON CODICE ASCII NO PARITY')
0126          1013 FORMAT (1H0,'CALIBRAZIONE    Y=',F7.3,'*X+',F8.3)
0127          1014 FORMAT(1H0,'IN QUESTO PROGRAMMA CI SONO ',I4,'  SPETTRI')
0128          1015 FORMAT(1H+,45X,' PERFORATI CON CODICE IBM')
0129          1016 FORMAT(1H+,45X,' PERFORATI CON CODICE ASCII')
0130          1017 FORMAT(1H0,'NON CI SONO PICCHI DI CALIBRAZIONE')
0131          1018 FORMAT (1H0,5X,'LIBRERIA'///' ELEM',5X,'EN(KEV) RES(KEV)  DEC(MIN)
                 1',3X,'VALORE A',3X,'P. MOL.',5X,'ELEM',5X,'EN(KEV) RES(KEV)  DEC(M
                 2IN)',3X,'VALORE A',3X,'P.MOL.'//)
0132          1019 FORMAT (1H0,A8,2X,F7.2,F7.3,3X,1PE9.3,2X,E9.3,2X,0PF7.3,5X,A8,2X,F
                 17.2,F7.3,3X,1PE9.3,2X,E9.3,2X,0PF7.3)
0133          1020 FORMAT (1H1,'SPETTRO N.',I5,'  CANALI',I5,'  TCON',F10.3,' MINUTI
                  1  DATA  ',5I4,'   DECAD',F12.3,'  MIN',14X,'CALCOMP'/)
0134               GO TO 334
0135           333 WRITE (6,1017)
0136           334 STOP
0137               END
```

```
0001                SUBROUTINE TAPE(NPT,Y)
                C
0002                DIMENSION Y(1)
0003                INTEGER * 2 A(60)
0004                J=0
0005              2 CONTINUE
0006                IF (J.EQ.NPT) GO TO 3
0007                READ(11,1,END=4) (A(I),I=1,60)
0008              1 FORMAT (6X,60A1)
0009                J=J+1
0010                Y(J)=CONV(A,1,5)
0011                IF(Y(J).NE.0.) GO TO 2
0012                Y(J)=1.
0013                GO TO 2
0014              3 NPT=J
0015                RETURN
0016              4 WRITE(6,5)
0017              5 FORMAT (1H1,'** END OF FILE ON PAPER TAPE **')
0018                STOP
0019                END
```

```
0001                  SUBROUTINE TAPEAS(NPT,Y)
                C
0002                  DIMENSION Y(1)
0003                  INTEGER*2 A(60)
0004                  INTEGER*2 UNO/'1 '/
0005                  J=0
0006                22 CONTINUE
0007                  IF(J.EQ.NPT) GO TO 3
0008                  READ (11,1,END=4) K,(A(I),I=1,60)
0009                 1 FORMAT (3X,I3,60A1)
0010                  IF (K-57) 2,101,102
0011                 2 IF(K-1)22,22,103
0012               103 DO 100 I=1,60
0013                  A(I)=UNO
0014               100 CONTINUE
0015               101 DO 5 K=1,8
0016                  J=J+1
0017                  L1=K*7-6
0018                  L2=L1+5
0019                  Y(J)=CONV(A,L1,L2)
0020                  IF(Y(J).NE.0.) GO TO 5
0021                  Y(J)=1.
0022                5 CONTINUE
0023                  GOTO 22
0024               102 DO 6 K=1,3
0025                  J=J+1
0026                  L1=K*7-5
0027                  L2=L1+5
0028                  Y(J)=CONV(A,L1,L2)
0029                  IF (Y(J).NE.0.) GO TO 6
0030                  Y(J)=1.
0031                6 CONTINUE
0032                  GOTO 22
0033                3 NPT=J
0034                  RETURN
0035                4 WRITE (6,15)
0036               15 FORMAT (1H1,'**END OF FILE ON PAPER TAPE**')
0037                  STOP
0038                  END
```

```
0001                FUNCTION CONV(A,L1,L2)
                C
0002                INTEGER * 2 A(1),TAB(11)
0003                DATA TAB /ZF040,ZF140,ZF240,ZF340,ZF440,ZF540,ZF640,
                   *          ZF740,ZF840,ZF940,Z4040/
0004                CONV=0.
0005                DO 2    I=L1,L2
0006                IF(A(I).EQ.TAB(11)) A(I)=TAB(1)
0007                DO 1  J=1,10
0008                IF(A(I).EQ.TAB(J)) GO TO 3
0009              1 CONTINUE
0010                CONV=0.
0011                RETURN
0012              3 FJ=J
0013                CONV=CONV*10.+FJ-1.
0014              2 CONTINUE
0015                RETURN
0016                END
```

```
0001                  SUBROUTINE TAPEGA(NPT,Y)
                C
0002                  DIMENSION Y(1)
0003                  INTEGER*2 A(64)
0004                  INTEGER*2 UNO/'1 '/
0005                  J=0
0006               22 CONTINUE
0007                  IF(J.EQ.NPT) GO TO 3
0008                  READ (11,1,END=4) K,(A(I),I=1,64)
0009                1 FORMAT (3X,I3,10X,64A1)
0010                  IF(K-71) 2,101,101
0011                2 IF(K-12) 22,22,103
0012              103 DO 100 I=1,64
0013                  A(I)=UNO
0014              100 CONTINUE
0015              101 DO 5 K=1,8
0016                  J=J+1
0017                  L1=K*8-7
0018                  L2=L1+7
0019                  Y(J)=CONVB(A,L1,L2)
0020                  IF(Y(J).NE.0.) GO TO 5
0021                  Y(J)=1.
0022                5 CONTINUE
0023                  GO TO 22
0024                3 NPT=J
0025                  RETURN
0026                4 WRITE (6,15)
0027               15 FORMAT (1H1,'**END OF FILE ON PAPER TAPE**')
0028                  STOP
0029                  END
```

```
0001                  FUNCTION CONVB(A,L1,L2)
                C
0002                  INTEGER * 2 A(1),TAB(11)
0003                  DATA TAB /ZF040,ZF140,ZF240,ZF340,ZF440,ZF540,ZF640,
                     *          ZF740,ZF840,ZF940,Z4040/
0004                  CONVB=0.
0005                  DO 2    I=L1,L2
0006                  IF(A(I).EQ.TAB(11)) RETURN
0007                  DO 1 J=1,10
0008                  IF(A(I).EQ.TAB(J)) GO TO 3
0009                1 CONTINUE
0010                  CONVB=0
0011                  RETURN
0012                3 FJ=J
0013                  CONVB=CONVB*10.+FJ-1.
0014                2 CONTINUE
0015                  RETURN
0016                  END
```

```
0001                FUNCTION TDEC(MO,IO,IME)
0002                DIMENSION MO(5),IO(5),IME(12)
                C
0003                I1=MO(2)
0004                I2=IO(2)
0005                TDEC=(((MO(1)-IO(1))*365+IME(I1)-IME(I2)+MO(3)-IO(3))*24+MO(4)-IO(
                   14))*60+MO(5)-IO(5)
0006                RETURN
0007                END
```

```
0001                  SUBROUTINE SMOOS(NSMO)
                C
                C
0002                  REAL*8 EL1,ELEM
0003                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0004                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0005                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0006                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0007                  COMMON AREA(50),ERR(50),FWHM(50)
0008                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0009                  COMMON DECAY(10),VALA(10),PESO(10)
0010                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
                C
                C
0011                  IF(NSMO-7) 30,40,50
                C
                CC    *** SMOOTHING A 9 PUNTI ***
                C
0012               50 N1=ISTAR+4
0013                  N2=IEND-4
0014                  C0=59.
0015                  C1=54.
0016                  C2=39.
0017                  C3=14.
0018                  C4=-21.
0019                  CNORM=231.
0020                  GO TO 60
                C
                CC    *** SMOOTHING A 7 PUNTI ***
                C
0021               40 N1=ISTAR+3
0022                  N2=IEND-3
0023                  C0=7.
0024                  C1=6.
0025                  C2=3.
0026                  C3=-2.
0027                  C4=0.
0028                  CNORM=21.
0029                  GO TO 60
                C
                CC    *** SMOOTHING A 5 PUNTI ***
                C
0030               30 N1=ISTAR+2
0031                  N2=IEND-2
0032                  C0=17.
0033                  C1=12.
0034                  C2=-3.
0035                  C3=0.
0036                  C4=0.
0037                 * CNORM=35.
                C
0038               60 DO 1 K=N1,N2
0039                  SPSM(K)=C0*COUNT(K)+C1*(COUNT(K+1)+COUNT(K-1))+C2*(COUNT(K+2)+COUN
```

```
     1T(K-2))+C3*(COUNT(K+3)+COUNT(K-3))+C4*(COUNT(K+4)+COUNT(K-4))
0040     1 SPSM(K)=SPSM(K)/CNORM
0041       RETURN
0042       END
```

```
0001                SUBROUTINE DERIV(NSMO)
                C
0002                REAL*8 EL1,ELEM
0003                COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0004                COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0005                COMMON COUNT(4096),SPSM(4096),DER(4096)
0006                COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0007                COMMON AREA(50),ERR(50),FWHM(50)
0008                COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0009                COMMON DECAY(10),VALA(10),PESO(10)
0010                COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
                C
0011                IF(NSMO-7) 10,20,30
0012             30 IS=ISTAR+5
0013                IE=IEND-5
0014                GO TO 40
0015             20 IS=ISTAR+4
0016                IE=IEND-4
0017                GO TO 40
0018             10 IS=ISTAR+3
0019                IE=IEND-3
                C
0020             40 DO 1 I=IS,IE
0021                IP=I+1
0022                IN=I-1
0023                DER(I)=(SPSM(IP)-SPSM(IN))/2.
0024              1 CONTINUE
0025                RETURN
0026                END
```

```
0001                  SUBROUTINE FIRST(LIBST,NCH,III,JS)
                C
0002                  REAL*8 EL1,ELEM
0003                  REAL*8 EL4
0004                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0005                  COMMON ELEM(50),CN(50),FWT(50),XLAM(50),AA(50)
0006                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0007                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0008                  COMMON AREA(50),ERR(50),FWHM(50)
0009                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0010                  COMMON DECAY(10),VALA(10),PESO(10)
0011                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0012                  COMMON /ET4/ EL4(10),CKK(10),VKK(10),VMAX(10),NPK
                C
0013                  DIMENSION CK(10),VK(10),FCOR(10)
                C
0014                  NPK=0
0015                  JJJ=0
0016                  CALL PKF(JJJ,III,IRIG)
0017                  IF(JMAX.LE.1) RETURN
0018                  CALL SURF(NCH,JS)
                C
0019                  WRITE (6,1998)
0020                  WRITE (6,1999)
0021                  DO 3 J=1,JMAX
0022                  DO 4 I=1,LIBST
0023                  IDELTA=ICAN(I)-INT(I)
0024                  KDELTA=ICAN(I)+INT(I)
0025                  IF(CENTR(J)-IDELTA) 4,6,6
0026                6 IF(CENTR(J)-KDELTA) 7,7,4
0027                7 NPK=NPK+1
0028                  CK(NPK)=CENTR(J)
0029                  VK(NPK)=EN1(I)
0030                  EL1(NPK)=EL1(I)
0031                  FDEC=EXP(DECAY(I)*TDEC1)
0032                  FSAT=1.-EXP(-DECAY(I)*TIRR)
0033                  CPM=AREA(J)/TCON
0034                  AZERO=CPM*FDEC
0035                  ASPER=FLUX*FSAT*PESO(I)*1.E+06/AZERO
0036                  FCOR(NPK)=ASPER/VALA(I)
                C
                C     ***** I SEGUENTI VALORI VANNO NEL COMMON /ET4/ E SERVONO PER 'FIGURE' *****
                C
0037                  IK=CK(NPK)+0.5
0038                  VMAX(NPK)=COUNT(IK)
0039                  EL4(NPK)=EL1(NPK)
0040                  CKK(NPK)=CK(NPK)
0041                  VKK(NPK)=VK(NPK)
                C
0042                  WRITE (6,2000) NPK,EL1(NPK),VK(NPK),PESO(I),CK(NPK),CPM,AZERO,ASPE
                     1R,VALA(I),FCOR(NPK)
0043                4 CONTINUE
0044                3 CONTINUE
```

```
0045                  IF(NPK.LE.1) RETURN
                C
0046                  CALL KAL(NPK,CK,VK,ALFA,BETA)
0047                  FMEDIO=0.
0048                  DO 5 K=1,NPK
0049                5 FMEDIO=FMEDIO+FCOR(K)
0050                  FMEDIO=FMEDIO/NPK
0051                  WRITE (6,2002)
0052                  WRITE (6,2001) NPK,FMEDIO
                C
0053 .             1998 FORMAT (1H0)
0054               1999 FORMAT (1H0,3X,'N.',4X,'ELEM',7X,'EN',6X,'PESO (G)',5X,'CENTR',5X,
                    1'C P M',4X,'AREA ZERO',3X,'A SPER',5X,'A TEOR',4X,'FATT CORR'////)
0055               2000 FORMAT (1H ,I5,2X,A8,2X,F7.2,2X,F11.8,3X,F7.2,5(2X,1PE9.3))
0056               2001 FORMAT (1H ,5X,'VALORE MEDIO DEL FATTORE CORRETTIVO SU ',I4,' PICC
                    1HI',39X,1PE9.3/////)
0057               2002 FORMAT (1H0,93X,'=========='///)
0058                  RETURN
0059                  END
```

```
0001                  SUBROUTINE ANALYS(NLIB,NCH,III,JS)
                C
0002                  INTEGER*2 H1,H2
0003                  REAL*8 EL1,ELEM
0004                  REAL*8 EL2,EL3,EL2D
                C
0005                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0006                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0007                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0008                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0009                  COMMON AREA(50),ERR(50),FWHM(50)
0010                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0011                  COMMON DECAY(10),VALA(10),PESO(10)
0012                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0013                  COMMON FWHT
                C
0014                  COMMON/ET2/PPM,ATOMI,PERC,AKEV,CPM,AREAD,UGM,LARG,H1,H2,J1
0015                  COMMON /ET5/ EL3(50),VS(50),P2(50),CS(50),VS2(50),VD2(50),CLS2(50)
                     1,CLD2(50),ISENS
0016                  COMMON /ET6/ EL2(50),VC(50),P1(50),CC(50),VS1(50),VD1(50),CLS1(50)
                     1,CLD1(50),IPICK
0017                  COMMON/ET7/C1,C2,JDOUB,KKK,IND2
0018                  COMMON/ET8/FDEC,FSAT,DENS
0019                  COMMON/ET9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
                C
0020                  IPICD=0
0021                  IPICK=0
0022                  ISENS=0
0023                  IRIG=0
0024                  FA=2.
0025                  FB=1.2
0026                  CALL PRINT(3,IRIG)
                C
0027                  DO 3 J=1,NLIB
0028                  JJJ=J
0029                  J1=J
0030                  FDEC=EXP(XLAM(J)*TDEC1)
0031                  FSAT=1.-EXP(-XLAM(J)*TIRR)
0032                  ENCH=(EN(J)-BETA)/ALFA
0033                  FWHT=FWT(J)/ALFA
0034                  ISTAR=(ENCH-FWHT*FA)
0035                  IEND=(ENCH+FWHT*FA)
0036                  H1=(ENCH-FWHT*FB)-0.5
0037                  H2=(ENCH+FWHT*FB)+0.5
0038                  L=1
0039                  IF(ISTAR.GT.L.AND.IEND.LT.NCH) GO TO 7
                C
0040                  CALL PRINT(4,IRIG)
                C
0041                  GO TO 3
0042                7 CALL PKF(JJJ,III,IRIG)
0043                  IF(JMAX.GT.0) GO TO 9
0044                  IF(JDOUB.GT.0) GOTO 3
```

```
0045            10 CALL SENSIT(RAD)
0046               SENS=RAD/TCON
0047               UGM=AA(J)*SENS*FDEC/(FLUX*FSAT)
0048               PPM=UGM/WEIGHT
0049               ATOMI=6.02E17*UGM*DENS/(PMOL(J)*WEIGHT)
                C
                C     ***** I SEGUENTI VALORI VANNO NEL COMMON /ET5/ E SERVONO PER 'FIGURE' *****
                C
0050               IIN=H1+(H2-H1)/2
0051               ISENS=ISENS+1
0052               VS(ISENS)=COUNT(IIN)
0053               P2(ISENS)=EN(J)
0054               CS(ISENS)=IIN+0.5
0055               EL3(ISENS)=ELEM(J)
0056               VS2(ISENS)=H1+0.5
0057               VD2(ISENS)=H2+0.5
0058               CLS2(ISENS)=COUNT(H1)
0059               CLD2(ISENS)=COUNT(H2)
                C
0060               CALL PRINT(5,IRIG)
                C
0061               GO TO 3
0062             9 CALL SURF(NCH,JS)
0063               DO 1 K=1,JMAX
0064               IF(AREA(K).GT.0) GO TO 8
0065               GO TO 10
0066             8 CPM=AREA(K)/TCON
0067               ERR1=ERR(K)/TCON
0068               PERC=ERR1*100./CPM
0069               AREAD=CPM*FDEC
0070               UGM=AA(J)*AREAD/(FLUX*FSAT)
0071               PPM=UGM/WEIGHT
0072               AKEV=CENTR(K)*ALFA+BETA
0073               ENDIFF=EN(J)-AKEV
0074               H1=LS(K)
0075               H2=LD(K)
0076               LARG=LD(K)-LS(K)+1
0077               ATOMI=6.02E17*UGM*DENS/(PMOL(J)*WEIGHT)
0078               IK=CENTR(K)+0.5
                C
                C     ***** I SEGUENTI VALORI VANNO NEL COMMON /ET6/ E SERVONO PER 'FIGURE' *****
                C
0079               IPICK=IPICK+1
0080               EL2(IPICK)=ELEM(J)
0081               VC(IPICK)=COUNT(IK)
0082               P1(IPICK)=AKEV
0083               CC(IPICK)=CENTR(K)
0084               VS1(IPICK)=LS(K)
0085               VD1(IPICK)=LD(K)
0086               CLS1(IPICK)=COUNT(H1)
0087               CLD1(IPICK)=COUNT(H2)
                C
0088               IF(PERC.GT.50.) GO TO 40
```

```
                C
0089                 CALL PRINT(9,IRIG)
                C
0090                 GO TO 1
                C
0091              40 CALL PRINT(10,IRIG)
                C
0092               1 CONTINUE
0093               3 CONTINUE
                C
0094                 RETURN
0095                 END
```

```
0001                  SUBROUTINE PKF(JJJ,III,IRIG)
                C
0002                  REAL*8 EL1,ELEM,EL2D
0003                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0004                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0005                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0006                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0007                  COMMON AREA(50),ERR(50),FWHM(50)
0008                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0009                  COMMON DECAY(10),VALA(10),PESO(10)
0010                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0011                  COMMON FWHT
0012                  COMMON/ET2/PPM,ATOMI,PERC,AKEV,CPM,AREA0,UGM,LARG,H1,H2,J1
0013                  COMMON/ET3/ENERG(50)
0014                  COMMON/ET7/C1,C2,JDOUB,KKK,IND2
0015                  COMMON/ET8/FDEC,FSAT,DENS
0016                  COMMON/ET9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
0017                  DIMENSION SIGMA(50)
0018                  DIMENSION IND(50)
                C
                C
0019                  J1=JJJ
0020                  JDOUB=0
0021                  ITOUR=0
0022                  ITOURE=0
0023               12 CONF=1.5
0024                  I=ISTAR
0025                  JMAX=0
0026               10 IL=I
0027                  ISW=-1
0028                1 I=I+1
0029                  IF(I.GE.IEND) GOTO 6
0030                  IF(DER(I)) 3,3,2
0031                2 IF(ISW.GT.0) GO TO 1
0032                  ISW=1
0033                  GO TO 1
0034                3 IF(ISW.LT.0) GO TO 1
0035                  ISW=-1
0036                  AMAX=-10.E+50
0037                  AMIN=+10.E+50
0038                  J=I-1
0039                7 IF(DER(J).LE.AMAX) GO TO 4
0040                  AMAX=DER(J)
0041                  JL=J
0042                  J=J-1
0043                  GO TO 7
0044                4 CONTINUE
0045                  J=I
0046                8 IF(DER(J).GE.AMIN) GO TO 5
0047                  AMIN=DER(J)
0048                  JR=J
0049                  J=J+1
0050                  GO TO 8
```

```
0051              5 CONTINUE
0052                A1=SPSM(JL+1)+SPSM(JL-1)
0053                A2=SPSM(JR+1)+SPSM(JR-1)
0054                IF(A1.LE.0.OR.A2.LE.0) GO TO 10
0055                SDEV1=CONF*SQRT(A1)/2.0
0056                SDEV2=CONF*SQRT(A2)/2.0
0057                AMIN=ABS(AMIN)
0058                IF(AMIN.EQ.0.OR.AMAX.EQ.0)GOTO10
0059                VALMAX=AMAX1(AMAX,AMIN)
0060                VALMIN=AMIN1(AMAX,AMIN)
0061                RATIO=VALMAX/VALMIN
0062                IF(AMAX.LE.SDEV1.AND.AMIN.LE.SDEV2) GO TO 10
0063                JMAX=JMAX+1
                C
                C       POUR CHAQUE PIC RECHERCHE DE L'INDICE IND(JMAX)
                C
0064                IF((AMAX.GT.SDEV1.AND.AMIN.GT.SDEV2).AND.(RATIO.LE.1.5)) GOTO 97
                C
0065                IF(AMAX.GT.SDEV1.AND.AMAX.GE.AMIN) GOTO 98
                C
0066                IF(AMIN.GT.SDEV2.AND.AMIN.GE.AMAX) GOTO 99
                C
0067             97 IND(JMAX)=0
0068                GOTO 100
                C
0069             98 IND(JMAX)=1
0070                GOTO 100
                C
0071             99 IND(JMAX)=2
                C
                C       CALCUL DES PARAMETRES
                C
0072            100 FL=JL+(DER(JL-1)-DER(JL+1))*0.5/(DER(JL+1)-2.*DER(JL)+DER(JL-1))
0073                FR=JR+(DER(JR-1)-DER(JR+1))*0.5/(DER(JR+1)-2.*DER(JR)+DER(JR-1))
0074                IM=I-1
0075                CENTR(JMAX)=IM-DER(IM)/(DER(I)-DER(IM))
0076                CENTR1=CENTR(JMAX)
0077                SIGMA(JMAX)=(FR-FL)/2.0
0078                SIGMA1=SIGMA(JMAX)
0079                FWHM(JMAX)=SIGMA(JMAX)*2.355
0080                FWHM1=FWHM(JMAX)
0081                INDICE=IND(JMAX)
0082                I=JR
                C
                C       VALABLE POUR LE PREMIER SPECTRE DE CALIBRATION
                C       EXCLUSION DES PICS DOUBLETS
                C
0083                IF(III-1)102,103,102
0084            103 IF(IND(JMAX).EQ.1.OR.IND(JMAX).EQ.2)JMAX=JMAX-1
0085                IF(JMAX.LT.0) JMAX=0
0086                GOTO 10
0087            102 ENERG(JMAX)=CENTR(JMAX)*ALFA+BETA
0088                ENERG1=ENERG(JMAX)
```

```
0089                IF(IND(JMAX).EQ.2) GOTO400
0090                IF(IND(JMAX).EQ.1) GO TO 900
0091                IF(JMAX.EQ.1) GO TO 11
                C
                C       RECHERCHE SI LE PIC AVEC IND(JMAX)=0 FAIT PARTIE D'UN DOUBLET
                C
0092                IF(IND(JMAX-1).EQ.1) GO TO 200
0093              11 IF(JMAX-50)10,6,6
0094             200 IF((CENTR(JMAX)-CENTR(JMAX-1)).GE.(2.0 * FWHT)) GOTO 300
0095                 C1=CENTR(JMAX-1)
0096                 C2=0
0097                 JDOUB=1
0098                 CALL SURF2(IRIG)
0099                 GOTO 301
0100             300 IF(ITOURE.EQ.1) GOTO 800
0101             301 JMAX=JMAX-1
0102                 CENTR(JMAX)=CENTR1
0103                 FWHM(JMAX)=FWHM1
0104                 SIGMA(JMAX)=SIGMA1
0105                 IND(JMAX)=INDICE
0106                 ENERG(JMAX)=ENERG1
0107                 IF(ITOURE.EQ.1) GOTO 60
0108                 GOTO10
                C
                C       ETUDE DU PIC AVEC IND(JMAX)=2
                C       RETOUR EN ARRIERE DU CANAL DE DEPART DE L(INTERVALLE
                C
0109             400 IF(JMAX.GT.1) GOTO 500
0110                 IF(ITOUR.GT.0) GOTO 303
0111                 ISTAR= CENTR1-5*FWHT
0112                 ITOUR=ITOUR+1
0113                 GOTO 12
                C
                C       RECHERCHE DU PIC DOUBLET
                C       1) FORME UN PIC DOUBLET AVEC PIC NORMAL IND(JMAX)=0
                C
0114             500 IF(IND(JMAX-1).EQ.1) GO TO 700
0115                 IF((CENTR(JMAX)-CENTR(JMAX-1)).GE.(2.0 * FWHT)) GOTO 310
0116                 C2=CENTR(JMAX)
0117                 C1=0
0118                 JDOUB=2
0119                 CALL SURF2(IRIG)
0120             302 IF(ITOUR.NE.1) GOTO 303
0121                 JMAX=JMAX-1
0122                 ITOUR=ITOUR+1
0123                 GOTO 10
0124             310 IF(ITOUR.NE.1) GOTO 303
0125                 JMAX=JMAX-2
0126                 ITOUR=ITOUR+1
0127                 GOTO 10
0128             303 JMAX=JMAX-1
0129                 GO TO 10
                C
```

```
                C       2) FORME UN PIC DOUBLET AVEC PIC  IND(JMAX)=1
                C
0130              700   IF((CENTR(JMAX)-CENTR(JMAX-1)).GE.(2.0 * FWHT)) GOTO 801 .
0131                    C1=CENTR(JMAX-1)
0132                    C2=CENTR(JMAX)
0133                    JDOUB=3
0134                    CALL SURF2(IRIG)
0135              801   IF(ITOUR.NE.1) GOTO 800
0136                    JMAX=0
0137                    ITOUR=ITOUR+1
0138                    GOTO 10
0139              800   JMAX=JMAX-2
0140                    IF(ITOURE.EQ.1) GOTO 60
0141                    GO TO 10
                C
                C       ETUDE DU PIC AVEC IND(JMAX)=1
                C
0142              900   IF(JMAX.EQ.1) GO TO 10
0143                    IF(IND(JMAX-1).EQ.1) GO TO 1000
0144                    GO TO 11
0145             1000   JMAX=JMAX-1
0146                    CENTR(JMAX)=CENTR1
0147                    FWHM(JMAX)=FWHM1
0148                    SIGMA(JMAX)=SIGMA1
0149                    IND(JMAX)=INDICE
0150                    ENERG(JMAX)=ENERG1
0151                    GOTO10
0152                6   IF(JMAX.EQ.0) GOTO 60
0153                    IF(IND(JMAX)-1) 60,62,60
                C
                C       BOND EN AVANT DU CANAL FINAL DE L'INTERVALLE
                C
0154               62   IF(ITOURE.GT.0) GOTO 61
0155                    IEND=CENTR1+5*FWHT
0156                    ITOURE=ITOURE+1
0157                    I=JR
0158                    GOTO 10
0159               61   JMAX=JMAX-1
0160               60   CONTINUE
0161                    RETURN
0162                    END
```

```
0001                SUBROUTINE SENSIT(RAD)
                C
0002                INTEGER*2 H1,H2
0003                REAL*8  EL1,ELEM
0004                COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0005                COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0006                COMMON COUNT(4096),SPSM(4096),DER(4096)
0007                COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0008                COMMON AREA(50),ERR(50),FWHM(50)
0009                COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0010                COMMON DECAY(10),VALA(10),PESO(10)
0011                COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0012                COMMON/ET2/PPM,ATOMI,PERC,AKEV,CPM,AREAO,UGM,LARG,H1,H2,J1
                C
0013                SP=0.
0014                CAPPA=4./1.66
0015                DO 1 J=H1,H2
0016              1 SP=SP+COUNT(J)
0017                RAD=CAPPA*(1.+SQRT(1.+2.*SP))
0018                RETURN
0019                END
```

```
0001                SUBROUTINE SURF(NCH,JS)
                C
0002                REAL*8 EL1,ELEM
0003                COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0004                COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0005                COMMON COUNT(4096),SPSM(4096),DER(4096)
0006                COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0007                COMMON AREA(50),ERR(50),FWHM(50)
0008                COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0009                COMMON DECAY(10),VALA(10),PESO(10)
0010                COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0011                DIMENSION POUNT(4096)
                C
0012                IF(JS.EQ.1) GO TO 20
0013                DO 30 J=1,NCH
0014             30 POUNT(J)=COUNT(J)
0015                GO TO 40
                C
0016             20 DO 10 I=1,NCH
0017             10 POUNT(I)=SPSM(I)
                C
0018             40 DO 1 J=1,JMAX
0019                IC=CENTR(J)+0.5
0020                IL=IC-1
0021                IR=IC+1
0022                W=SQRT(POUNT(IC))
0023                W=POUNT(IC)-W
0024                IND=0
0025                AR=POUNT(IC)
0026                IF(POUNT(IC-1).LT.W) GO TO 2
0027                IND=1
0028              2 IF(POUNT(IC+1).LT.W) GO TO 3
0029                IF(IND.EQ.1) GO TO 4
0030                AR=AR+POUNT(IC+1)
0031                IR=IR+1
0032              3 IF(IND.EQ.0) GO TO 4
0033                AR=AR+POUNT(IC-1)
0034                IL=IL-1
0035              4 CONTINUE
0036                A=POUNT(IL)+POUNT(IR)
0037                INTV=CENTR(J)+FWHM(J)*2.1231+0.5
0038                DO 5 I=IC,INTV
0039                AR=AR+A
0040                IR=IR+1
0041                IL=IL-1
0042                A1=POUNT(IR)+POUNT(IL)
0043                IF(A1.GT.A) GO TO 6
0044                A=A1
0045              5 CONTINUE
0046              6 HM=IR-IL-1
0047                A2=(POUNT(IR-1)+POUNT(IL+1))/2
0048                FONDO=A2*HM
0049                LD(J)=IR-1
```

```
0050                  LS(J)=IL+1
0051                  AREA(J)=AR-FONDO
0052                  ERR(J)=SQRT(AR+HM*FONDO/2.0)
0053                1 CONTINUE
0054                  RETURN
0055                  END
```

```
0001                  SUBROUTINE SURF2(IRIG)
                C
0002                  REAL*8 EL1,ELEM,EL2D
0003                  INTEGER*2 H1,H2
0004                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0005                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0006                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0007                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0008                  COMMON AREA(50),ERR(50),FWHM(50)
0009                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0010                  COMMON DECAY(10),VALA(10),PESO(10)
0011                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0012                  COMMON FWHT
0013                  COMMON/CT2/PPM,ATOMI,PERC,AKEV,CPM,AREAO,UGM,LARG,H1,H2,J1
0014                  COMMON/CT3/ENERG(50)
0015                  COMMON/CT7/C1,C2,JDOUB,KKK,IND2
0016                  COMMON/CT8/FDLC,FSAT,DENS
0017                  COMMON/CT9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
0018                  DIMENSION SIGMA(50)
                C
0019                  JJJ=J1
0020                  IC1=C1
0021                  IC2=C2
0022                  JC1=IC1+1
0023                  JC2=IC2+1
0024                  ASPM1=AMAX1(SPSM(IC1),SPSM(JC1))
0025                  ASPM2=AMAX1(SPSM(IC2),SPSM(JC2))
0026                  IF(ASPM1.NE.SPSM(IC1)) IC1=JC1
0027                  IF(ASPM2.NE.SPSM(IC2))IC2=JC2
0028                  IND=1
0029                  GOTO(10,20,30),JDOUB
0030               30 JDOUB=2
0031                  DO 1 K=1,JDOUB
0032                  KKK=K
0033                  GOTO (11,21),KKK
0034               10 DO 1 K=1,JDOUB
0035                  KKK=K
0036               11 AR=SPSM(IC1)
0037                  W=AR
0038                  IL=IC1-1
0039                  IPICD=IPICD+1
0040                  GOTO 4
0041               20 DO 1 K=2,JDOUB
0042                  KKK=K
0043               21 AR=SPSM(IC2)
0044                  W=AR
0045                  IL=IC2+1
0046                  IND=1
0047                  IPICD=IPICD+1
0048                4 IF(W-SPSM(IL))2,3,3
0049                3 IND=IND+1
0050                  AR=AR+SPSM(IL)
0051                  W=SPSM(IL)
```

```
0052                GOTO (40,50),KKK
0053             40 IL=IL-1
0054                GOTO 4
0055             50 IL=IL+1
0056                GOTO 4
0057              2 AR=AR*2
0058                IF(KKK.NE.1) GOTO 60
0059                IL=IL+1
0060                AR=AR-SPSM(IC1)
0061                EL2D(IPICD)=ELEM(JJJ)
0062                VCD(IPICD)=COUNT(IC1)
0063                P1D(IPICD)=ENERG(JMAX-1)
0064                CCD(IPICD)=C1
0065                V1D(IPICD)=IL
0066                CL1D(IPICD)=COUNT(IL)
0067                GOTO 70
0068             60 AR=AR-SPSM(IC2)
0069                IL=IL-1
0070                EL2D(IPICD)=ELEM(JJJ)
0071                VCD(IPICD)=COUNT(IC2)
0072                P1D(IPICD)=ENERG(JMAX)
0073                CCD(IPICD)=C2
0074                V1D(IPICD)=IL
0075                CL1D(IPICD)=COUNT(IL)
0076             70 FIND=IND*2
0077                FIND=FIND-1
0078                FOND=W*FIND
0079                ARES=AR-FOND
0080                CPM=ARES/TCON
0081                ERS=SQRT(AR+FIND*FOND/2.0)
0082                ERR1=ERS/TCON
0083                PERC=ERR1*100./CPM
0084                AREA0=CPM*FDEC
0085                UGM=AA(JJJ)*AREA0/(FLUX*FSAT)
0086                PPM=UGM/WEIGHT
0087                ATOMI=6.02E17*UGM*DENS/(PMOL(JJJ)*WEIGHT)
0088                H1=IL
0089                IF(KKK.EQ.1) LARG=IC1-IL
0090                IF(KKK.EQ.2) LARG=IL-IC2
0091                IF(KKK.EQ.1) IWR=6
0092                IF(KKK.EQ.2) IWR=7
0093                CALL PRINT(IWR,IRIG)
0094              1 CONTINUE
0095                RETURN
0096                END
```

```
0001                  SUBROUTINE KAL(N,C,E,A,B)
                C
0002                  DIMENSION C(10),E(10)
                C
0003                  FN=N
0004                  C1=0.
0005                  E1=0.
0006                  C2=0.
0007                  CE=0.
0008                  DO 1 J=1,N
0009                  C1=C1+C(J)
0010                  E1=E1+E(J)
0011                  C2=C2+C(J)**2
0012                  CE=CE+C(J)*E(J)
0013                1 CONTINUE
0014                  DEN=FN*C2-C1**2
0015                  A=(FN*CE-C1*E1)/DEN
0016                  B=(C2*E1-C1*CE)/DEN
0017                  RETURN
0018                  END
```

```
0001                  SUBROUTINE FIGURE(NCH,NSP)
                C
0002                  REAL*8 EL1,ELEM
0003                  REAL*8 EL2,EL3,EL4,EL2D
0004                  INTEGER*2 H1,H2
                C
0005                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0006                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0007                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0008                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0009                  COMMON AREA(50),ERR(50),FWHM(50)
0010                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0011                  COMMON DECAY(10),VALA(10),PESO(10)
0012                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
                C
0013                  COMMON/ET1/NIRR,IO(5),MO(5),ANOME(5),ASAMPL(3)
0014                  COMMON/ET2/PPM,ATOMI,PERC,AKEV,CPM,AREAO,UGM,LARG,H1,H2,J1
0015                  COMMON/ET3/ENERG(50)
0016                  COMMON /ET4/ EL4(10),CKK(10),VKK(10),VMAX(10),NPK
0017                  COMMON /ET5/ EL3(50),VS(50),P2(50),CS(50),VS2(50),VD2(50),CLS2(50)
                     1,CLD2(50),ISENS
0018                  COMMON /ET6/ EL2(50),VC(50),P1(50),CC(50),VS1(50),VD1(50),CLS1(50)
                     1,CLD1(50),IPICK
0019                  COMMON/ET9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
                C
0020                  DIMENSION FIO(5),FMO(5),XA(3),Z(4096),OTJ(50),OTJD(50),OTJS(50)
0021                  REAL YY(3)/2*10000000.,1./,Y(12)/2*10.,2*100.,2*1000.,2*10000.,2*1
                     100000.,2*1000000./
0022                  LOGICAL SALTO/.FALSE./
                C
0023                  NCAN=NCH
0024                  FNSP=FLOAT(NSP)
0025                  FNC=FLOAT(NCAN)
                C
                C     ***** DISEGNO DELLO SPETTRO *****
                C
0026                  XA(1)=1.
0027                  XA(2)=FNC
0028                  XA(3)=XA(2)
0029                  DYY=51.2
0030                  FNIRR=NIRR
0031                  FLUSSO=FLUX/1.E13
0032                  DO 99 K=1,NCAN
0033                  I=K
0034               99 Z(K)=I
                C
0035                  CALL DESSIN(XA,YY,3,1,1,1,0,0,DYY,31.5,0,1,'CHANNS',6,'COUNTS',-6,
                     10)
0036                  CALL DESSIN(XA,Y,2,1,1,6,0,2,DYY,-31.5,0,1,'CHANNS',6,'COUNTS',-6,
                     10)
0037                  CALL DESSIN(Z(2),COUNT(2),(NCAN-1),1,1,1,0,0,DYY,-27.,0,1,'CHANNS'
                     1,6,'COUNTS',-6,0)
                C
```

```
C      ***** DISEGNO DELLA TABELLA IN ALTO A DESTRA *****
C
0038        CALL SYMBL4(2.,29.5,1.,0.,ANOME,20)
C
0039        XB=38.0
0040        XC=33.0
0041        XTAB=26.0
0042        YTAB=29.5
0043        CALL SYMBL4(XTAB,YTAB,0.3,0.,'IRRAGGIAMENTO',13)
0044        CALL NUMBER((XTAB+4.),YTAB,0.3,0.,FNIRR,-1)
0045        CALL NUMBER((XTAB+6.),YTAB,0.3,0.,TIRR,3)
0046        CALL SYMBL4((XTAB+8.5),YTAB,0.3,0.,'MIN   DATA',10)
0047        DO 1 I=1,5
0048        FID(I)=ID(I)
0049        CALL NUMBER(XB,YTAB,0.3,0.,FID(I),-1)
0050        XB=XB+1.2
0051      1 CONTINUE
C
0052        CALL SYMBL4((XTAB+13.0),YTAB,0.3,0.,'FLUSSO',6)
0053        CALL NUMBER((XTAB+20.5),YTAB,0.3,0.,FLUSSO,5)
0054        CALL SYMBL4((XTAB+22.5),YTAB,0.3,0.,'(X10   )',8)
0055        CALL SYMBL4((XTAB+23.3),(YTAB+0.2),0.3,0.,'13',2)
C
0056        CALL SYMBL4(XTAB,(YTAB-0.7),0.3,0.,'MISURA  TCON.',13)
0057        CALL NUMBER((XTAB+4.),(YTAB-0.7),0.3,0.,TCON,3)
0058        CALL SYMBL4((XTAB+6.),(YTAB-0.7),0.3,0.,'MIN                DATA',20)
0059        DO 2 J=1,5
0060        FMO(J)=MO(J)
0061        CALL NUMBER(XC,(YTAB-0.7),0.3,0.,FMO(J),-1)
0062        XC=XC+1.2
0063      2 CONTINUE
0064        CALL SYMBL4((XTAB+13.0),(YTAB-0.7),0.3,0.,'DECAD.',6)
0065        CALL NUMBER((XTAB+20.5),(YTAB-0.7),0.3,0.,TDEC1,3)
C
0066        CALL SYMBL4(XTAB,(YTAB-1.4),0.3,0.,'CAMPIONE  N.',12)
0067        CALL SYMBL4((XTAB+3.5),(YTAB-1.4),0.3,0.,ASAMPL,12)
0068        CALL SYMBL4((XTAB+7.0),(YTAB-1.4),0.3,0.,'PESO G.',7)
0069        CALL NUMBER((XTAB+9.5),(YTAB-1.4),0.3,0.,WEIGHT,6)
0070        CALL SYMBL4((XTAB+13.0),(YTAB-1.4),0.3,0.,'N. SPETTRO',10)
0071        CALL NUMBER((XTAB+16.5),(YTAB-1.4),0.3,0.,FNSP,-1)
C
C
C      ***** DISEGNO INDICAZIONI PPM ELEMENTI TROVATI *****
C
0072        IF(NCAN-1024) 3,4,5
0073      3 FNORM=10.0
0074        GO TO 10
0075      4 FNORM=20.0
0076        GO TO 10
0077      5 FNORM=40.0
0078     10 CONTINUE
0079        IF(IPICK.LE.0) GO TO 960
0080        DO 97 IK=1,IPICK
```

```
0081                  X1=(CC(IK)-1.)/FNORM
0082                  X2=(VS1(IK)-1.)/FNORM
0083                  X3=(VD1(IK)-1.)/FNORM
0084                  Y1=ALOG10(VC(IK))*4.5
0085                  Y2=ALOG10(CLS1(IK))*4.5
0086                  Y3=ALOG10(CLD1(IK))*4.5
0087                  CALL PLOT(X2,Y2,3)
0088                  CALL PLOT(X3,Y3,2)
0089                  Y8=Y1+3.0
0090                  IF(IK.EQ.1) GO TO 30
0091                  IPAS=0
0092                  L=IK-1
0093                  DO 101 J=1,L
0094                  DTJ(IK)=ABS(P1(IK)-P1(J))
0095                  IF(DTJ(IK).EQ.0)IPAS=IPAS+1
0096                  IF((DTJ(IK).LT.8.0).AND.(IPAS.EQ.0))Y8=Y8+2.0
0097              101 IF(DTJ(IK).EQ.0) Y8=Y8+2.0
0098                  IF(IPAS.EQ.0) GOTO 30
0099                  CALL SYMBL4(X1,Y8+2.5,0.2,90.,EL2(IK),8)
0100                  GO TO 97
0101               30 CALL PLOT(X1,(Y1+1.),3)
0102                  CALL PLOT(X1,Y8,2)
0103                  CALL SYMBL4((X1-0.15),(Y8+0.5),0.3,0.,CARSP(92),1)
0104                  CALL NUMBER(X1,(Y8+1.3),0.2,90.,P1(IK),1)
0105                  CALL SYMBL4(X1,(Y8+2.5),0.2,90.,EL2(IK),8)
0106               97 CONTINUE
0107              960 CONTINUE
                C
                C
                C     DISEGNO INDICAZIONI PICCO DOPPIO
                C
0108                  IF (IPICD.LE.0) GOTO 96
0109                  DO 120 IK=1,IPICD
0110                  EL2(IK)=EL2D(IK)
0111                  VC(IK)=VCD(IK)
0112                  P1(IK)=P1D(IK)
0113                  CC(IK)=CCD(IK)
0114                  VS1(IK)=V1D(IK)
0115                  CLS1(IK)=CL1D(IK)
0116                  X1=(CC(IK)-1.)/FNORM
0117                  X2=(VS1(IK)-1.)/FNORM
0118                  Y1=ALOG10(VC(IK))*4.5
0119                  Y2=ALOG10(CLS1(IK))*4.5
0120                  CALL PLOT(X2,Y2,3)
0121                  CALL PLOT(X1,Y2,2)
0122                  Y8=Y1
0123                  IF(IK.EQ.1) GOTO 52
0124                  IPAS=0
0125                  ID=IK-1
0126                  DO 51 J=1,ID
0127                  DTJD(IK)=ABS(P1D(IK)-P1D(J))
0128                  IF(DTJD(IK).EQ.0) IPAS=IPAS+1
0129               51 IF(DTJD(IK).EQ.0) Y8=Y8+2.0
```

```
0130                IF(IPAS.EQ.0) GOTO 50
0131                OTK=ABS(P1D(IK)-P1D(IK-1))
0132                IF((P1D(IK).GT.P1D(IK-1)).AND.(OTK.LT.8.)) Y8=Y8-2.0
0133                CALL SYMBL4(X1,(Y8+9.),0.2,90.,EL2(IK),8)
0134                GO TO 120
0135             50 OTK=ABS(P1D(IK)-P1D(IK-1))
0136                IF(OTK.LE.8) Y8=Y8-2.
0137             52 CALL PLOT(X1,(Y1+1.),3)
0138                CALL PLOT(X1,Y8+6.5,2)
0139                CALL SYMBL4((X1-0.15),(Y8+7.0),0.3,0.,CARSP(92),1)
0140                CALL NUMBER(X1,(Y8+7.8),0.2,90.,P1(IK),1)
0141                CALL SYMBL4(X1,(Y8+9.0),0.2,90.,EL2(IK),8)
0142            120 CONTINUE
0143             96 CONTINUE
                C
                C      **** DISEGNO INDICAZIONI PPM SENSIBILITA ****
                C
0144                IF(ISENS.LE.0) GO TO 95
0145                DO 94 JK=1,ISENS
0146                X4=(CS(JK)-1.)/FNORM
0147                X5=(VS2(JK)-1.)/FNORM
0148                X6=(VD2(JK)-1.)/FNORM
0149                Y4=ALOG10(VS(JK))*4.5
0150                Y5=ALOG10(CLS2(JK))*4.5
0151                Y6=ALOG10(CLD2(JK))*4.5
0152                Y9=Y4+3.0
0153                IF(JK.EQ.1) GO TO 6
0154                IPAS=0
0155                IS=JK-1
0156                DO 53 J=1,IS
0157                OTJS(JK)=ABS(P2(JK)-P2(J))
0158                IF(OTJS(JK).EQ.0) IPAS=IPAS+1
0159                IF((OTJS(JK).LT.8.0).AND.(IPAS.EQ.0)) Y9=Y9+3.0
0160             53 IF(OTJS(JK).EQ.0) Y9=Y9+2.0
0161                IF(IPAS.EQ.0) GOTO 6
0162                CALL SYMBL4(X4,Y9+1.7,0.2,90.,EL3(JK),8)
0163                GO TO 94
0164              6 CALL PLOT(X4,(Y4+1.),3)
0165                CALL PLOT(X4,Y9,2)
0166                CALL NUMBER(X4,(Y9+0.5),0.2,90.,P2(JK),1)
0167                CALL SYMBL4(X4,(Y9+1.7),0.2,90.,EL3(JK),8)
0168             94 CONTINUE
0169             95 CONTINUE
                C
                C
0170                IF(SALTO) GO TO 11
0171                CALL FINIM(0.,35.)
0172                SALTO=.NOT.SALTO
0173                GO TO 100
0174             11 CALL FINIM(65.,-35.)
0175                SALTO=.NOT.SALTO
0176            100 RETURN
0177                END
```

```
0001                  SUBROUTINE PRINT(IWR,IRIG)
                C
                C     **********  IN QUESTA ROUTINE SI FANNO TUTTE LE STAMPE  **********
                C
0002                  REAL*8 EL1,ELEM
0003                  INTEGER*2 H1,H2
                C
0004                  COMMON EL1(10),EN1(10),ICAN(10),INT(10)
0005                  COMMON ELEM(50),EN(50),FWT(50),XLAM(50),AA(50)
0006                  COMMON COUNT(4096),SPSM(4096),DER(4096)
0007                  COMMON ISTAR,IEND,INDEX,JMAX,FMEDIO
0008                  COMMON AREA(50),ERR(50),FWHM(50)
0009                  COMMON LS(50),CENTR(50),LD(50),PMOL(50)
0010                  COMMON DECAY(10),VALA(10),PESO(10)
0011                  COMMON TDEC1,TIRR,TCON,ALFA,BETA,FLUX,WEIGHT
0012                  COMMON/ET1/NIRR,IO(5),MO(5),ANOME(5),ASAMPL(3)
0013                  COMMON/ET2/PPM,ATOMI,PERC,AKEV,CPM,AREAO,UGM,LARG,H1,H2,J1
0014                  COMMON/ET3/ENERG(50)
0015                  COMMON/ET7/C1,C2,JDOUB,KKK,IND2
0016                  COMMON/ET9/EL2D(50),VCD(50),P1D(50),CCD(50),V1D(50),CL1D(50),IPICD
                C
0017                  JJJ=J1
0018                  J=J1
0019                  IF(IRIG-53) 20,21,21
0020               21 WRITE (6,906)
0021                  IRIG=0
0022                  WRITE (6,902)
0023                  WRITE (6,900)
0024                  WRITE(6,901)
0025                  WRITE (6,900)
0026                  WRITE (6,902)
0027                  IRIG=IRIG+5
                C
0028               20 GO TO(1,2,3,4,5,6,7,8,9,10),IWR
                C
0029                1 CONTINUE
0030                  WRITE (6,1008) NIRR,TIRR,(IO(K),K=1,5),FLUX
0031                  WRITE (6,1009) TCON,(MO(K),K=1,5),TDEC1
0032                  WRITE (6,1012) (ASAMPL(K),K=1,3),(ANOME(K),K=1,5)
0033                  WRITE (6,1011)
0034                  GO TO 100
                C
0035                2 CONTINUE
0036                  WRITE (6,1008) NIRR,TIRR,(IO(K),K=1,5),FLUX
0037                  WRITE (6,1009) TCON,(MO(K),K=1,5),TDEC1
0038                  WRITE (6,1010) (ASAMPL(K),K=1,3),WEIGHT,ALFA,BETA,(ANOME(K),K=1,5)
0039                  WRITE (6,1011)
0040                  GO TO 100
                C
0041                3 IRIG=0
0042                  WRITE (6,902)
0043                  WRITE (6,900)
0044                  WRITE (6,901)
```

```
0045                WRITE (6,900)
0046                WRITE (6,902)
0047                IRIG=IRIG+5
0048                GO TO 100
                C
0049              4 CONTINUE
0050                WRITE (6,900)
0051                WRITE (6,904) ELEM(J),EN(J)
0052                IRIG=IRIG+2
0053                GO TO 100
                C
0054              5 CONTINUE
0055                WRITE (6,900)
0056                WRITE (6,905) ELEM(J),PPM,AA(J),EN(J),ATOMI
0057                IRIG=IRIG+2
0058                GO TO 100
                C
0059              6 CONTINUE
0060                WRITE(6,900)
0061                WRITE(6,909) ELEM(JJJ),PPM,PERC,AA(JJJ),EN(JJJ),ENERG(JMAX-1),H1,L
                   1ARG,CPM,ENERG(JMAX-1),ENERG(JMAX),ATOMI
0062                IRIG=IRIG+2
0063                GO TO 100
                C
0064              7 CONTINUE
0065                WRITE(6,900)
0066                WRITE(6,910) ELEM(JJJ),PPM,PERC,AA(JJJ),EN(JJJ),ENERG(JMAX),H1,LAR
                   1G,CPM,ENERG(JMAX-1),ENERG(JMAX),ATOMI
0067                IRIG=IRIG+2
0068                GO TO 100
                C
0069              8 CONTINUE
0070                WRITE(6,900)
0071                IRIG=IRIG+2
0072                GO TO 100
                C
0073              9 CONTINUE
0074                WRITE (6,900)
0075                WRITE (6,903) ELEM(J),PPM,PERC,AA(J),EN(J),AKEV,H1,LARG,CPM,AREAO,
                   1UGM,ATOMI
0076                IRIG=IRIG+2
0077                GO TO 100
                C
0078             10 CONTINUE
0079                WRITE (6,900)
0080                WRITE (6,907) ELEM(J),PPM,PERC,AA(J),EN(J),AKEV,H1,LARG,CPM,AREAO,
                   1UGM,ATOMI
0081                IRIG=IRIG+2
                C
                C
0082              900 FORMAT (1H ,'1',10X,'I',11X,'I',9X,'I I',11X,'I',9X,'I',9X,'I',10X
                     1,'I',11X,'I',11X,'I',11X,'I',11X,'I')
0083              901 FORMAT (1H ,'I   ELEM   I   P.P.M.  I ERR.O/O I I VALORE A  I KEV
```

```
                1(T) I KEV (S) I LS   WT I   C P M   I AREA ZERO I   UGM    I  A
               2T/CC    I')
0084          902 FORMAT(1H ,' I----------I----------I----------I I----------I------
               1---I----------I----------I----------I----------I----------I-----
               2------I')
0085          903 FORMAT (1H ,'I ',A8,' I ',1PE9.3,' I ',0PF6.2,' I I ',1PE9.3,' I
               1',0PF7.2,' I ',F7.2,' I ',2I4,' I ',1PE9.3,' I ',E9.3,' I ',E9.3,'
               2 I ',E9.3,' I')
0086          904 FORMAT (1H ,'I ',A8,' I OUT SCALE I',9X,'I I',11X,'I ',F7.2,' I ',
               18X,'I',10X,'I',11X,'I',11X,'I',11X,'I',11X,'I')
0087          905 FORMAT (1H ,'I ',A8,' I(',1PE9.3,')I',9X,'I I ',E9.3,' I ',0PF7.2,
               1' I',9X,'I',10X,'I',11X,'I',11X,'I',11X,'I ',1PE9.3,' I')
0088          906 FORMAT(1H1)
0089          907 FORMAT (1H ,'I ',A8,' I ',1PE9.3,' I ',0PF6.2,' I*I ',1PE9.3,' I
               1',0PF7.2,' I ',F7.2,' I ',2I4,' I ',1PE9.3,' I ',E9.3,' I ',E9.3,'
               2 I ',E9.3,' I')
0090          909 FORMAT (1H ,'I ',A8,' I ',1PE9.3,' I ',0PF6.2,' I I ',1PE9.3,' I
               1',0PF7.2,' I ',F7.2,' I ',2I4,' I ',1PE9.3,' I','PRIMO (',0PF7.2,1
               2X,F7.2,')','I ',1PE9.3,' I')
0091          910 FORMAT (1H ,'I ',A8,' I ',1PE9.3,' I ',0PF6.2,' I I ',1PE9.3,' I
               1',0PF7.2,' I ',F7.2,' I ',2I4,' I ',1PE9.3,' I','SECOND(',0PF7.2,1
               2X,F7.2,')','I ',1PE9.3,' I')
0092         1008 FORMAT (1H ,'- IRRAGGIAMENTO -',I7,2X,F12.3,' MINUTI    DATA ',5I
               15,5X,'FLUSSO',3X,1PE10.4/)
0093         1009 FORMAT (1H ,'- MISURA -  TEMPO CONTEGGIO  ',F8.3,' MINUTI    DAT
               1A ',5I5,5X,'DECADIMENTO ',F12.3,' MINUTI'/)
0094         1010 FORMAT (1H ,'- CAMPIONE -',2X,3A4,5X,'PESO  ',F12.8,' G    CALIB.
               1    Y=',F7.3,'*X+',F8.3,8X,'PROBLEMA   ',5A4)
0095         1011 FORMAT (1H ,93X,'-------------------------------'/)
0096         1012 FORMAT (1H ,'- CAMPIONE -',2X,3A4,67X,'PROBLEMA   ',5A4)
                C
                C
0097          100 RETURN
0098              END
```

IN QUESTO PROGRAMMA CI SONO 3 SPETTRI PERFORATI CON CODICE ASCII
LIBRERIA

ELEM		EN(KEV)	RES(KEV)	DEC(MIN)	VALORE A	P. MOL.	ELEM		EN(KEV)	RES(KEV)	DEC(MIN)	VALORE A	P.MOL.
L1AG	110	657.80	3.000	1.850E-06	6.911E 08	107.870	L2CA	47	489.50	2.900	1.010E-04	5.761E 13	40.080
L1CA	47	807.40	3.100	1.010E-04	9.274E 13	40.080	L2CA	47	1296.40	4.200	1.010E-04	1.130E 14	40.080
L2CE	141	145.40	2.400	1.502E-05	1.736E 09	140.130	L2CO	60	1173.20	4.100	2.496E-07	2.612E 07	58.900
L1CO	60	1332.40	4.200	2.496E-07	2.893E 07	58.900	L2CR	51	320.00	2.600	1.730E-05	2.406E 09	52.000
L2CS	134	604.70	3.000	5.980E-07	4.100E 07	132.910	L1CS	134	795.00	3.100	5.980E-07	5.683E 07	132.910
L1FE	59	1098.60	4.100	1.060E-05	3.914E 11	55.850	L2FE	59	1291.50	4.200	1.060E-05	5.812E 11	55.850
L2HG	203	279.10	2.500	1.035E-05	1.018E 09	200.610	M2LA	140	328.60	2.600	2.870E-04	4.769E 08	138.920
M2LA	140	486.80	2.900	2.870E-04	3.030E 08	138.920	M2LA	140	1595.40	4.600	2.870E-04	3.561E 08	138.920
L1RB	86	1076.60	4.100	3.320E-05	3.972E 10	85.500	L1RU	103	497.00	2.900	1.201E-05	2.034E 09	101.100
L1RU	103	610.20	3.100	1.201E-05	3.004E 09	101.100	L2SB	124	602.60	3.100	8.030E-06	5.952E 08	121.760
L1SB	124	1690.70	4.700	8.030E-06	2.976E 09	121.760	L1SC	46	889.40	3.100	5.675E-06	2.427E 07	45.000
L2SC	46	1120.30	4.100	5.675E-06	2.926E 07	45.000	L2SR	85	514.00	2.900	7.400E-06	1.395E 11	87.630
L2ZN	65	511.00	2.900	1.965E-06	6.458E 10	65.380	L2ZN	65	1115.40	4.200	1.965E-06	6.818E 09	65.380
L1ZR	95	724.00	3.000	7.390E-06	1.877E 11	91.220	L2ZR	95	756.60	3.000	7.390E-06	1.509E 11	91.220

SPETTRO N. 1 CANALI 2048 TCON 10.000 MINUTI DATA 1973 7 11 10 30 DECAD 60150.000 MIN

	1	2	3	4	5	6	7	8	9	10
0	600.	9.	27.	72.	120.	89.	79.	95.	79.	56.
1	104.	401.	1636.	8538.	1230.	439.	278.	101.	19.	22.
2	21.	23.	31.	50.	74.	83.	130.	144.	215.	330.
3	610.	2293.	5431.	5885.	5878.	5832.	5692.	5814.	6174.	6428.
4	6500.	7203.	8902.	6510.	5199.	3629.	3394.	3511.	3807.	3269.
5	2658.	2262.	2116.	2059.	2012.	2151.	2046.	1961.	1952.	1860.
6	1924.	2005.	1950.	1902.	1962.	1910.	2008.	1907.	1824.	1830.
7	1914.	1932.	1943.	1873.	1839.	1900.	1854.	1809.	1915.	1852.
8	1647.	1911.	1876.	1885.	1892.	1892.	1800.	1905.	1896.	1963.
9	1928.	1938.	1957.	1910.	1831.	1915.	1912.	1933.	1927.	1853.
10	1937.	2003.	2079.	2003.	1934.	2099.	2044.	1910.	2091.	2066.
11	2057.	2079.	2132.	2178.	2174.	2125.	2231.	2246.	2284.	2382.
12	2480.	2740.	3453.	7113.	12206.	8491.	3499.	1811.	1467.	1413.
13	1443.	1376.	1287.	1326.	1356.	1329.	1357.	1244.	1330.	1285.
14	1219.	1289.	1286.	1322.	1283.	1274.	1303.	1308.	1300.	1222.
15	1295.	1281.	1319.	1290.	1325.	1305.	1341.	1262.	1301.	1305.
16	1262.	1274.	1325.	1284.	1281.	1171.	1197.	1209.	1274.	1239.
17	1164.	1142.	1139.	1206.	1188.	1174.	1200.	1159.	1153.	1162.
18	1177.	1151.	1158.	1160.	1215.	1164.	1216.	1138.	1172.	1154.
19	1174.	1186.	1192.	1178.	1183.	1196.	1162.	1148.	1136.	1124.
20	1035.	1124.	1117.	1056.	1047.	1088.	1117.	1102.	1128.	1133.
21	1049.	1079.	1146.	1114.	1125.	1197.	1132.	1116.	1147.	1179.
22	1155.	1157.	1104.	1161.	1153.	1093.	1044.	1099.	1081.	1060.
23	1135.	1081.	1081.	1094.	1071.	1130.	1149.	1065.	1091.	1115.
24	1078.	1140.	1106.	1169.	1237.	1732.	2663.	2440.	1396.	1223.
25	1180.	1100.	1000.	1027.	1021.	1053.	1000.	972.	992.	1017.
26	1015.	980.	991.	971.	993.	955.	1027.	898.	901.	979.
27	902.	926.	976.	978.	995.	952.	1012.	944.	917.	944.
28	948.	936.	1015.	906.	913.	913.	985.	889.	899.	945.
29	899.	962.	940.	943.	905.	943.	931.	1040.	962.	920.
30	876.	860.	879.	900.	880.	812.	897.	993.	836.	894.
31	907.	911.	956.	955.	896.	918.	621.	887.	883.	894.
32	893.	906.	808.	902.	918.	905.	898.	912.	892.	885.
33	910.	927.	977.	890.	898.	926.	962.	952.	993.	954.
34	970.	956.	1005.	1319.	2540.	5241.	5005.	2075.	902.	742.
35	736.	787.	821.	758.	765.	726.	797.	692.	760.	743.
36	760.	732.	748.	770.	763.	768.	777.	812.	869.	888.
37	874.	822.	799.	786.	762.	725.	785.	778.	775.	769.
38	774.	762.	775.	785.	740.	772.	740.	776.	732.	768.
39	775.	690.	711.	751.	711.	747.	742.	739.	752.	759.
40	781.	717.	745.	765.	748.	723.	755.	793.	795.	752.
41	789.	856.	1047.	892.	799.	764.	762.	729.	811.	763.
42	705.	681.	713.	700.	758.	795.	723.	724.	701.	712.
43	734.	699.	738.	723.	690.	772.	704.	734.	707.	785.
44	736.	740.	725.	795.	985.	1050.	944.	747.	724.	714.
45	734.	705.	774.	705.	703.	738.	776.	783.	727.	734.
46	746.	687.	760.	737.	754.	693.	694.	737.	764.	728.
47	734.	722.	715.	728.	756.	665.	715.	702.	701.	632.
48	716.	679.	682.	691.	644.	677.	649.	702.	638.	670.
49	703.	674.	669.	655.	664.	577.	628.	599.	615.	603.
50	584.	618.	605.	651.	660.	640.	627.	605.	600.	636.
51	585.	631.	674.	580.	645.	615.	589.	653.	588.	594.
52	565.	597.	570.	582.	546.	605.	621.	589.	560.	590.
53	601.	592.	621.	573.	569.	611.	599.	578.	586.	566.
54	603.	577.	559.	563.	533.	579.	570.	571.	532.	555.
55	608.	555.	549.	604.	535.	573.	589.	543.	576.	593.

56	548.	569.	559.	615.	607.	597.	602.	547.	571.	573.
57	580.	524.	553.	525.	531.	558.	600.	554.	559.	558.
58	544.	601.	574.	588.	591.	566.	623.	638.	590.	553.
59	506.	607.	592.	638.	579.	583.	568.	533.	574.	539.
60	515.	539.	543.	565.	525.	537.	561.	529.	524.	552.
61	559.	543.	567.	561.	555.	543.	572.	546.	523.	533.
62	564.	586.	562.	594.	540.	599.	578.	556.	564.	555.
63	585.	623.	558.	568.	621.	555.	592.	573.	611.	576.
64	561.	556.	606.	619.	597.	607.	646.	599.	605.	589.
65	636.	590.	612.	655.	675.	659.	677.	767.	798.	916.
66	1639.	3893.	6264.	4324.	1483.	620.	468.	533.	496.	465.
67	444.	493.	495.	496.	496.	471.	497.	531.	491.	538.
68	528.	475.	501.	467.	503.	530.	489.	536.	571.	566.
69	515.	489.	495.	513.	507.	480.	473.	531.	495.	504.
70	477.	478.	435.	508.	460.	487.	508.	503.	497.	490.
71	496.	477.	510.	522.	511.	521.	490.	509.	478.	510.
72	504.	540.	528.	504.	630.	554.	507.	467.	520.	455.
73	492.	511.	499.	517.	522.	548.	492.	521.	548.	521.
74	522.	498.	518.	487.	524.	500.	532.	517.	531.	482.
75	526.	532.	510.	554.	499.	541.	520.	555.	501.	517.
76	518.	571.	497.	535.	541.	513.	511.	546.	473.	499.
77	533.	528.	503.	526.	514.	540.	557.	695.	976.	1368.
78	1131.	679.	511.	511.	500.	454.	511.	523.	499.	513.
79	503.	524.	493.	519.	526.	525.	485.	462.	533.	476.
80	511.	499.	492.	526.	526.	548.	512.	495.	497.	493.
81	506.	553.	491.	546.	559.	515.	497.	547.	511.	499.
82	506.	567.	476.	542.	518.	517.	504.	528.	556.	493.
83	501.	498.	514.	516.	516.	541.	508.	511.	560.	507.
84	505.	500.	491.	485.	542.	533.	516.	508.	487.	492.
85	573.	510.	529.	552.	554.	527.	551.	539.	536.	521.
86	551.	552.	574.	564.	508.	511.	596.	694.	704.	590.
87	555.	543.	563.	616.	536.	541.	545.	511.	538.	575.
88	525.	524.	529.	561.	549.	574.	520.	518.	558.	553.
89	528.	570.	570.	578.	528.	571.	554.	498.	522.	536.
90	502.	503.	567.	507.	545.	555.	546.	540.	557.	549.
91	512.	547.	563.	571.	513.	565.	532.	552.	578.	584.
92	558.	568.	581.	531.	508.	582.	626.	544.	584.	576.
93	513.	578.	581.	533.	585.	523.	600.	554.	530.	582.
94	564.	622.	581.	619.	575.	527.	550.	618.	585.	584.
95	606.	506.	602.	566.	637.	572.	582.	559.	602.	581.
96	596.	598.	704.	929.	1081.	932.	665.	531.	489.	466.
97	447.	521.	454.	479.	497.	443.	485.	451.	422.	454.
98	491.	414.	474.	449.	468.	453.	467.	449.	413.	450.
99	447.	441.	467.	397.	461.	502.	464.	463.	492.	417.
100	458.	472.	424.	457.	508.	511.	485.	397.	431.	387.
101	455.	423.	593.	387.	386.	305.	402.	416.	388.	439.
102	385.	411.	401.	386.	413.	427.	403.	400.	392.	382.
103	429.	411.	487.	357.	378.	389.	377.	395.	391.	414.
104	421.	406.	407.	367.	398.	374.	416.	374.	365.	385.
105	391.	405.	373.	411.	369.	369.	360.	399.	371.	360.
106	381.	379.	391.	392.	370.	370.	407.	369.	391.	383.
107	364.	386.	410.	410.	392.	391.	431.	392.	414.	403.
108	406.	419.	400.	405.	516.	675.	748.	682.	519.	495.
109	460.	460.	442.	400.	370.	412.	408.	361.	402.	359.
110	400.	389.	404.	360.	399.	359.	402.	418.	385.	485.
111	508.	728.	824.	743.	505.	395.	416.	332.	338.	360.
112	334.	395.	558.	319.	350.	308.	317.	346.	309.	315.
113	318.	323.	283.	255.	234.	311.	291.	286.	317.	290.
114	283.	282.	284.	268.	295.	295.	320.	301.	292.	308.
115	296.	316.	321.	300.	305.	286.	372.	335.	338.	327.
116	351.	330.	372.	336.	336.	403.	438.	449.	492.	602.

117	920.	1882.	4451.	6722.	5819.	2649.	671.	255.	210.	168.
118	175.	162.	177.	162.	142.	170.	177.	167.	147.	137.
119	166.	172.	153.	160.	144.	154.	134.	134.	129.	168.
120	135.	128.	117.	148.	143.	128.	127.	135.	127.	114.
121	141.	101.	141.	141.	137.	101.	134.	93.	113.	101.
122	121.	118.	109.	102.	108.	121.	94.	82.	107.	110.
123	120.	118.	121.	93.	110.	90.	111.	109.	109.	95.
124	97.	79.	88.	85.	100.	101.	112.	93.	88.	108.
125	109.	105.	95.	107.	100.	81.	106.	92.	91.	88.
126	89.	94.	103.	106.	82.	95.	101.	87.	87.	100.
127	97.	101.	117.	141.	180.	177.	163.	111.	97.	97.
128	101.	96.	93.	91.	101.	88.	102.	113.	85.	90.
129	83.	101.	116.	118.	104.	123.	110.	124.	143.	152.
130	159.	149.	107.	114.	127.	117.	113.	112.	106.	104.
131	126.	117.	152.	122.	136.	140.	130.	153.	166.	170.
132	172.	160.	142.	187.	204.	198.	248.	273.	401.	673.
133	1405.	3194.	4951.	5234.	2883.	850.	203.	66.	35.	49.
134	42.	30.	32.	32.	33.	47.	27.	24.	30.	31.
135	29.	27.	24.	35.	27.	23.	30.	32.	22.	26.
136	25.	30.	33.	27.	29.	39.	19.	32.	31.	25.
137	26.	33.	28.	28.	29.	29.	36.	27.	30.	34.
138	34.	31.	29.	30.	51.	33.	37.	35.	27.	35.
139	29.	31.	27.	24.	29.	31.	37.	46.	35.	34.
140	42.	36.	47.	51.	58.	88.	221.	416.	557.	431.
141	245.	62.	51.	40.	82.	25.	35.	24.	21.	19.
142	32.	22.	36.	21.	26.	28.	18.	28.	22.	20.
143	23.	25.	25.	28.	30.	25.	17.	26.	17.	11.
144	19.	25.	22.	28.	22.	23.	29.	22.	22.	26.
145	24.	23.	24.	26.	13.	24.	26.	27.	27.	22.
146	21.	15.	13.	16.	19.	17.	24.	13.	18.	11.
147	17.	20.	13.	14.	17.	17.	15.	15.	17.	18.
148	17.	20.	15.	21.	14.	20.	16.	11.	18.	15.
149	22.	21.	20.	19.	20.	17.	22.	14.	9.	16.
150	14.	17.	18.	15.	20.	18.	25.	24.	15.	17.
151	16.	20.	24.	16.	15.	14.	18.	19.	13.	14.
152	19.	17.	11.	15.	15.	18.	15.	24.	27.	39.
153	29.	24.	15.	13.	9.	11.	11.	16.	13.	16.
154	9.	18.	13.	14.	16.	15.	12.	12.	15.	27.
155	16.	16.	13.	14.	17.	11.	14.	16.	9.	13.
156	14.	11.	19.	16.	11.	10.	12.	12.	10.	12.
157	16.	10.	19.	19.	14.	16.	19.	15.	16.	15.
158	10.	9.	13.	12.	11.	18.	9.	13.	14.	11.
159	11.	13.	13.	15.	19.	20.	20.	15.	19.	22.
160	16.	19.	16.	13.	12.	8.	7.	12.	17.	13.
161	7.	15.	8.	14.	13.	12.	15.	10.	19.	13.
162	13.	11.	7.	14.	10.	13.	11.	8.	18.	10.
163	12.	13.	15.	14.	17.	14.	16.	17.	9.	7.
164	18.	12.	17.	14.	18.	13.	16.	13.	7.	15.
165	6.	7.	12.	12.	7.	10.	17.	14.	15.	10.
166	12.	10.	5.	13.	12.	15.	10.	11.	4.	9.
167	13.	15.	9.	16.	14.	7.	7.	10.	11.	10.
168	8.	9.	10.	14.	9.	7.	15.	9.	11.	4.
169	13.	20.	14.	13.	22.	13.	13.	13.	14.	14.
170	9.	15.	16.	12.	10.	12.	9.	6.	10.	10.
171	11.	15.	14.	10.	11.	9.	17.	12.	11.	7.
172	13.	9.	12.	3.	7.	10.	4.	7.	11.	10.
173	16.	12.	9.	11.	13.	12.	7.	11.	11.	11.
174	13.	5.	18.	9.	11.	11.	12.	13.	8.	13.
175	7.	13.	14.	14.	11.	12.	15.	17.	7.	12.
176	10.	9.	6.	8.	6.	11.	8.	4.	5.	10.
177	10.	6.	8.	10.	19.	13.	11.	9.	10.	12.

178	7.	11.	10.	11.	12.	11.	9.	10.	11.	13.
179	14.	10.	17.	8.	10.	7.	18.	10.	16.	6.
180	4.	12.	12.	14.	7.	12.	15.	3.	12.	9.
181	8.	8.	15.	15.	5.	9.	10.	8.	8.	9.
182	8.	13.	9.	9.	12.	8.	5.	10.	8.	11.
183	13.	7.	13.	10.	12.	10.	9.	12.	9.	11.
184	5.	9.	6.	6.	9.	9.	9.	7.	10.	8.
185	12.	9.	7.	5.	8.	6.	7.	10.	9.	8.
186	5.	6.	7.	7.	9.	13.	11.	9.	11.	8.
187	7.	8.	5.	10.	11.	8.	10.	9.	9.	6.
188	11.	10.	8.	7.	8.	8.	9.	10.	10.	7.
189	7.	8.	13.	7.	7.	7.	9.	12.	7.	4.
190	5.	11.	3.	9.	10.	14.	9.	13.	10.	4.
191	8.	16.	9.	6.	7.	10.	12.	5.	6.	5.
192	7.	10.	5.	10.	8.	8.	10.	7.	10.	10.
193	11.	11.	14.	7.	11.	8.	4.	11.	10.	12.
194	10.	9.	11.	11.	9.	5.	5.	13.	5.	6.
195	8.	9.	9.	13.	11.	4.	12.	6.	7.	7.
196	6.	7.	5.	8.	10.	11.	4.	6.	7.	11.
197	7.	9.	8.	6.	6.	9.	4.	9.	7.	4.
198	7.	7.	8.	7.	15.	10.	9.	8.	4.	7.
199	2.	11.	5.	7.	8.	9.	9.	11.	6.	4.
200	12.	8.	5.	7.	3.	9.	8.	7.	5.	2.
201	5.	5.	14.	8.	6.	7.	6.	6.	9.	8.
202	4.	9.	7.	1.	4.	12.	11.	9.	10.	5.
203	3.	7.	6.	2.	5.	8.	8.	4.	5.	8.
204	5.	9.	6.	7.	5.	6.	5.	4.		

- IRRAGGIAMENTO - 7772 34903.000 MINUTI DATA 1973 5 30 16 0 FLUSSO 4.9500E 12
- MISURA - TEMPO CONTEGGIO 10.000 MINUTI DATA 1973 7 11 10 30 DECADIMENTO 60150.000 MINUTI
- CAMPIONE - CALIB 100

PROBLEMA ACQUA DI MARE

N.	ELEM	EN	PESO (G)	CENTR	C P M	AREA ZERO	A SPER	A TEOR	FATT CORR
1	EL1	122.30	1.00000000	125.12	2.728E 03	2.745E 03	6.514E 12	5.400E 08	1.206E 04
2	EL2	245.00	1.00000000	247.33	5.017E 02	5.049E 02	3.542E 13	1.590E 08	2.227E 05
3	EL3	349.40	1.00000000	346.42	1.215E 03	1.223E 03	1.462E 13	2.710E 08	5.395E 04
4	CS	661.62	1.00000000	663.05	1.471E 03	1.493E 03	2.826E 13	5.300E 07	9.333E 05
5	CC1	1173.20	1.00000000	1174.23	2.211E 03	2.244E 03	1.880E 13	9.100E 06	2.066E 06
6	CC2	1332.40	1.00000000	1333.47	1.942E 03	1.971E 03	2.141E 13	8.130E 06	2.633E 06
7	EU5	1408.00	1.00000000	1409.04	1.893E 02	1.905E 02	9.389E 13	2.710E 08	3.464E 05

VALORE MEDIO DEL FATTORE CORRETTIVO SU 7 PICCHI 8.383E 05

CALIBRAZIONE Y= 1.001*X+ -2.540

SPETTRO N. 2 CANALI 2048 TCON 833.333 MINUTI DATA 1973 7 11 17 50 DECAD 60590.000 MIN

	1	2	3	4	5	6	7	8	9	10
0	50000.	38.	83.	374.	1049.	2089.	5372.	7993.	5143.	2413.
1	1210.	132302.	322742.	941359.	86659.	18681.	2536.	1524.	904.	882.
2	697.	820.	731.	765.	762.	861.	822.	899.	916.	1133.
3	1899.	42384.	245240.	265794.	253219.	240860.	230350.	221069.	210651.	198711.
4	188589.	179006.	168154.	159286.	150939.	142122.	134106.	128199.	120513.	114761.
5	108902.	102682.	97522.	91801.	88202.	83180.	78701.	74510.	70478.	67599.
6	63952.	60997.	57428.	54629.	51423.	43928.	46804.	44606.	42013.	40354.
7	38382.	36443.	34531.	33148.	31708.	30439.	29105.	28125.	26902.	25125.
8	24104.	22977.	21949.	20775.	20008.	19024.	18383.	17495.	16751.	15932.
9	15133.	14490.	13813.	13111.	12383.	12144.	11310.	10845.	10133.	9787.
10	9154.	8769.	8399.	8023.	7476.	7009.	6696.	6369.	6179.	5800.
11	5501.	5165.	5049.	4584.	4515.	4193.	3862.	3806.	3647.	3365.
12	3206.	3071.	2990.	2700.	2607.	2468.	2280.	2205.	2117.	1996.
13	1851.	1788.	1695.	1590.	1572.	1562.	1503.	1473.	1405.	1374.
14	1282.	1231.	1169.	1148.	1180.	1063.	1042.	1087.	1065.	1024.
15	933.	991.	962.	955.	949.	938.	915.	977.	931.	867.
16	938.	1092.	1037.	944.	895.	874.	674.	889.	881.	885.
17	872.	875.	895.	904.	886.	930.	919.	920.	910.	935.
18	903.	878.	886.	866.	804.	877.	843.	869.	899.	883.
19	825.	845.	820.	806.	806.	740.	819.	824.	737.	777.
20	777.	820.	792.	808.	757.	799.	812.	768.	736.	771.
21	740.	731.	721.	729.	730.	802.	734.	712.	738.	746.
22	734.	700.	694.	730.	725.	708.	666.	670.	734.	700.
23	691.	736.	681.	694.	716.	658.	686.	692.	653.	709.
24	734.	713.	676.	704.	660.	637.	680.	679.	663.	657.
25	646.	673.	628.	630.	633.	657.	645.	632.	633.	633.
26	617.	657.	667.	668.	620.	642.	681.	668.	665.	630.
27	628.	612.	635.	561.	542.	637.	581.	600.	620.	690.
28	875.	930.	769.	646.	618.	639.	641.	647.	595.	614.
29	559.	619.	505.	565.	615.	607.	599.	640.	597.	611.
30	620.	625.	598.	623.	601.	650.	606.	641.	616.	599.
31	594.	619.	633.	644.	670.	624.	706.	654.	736.	820.
32	1767.	3867.	3482.	1385.	560.	533.	490.	522.	525.	523.
33	556.	519.	523.	500.	507.	514.	495.	465.	494.	484.
34	478.	442.	486.	448.	467.	450.	415.	404.	363.	408.
35	362.	389.	387.	378.	367.	354.	349.	360.	378.	369.
36	355.	322.	334.	334.	343.	330.	322.	307.	295.	291.
37	313.	316.	313.	310.	333.	300.	316.	309.	297.	267.
38	290.	308.	296.	295.	273.	293.	288.	276.	301.	277.
39	308.	256.	271.	283.	260.	299.	264.	320.	293.	286.
40	282.	305.	269.	264.	267.	240.	281.	263.	237.	277.
41	212.	245.	244.	238.	249.	257.	238.	263.	265.	266.
42	235.	257.	221.	241.	233.	224.	217.	247.	275.	245.
43	242.	219.	235.	253.	230.	231.	230.	213.	229.	228.
44	226.	222.	254.	252.	244.	253.	222.	217.	205.	238.
45	212.	211.	230.	216.	231.	217.	211.	246.	199.	213.
46	252.	246.	239.	223.	268.	211.	223.	229.	237.	215.
47	255.	200.	252.	232.	243.	249.	259.	220.	249.	237.
48	272.	239.	240.	235.	264.	246.	256.	289.	275.	240.
49	258.	270.	252.	250.	276.	281.	319.	317.	270.	337.
50	310.	220.	234.	322.	308.	344.	370.	354.	380.	424.
51	522.	614.	946.	2283.	6953.	9806.	5177.	975.	192.	88.
52	116.	102.	106.	89.	79.	88.	99.	94.	102.	90.
53	75.	94.	90.	94.	94.	80.	90.	91.	95.	85.
54	80.	94.	101.	71.	83.	90.	87.	97.	90.	86.
55	107.	103.	93.	82.	90.	95.	75.	84.	83.	85.

56	95.	97.	98.	95.	114.	116.	79.	72.	91.	117.
57	132.	103.	101.	79.	90.	89.	77.	90.	87.	88.
58	80.	88.	95.	102.	109.	100.	87.	81.	107.	93.
59	114.	96.	84.	92.	87.	100.	93.	85.	94.	97.
60	98.	141.	279.	611.	595.	374.	250.	138.	81.	67.
61	76.	85.	72.	90.	78.	67.	65.	90.	64.	73.
62	63.	76.	69.	78.	63.	74.	70.	74.	64.	73.
63	68.	62.	76.	71.	67.	68.	82.	79.	71.	61.
64	78.	72.	71.	66.	73.	100.	109.	92.	85.	77.
65	67.	58.	70.	61.	100.	68.	61.	85.	109.	122.
66	80.	89.	79.	74.	79.	83.	51.	71.	65.	68.
67	57.	56.	73.	72.	71.	66.	83.	72.	67.	60.
68	70.	58.	69.	64.	82.	68.	78.	77.	73.	78.
69	65.	62.	76.	68.	83.	57.	59.	77.	73.	67.
70	74.	60.	64.	67.	65.	67.	79.	78.	79.	65.
71	69.	58.	65.	60.	66.	68.	66.	52.	69.	59.
72	61.	64.	80.	101.	104.	62.	76.	58.	60.	54.
73	67.	44.	68.	73.	61.	56.	54.	69.	71.	46.
74	60.	73.	52.	57.	55.	66.	61.	54.	50.	54.
75	59.	50.	57.	71.	59.	52.	56.	62.	51.	48.
76	46.	52.	57.	39.	71.	59.	76.	59.	66.	63.
77	67.	57.	59.	49.	45.	48.	49.	60.	46.	71.
78	53.	48.	53.	57.	49.	43.	52.	57.	60.	46.
79	51.	62.	54.	56.	79.	104.	156.	169.	97.	72.
80	50.	64.	61.	60.	57.	66.	59.	57.	53.	56.
81	48.	63.	59.	56.	64.	49.	49.	58.	58.	58.
82	56.	54.	58.	61.	56.	65.	50.	44.	59.	59.
83	45.	54.	54.	59.	51.	50.	53.	55.	55.	56.
84	61.	54.	48.	50.	52.	54.	51.	49.	53.	64.
85	53.	57.	61.	65.	63.	50.	52.	50.	48.	48.
86	65.	50.	57.	46.	61.	63.	56.	47.	65.	63.
87	66.	67.	58.	50.	61.	52.	44.	52.	71.	69.
88	68.	50.	56.	63.	91.	70.	88.	94.	184.	287.
89	355.	202.	79.	56.	51.	49.	43.	35.	49.	50.
90	53.	45.	42.	66.	43.	53.	46.	46.	44.	44.
91	50.	53.	47.	52.	34.	43.	48.	49.	42.	43.
92	45.	34.	40.	36.	38.	40.	41.	30.	46.	29.
93	42.	36.	42.	41.	28.	31.	38.	52.	59.	43.
94	48.	59.	31.	45.	43.	34.	40.	34.	37.	39.
95	48.	50.	52.	38.	35.	31.	41.	29.	33.	32.
96	35.	37.	33.	30.	30.	31.	44.	42.	20.	41.
97	34.	44.	33.	33.	25.	19.	32.	33.	20.	41.
98	25.	35.	37.	31.	27.	31.	23.	28.	28.	24.
99	24.	35.	25.	30.	19.	22.	34.	22.	25.	35.
100	32.	29.	34.	26.	26.	27.	27.	40.	29.	26.
101	20.	31.	36.	34.	28.	25.	24.	29.	31.	35.
102	34.	27.	21.	29.	22.	24.	18.	34.	32.	26.
103	24.	31.	23.	31.	25.	36.	22.	26.	21.	15.
104	32.	33.	26.	27.	20.	20.	27.	39.	24.	34.
105	25.	22.	38.	32.	26.	26.	36.	34.	25.	32.
106	26.	36.	22.	33.	26.	23.	23.	35.	35.	21.
107	29.	30.	30.	42.	47.	66.	184.	264.	218.	110.
108	41.	21.	22.	26.	26.	30.	22.	32.	30.	23.
109	27.	32.	22.	18.	26.	22.	28.	28.	27.	31.
110	28.	32.	24.	23.	26.	21.	23.	24.	32.	26.
111	23.	38.	36.	52.	70.	117.	166.	129.	72.	90.
112	200.	269.	192.	75.	24.	26.	18.	16.	16.	26.
113	15.	20.	13.	13.	11.	16.	13.	17.	21.	15.
114	15.	16.	22.	13.	20.	16.	17.	22.	13.	19.
115	11.	13.	28.	11.	23.	17.	22.	7.	18.	19.
116	18.	13.	16.	11.	21.	20.	23.	27.	26.	22.

117	23	35	65	123	132	86	31	15	22	18
118	15	17	20	21	11	15	11	30	11	15
119	10	15	17	16	13	12	10	21	6	9
120	10	19	15	13	13	10	10	10	12	11
121	9	11	13	12	13	12	14	10	9	17
122	9	16	11	13	15	8	14	16	18	10
123	19	19	9	18	11	11	6	7	12	12
124	12	12	13	11	14	7	6	11	6	11
125	13	3	8	12	12	10	14	11	14	6
126	16	7	8	9	16	7	12	12	17	14
127	17	14	13	9	14	12	7	11	7	10
128	3	6	10	15	17	12	11	7	12	9
129	16	10	15	11	12	14	15	17	19	15
130	12	8	15	8	8	9	12	13	7	11
131	15	15	10	15	11	11	10	16	14	9
132	15	6	13	10	8	18	13	18	17	21
133	11	5	103	116	96	52	16	8	11	9
134	9	3	7	12	10	12	10	6	5	13
135	7	7	10	9	13	14	9	14	11	11
136	7	3	7	14	12	14	9	14	13	18
137	16	14	9	19	8	11	13	8	7	14
138	11	10	14	11	20	14	9	7	8	7
139	7	6	11	12	12	11	12	12	11	10
140	7	13	5	8	10	7	8	17	11	7
141	12	7	6	8	14	6	6	5	10	8
142	12	8	5	10	6	10	7	8	9	10
143	7	10	10	6	13	6	7	13	13	9
144	10	7	9	10	10	8	13	10	12	7
145	11	18	10	7	7	6	10	10	9	13
146	9	15	12	11	10	15	6	8	10	8
147	12	8	8	11	4	6	5	8	11	7
148	10	6	7	12	9	7	4	7	7	7
149	7	11	6	9	6	6	6	7	6	8
150	9	9	6	13	9	12	12	7	5	1
151	8	6	5	8	6	6	7	8	4	7
152	5	4	5	8	4	10	4	3	7	4
153	7	5	7	7	4	5	9	2	7	4
154	4	7	8	8	7	3	2	7	4	3
155	7	6	9	6	8	5	12	6	7	8
156	8	8	9	6	6	9	4	4	6	7
157	4	5	2	5	4	3	6	1	4	10
158	4	4	7	4	4	7	6	5	4	6
159	4	6	12	8	16	8	4	14	9	9
160	6	8	5	8	12	4	4	3	2	2
161	1	2	5	4	6	6	6	7	3	4
162	2	1	8	5	5	4	5	3	3	4
163	4	6	6	5	6	8	11	6	2	4
164	4	5	6	6	3	3	5	2	6	2
165	6	1	9	10	1	9	7	3	3	7
166	4	7	2	5	5	6	7	1	4	4
167	5	4	3	4	6	3	3	4	5	1
168	8	3	2	3	8	10	5	12	8	36
169	34	60	76	47	21	7	8	6	5	6
170	5	5	7	3	5	1	5	5	1	4
171	4	4	3	5	5	7	6	3	1	7
172	2	6	3	5	5	4	5	3	2	1
173	1	1	3	6	2	2	3	7	5	4
174	2	7	3	6	5	5	3	5	5	3
175	3	7	1	5	5	2	5	2	2	2
176	2	3	4	5	2	3	6	2	6	2
177	4	2	3	3	1	5	2	4	3	6

178	4.	7.	1.	5.	6.	4.	2.	2.	3.	3.
179	5.	2.	5.	5.	4.	1.	5.	6.	1.	7.
180	2.	[illegible]	3.	3.	6.	5.	5.	3.	3.	1.
181	6.	[illegible]	5.	1.	3.	6.	2.	1.	2.	4.
182	5.	[illegible]	4.	5.	4.	7.	6.	7.	6.	6.
183	3.	6.	7.	7.	3.	3.	1.	1.	7.	3.
184	4.	5.	4.	5.	3.	2.	1.	4.	1.	1.
185	3.	7.	2.	4.	2.	5.	3.	4.	2.	4.
186	2.	2.	3.	2.	1.	2.	1.	2.	4.	1.
187	3.	2.	4.	4.	1.	3.	5.	1.	2.	5.
188	2.	1.	5.	3.	4.	4.	2.	4.	3.	4.
189	3.	8.	5.	3.	2.	1.	1.	4.	2.	6.
190	1.	1.	1.	5.	1.	3.	1.	5.	1.	3.
191	1.	2.	6.	2.	1.	2.	1.	5.	4.	1.
192	2.	2.	1.	3.	1.	4.	4.	4.	1.	1.
193	2.	1.	5.	1.	1.	1.	3.	1.	2.	4.
194	3.	3.	3.	2.	2.	1.	3.	2.	6.	9.
195	4.	1.	2.	2.	3.	2.	4.	2.	2.	2.
196	1.	1.	2.	1.	4.	1.	1.	1.	4.	1.
197	2.	2.	4.	2.	2.	1.	3.	4.	5.	2.
198	1.	1.	5.	1.	3.	2.	3.	3.	5.	1.
199	3.	2.	5.	5.	5.	2.	1.	2.	3.	2.
200	1.	3.	2.	5.	2.	2.	4.	2.	4.	3.
201	2.	4.	2.	3.	2.	3.	3.	3.	4.	1.
202	5.	3.	2.	2.	2.	5.	2.	5.	1.	4.
203	4.	1.	1.	4.	3.	2.	3.	5.	1.	1.
204	1.	2.	3.	3.	6.	2.	2.	1.		

- IRRAGGIAMENTO - 7772 34302.000 MINUTI DATA 1973 5 30 16 0 FLUSSO 4.9500E 12
- MISURA - TEMPO CONTEGGIO 333.333 MINUTI DATA 1973 7 11 17 50 DECADIMENTO 60590.000 MINUTI
- CAMPIONE - 5A PESO 0.10289997 G CALIB. Y= 1.001*X+ -2.540 PROBLEMA ACQUA DI MARE

ELEM	P.P.M.	ERR.0/0	VALORE A	KEV (T)	KEV (S)	LS	WT	C P M	AREA ZERO	UGM	AT/CC
L1AG 110	(2.915E-03)		6.911E 08	657.80							1.627E 13
L2CA 47	(1.074E 04)		5.761E 13	489.50							1.613E 20
L1CA 47	(8.652E 03)		9.274E 13	807.40							1.300E 20
L2CA 47	(5.762E 03)		1.130E 14	1296.40							8.654E 19
L2CE 141	(8.011E-03)		1.736E 09	145.40							3.442E 13
L2CO 60	2.624E-03	9.34	2.612E 07	1173.20	1173.48	1171	8	4.296E-01	4.361E-01	2.700E-04	2.682E 13
L1CO 60	3.892E-03	9.27	2.893E 07	1332.40	1332.89	1325	19	5.754E-01	5.842E-01	4.004E-04	3.977E 13
L2CR 51	3.058E-01	2.30	2.406E 09	320.00	320.24	318	9	1.016E 01	2.898E 01	3.147E-02	3.540E 15
L2CS 134	9.171E-03	5.61	4.100E 07	604.70	602.80	598	14	2.231E 00	2.313E 00	9.437E-04	4.154E 13
L1CS 134	2.455E-03	13.87	5.683E 07	795.00	795.90	794	8	4.308E-01	4.467E-01	2.526E-04	1.112E 13
L1FE 59	(3.608E-01)		3.914E 11	1098.60							3.889E 15
L2FE 59	(3.903E-01)		5.812E 11	1291.50							4.207E 15
L2HG 203	1.225E-02	17.49	1.018E 09	279.10	279.50	279	7	9.780E-01	1.831E 00	1.261E-03	3.676E 13
M2LA 140	(8.899E 03)		4.769E 08	328.60							3.856E 19
M2LA 140	(4.251E 03)		3.030E 08	486.80							1.842E 19
M2LA 140	(1.144E 03)		3.561E 08	1595.40							4.956E 18
L1RB 86	7.811E-01	6.74	3.972E 10	1076.60	1076.94	1073	11	9.108E-01	6.808E 00	8.037E-02	5.499E 15
L1RU 103	(5.264E-03)		2.034E 09	497.00							3.134E 13
L1RU 103	(4.791E-03)		3.004E 09	610.20							2.853E 13
L2SB 124	1.761E-02	5.61	5.952E 08	602.60	602.80	598	14	2.231E 00	3.629E 00	1.812E-03	8.708E 13
L1SB 124	1.066E-02	11.08	2.976E 09	1690.70	1692.19	1689	9	2.700E-01	4.392E-01	1.097E-03	5.270E 13
L1SC 46	5.319E-05	36.00	2.427E 07	889.40	884.35	883	3	1.400E-01	PRIMO (884.35	889.13)	7.116E 11
L1SC 46	3.923E-04	8.31	2.427E 07	889.40	889.13	886	11	1.033E 00	1.456E 00	4.037E-05	5.248E 12
L2SC 46	1.231E-04	21.42	2.926E 07	1120.30	1115.82	1114	7	2.688E-01	3.791E-01	1.267E-05	1.647E 12

ELEM	P.P.M.	ERR.0/0	VALORE A	KEV (T)	KEV (S)	LS	WT	C P M	AREA ZERO	UGM	AT/CC
L2SC 46	3.238E-04	7.78	2.926E 07	1120.30	1120.75	1119	7	7.068E-01	9.968E-01	3.332E-05	4.332E 12
L2SR 85	5.822E 01	0.97	1.395E 11	514.00	513.87	508	17	3.043E 01	4.765E 01	5.991E 00	4.000E 17
L2ZN 65	6.668E 01	0.97	6.458E 10	511.00	513.87	508	17	3.043E 01	3.428E 01	6.862E 00	6.140E 17
L2ZN 65	6.218E-02	21.42	6.818E 09	1115.40	1115.82	1114	7	2.688E-01	3.028E-01	6.398E-03	5.725E 14
L2ZN 65	1.035E-01	7.78	6.818E 09	1115.40	1120.75	1119	7	7.068E-01	7.962E-01	1.682E-02	1.505E 15
L1ZR 95	4.203E-01	44.76	1.877E 11	724.00	722.56	720	10	1.632E-01	2.554E-01	4.324E-02	2.773E 15
L2ZR 95	(1.967E-01)		1.509E 11	756.60							1.298E 15

SPETTRO N. 3 CANALI 2048 TCON 15.000 MINUTI DATA 1973 7 12 12 12 DECAD 61692.000 MIN

	1	2	3	4	5	6	7	8	9	10
0	900.	9.	42.	104.	218.	166.	173.	162.	126.	102.
1	103.	4093.	24721.	14596.	1913.	695.	360.	148.	32.	32.
2	28.	46.	46.	65.	72.	111.	176.	221.	355.	473.
3	755.	2442.	7796.	3656.	3964.	9034.	8727.	8668.	9438.	9707.
4	10074.	11008.	13266.	12942.	7800.	5399.	4965.	5163.	5449.	4730.
5	3752.	3109.	5062.	2989.	2876.	2888.	2815.	2861.	2832.	2856.
6	2747.	2766.	2797.	2690.	2771.	2659.	2809.	2826.	2752.	2786.
7	2774.	2776.	2778.	2758.	2655.	2714.	2748.	2759.	2712.	2693.
8	2771.	2688.	2716.	2757.	2769.	2731.	2780.	2836.	2749.	2837.
9	2910.	2780.	2876.	2857.	2865.	2945.	2783.	2776.	2751.	2867.
10	2835.	2916.	2918.	2980.	2894.	2983.	3030.	3069.	3018.	3141.
11	3074.	3154.	3175.	3318.	3293.	3389.	3363.	3435.	3439.	3595.
12	3788.	4179.	5214.	10461.	18262.	13298.	5279.	2693.	2136.	2090.
13	2076.	2072.	2114.	1963.	1919.	1921.	1906.	1842.	1880.	1879.
14	1943.	1940.	1968.	1883.	1838.	1817.	1937.	1863.	1904.	1839.
15	1964.	1920.	1872.	1897.	1859.	1799.	1936.	1795.	1870.	1840.
16	1885.	1894.	1834.	1856.	1967.	1804.	1770.	1759.	1823.	1722.
17	1734.	1722.	1737.	1674.	1749.	1700.	1735.	1722.	1731.	1689.
18	1742.	1687.	1647.	1741.	1689.	1668.	1667.	1722.	1737.	1717.
19	1667.	1720.	1761.	1729.	1682.	1581.	1641.	1658.	1692.	1648.
20	1665.	1661.	1744.	1655.	1616.	1621.	1628.	1664.	1638.	1649.
21	1671.	1659.	1618.	1663.	1640.	1654.	1620.	1716.	1654.	1659.
22	1651.	1653.	1716.	1645.	1587.	1600.	1629.	1634.	1573.	1596.
23	1626.	1609.	1583.	1686.	1687.	1600.	1586.	1642.	1627.	1571.
24	1639.	1593.	1645.	1706.	1797.	2467.	3880.	3578.	2054.	1716.
25	1740.	1616.	1577.	1560.	1502.	1498.	1394.	1507.	1421.	1478.
26	1416.	1505.	1344.	1449.	1427.	1429.	1395.	1422.	1421.	1350.
27	1450.	1489.	1427.	1424.	1433.	1451.	1401.	1441.	1420.	1439.
28	1440.	1386.	1331.	1417.	1382.	1395.	1449.	1379.	1425.	1432.
29	1344.	1387.	1282.	1326.	1313.	1409.	1383.	1393.	1471.	1315.
30	1344.	1330.	1306.	1319.	1284.	1325.	1255.	1313.	1365.	1356.
31	1317.	1355.	1354.	1375.	1289.	1309.	1338.	1337.	1294.	1300.
32	1297.	1387.	1317.	1394.	1344.	1298.	1379.	1341.	1377.	1363.
33	1361.	1400.	1360.	1394.	1404.	1375.	1429.	1426.	1388.	1398.
34	1451.	1504.	1534.	1867.	3307.	7514.	8129.	3444.	1434.	1226.
35	1169.	1130.	1167.	1200.	1119.	1126.	1122.	1079.	1113.	1129.
36	1114.	1108.	1170.	1196.	1144.	1113.	1155.	1201.	1236.	1344.
37	1273.	1150.	1134.	1117.	1118.	1097.	1081.	1192.	1168.	1106.
38	1075.	1050.	1120.	1125.	1121.	1074.	1092.	1122.	1072.	1133.
39	1151.	1142.	1092.	1053.	1072.	1034.	1037.	1098.	1093.	1074.
40	1136.	1060.	1117.	1100.	1105.	1071.	1080.	1078.	1132.	1185.
41	1207.	1322.	1483.	1399.	1223.	1179.	1141.	1088.	1082.	1097.
42	1090.	1050.	1091.	978.	1108.	1152.	1095.	1059.	1071.	1095.
43	1109.	1100.	1036.	1115.	1053.	1106.	1115.	1149.	1067.	1074.
44	1096.	1085.	1098.	1092.	1382.	1571.	1430.	1098.	1049.	1126.
45	1078.	1116.	1128.	1118.	1049.	1083.	1062.	1046.	1057.	1044.
46	1060.	1087.	1072.	1105.	1014.	1074.	1048.	1065.	1076.	1054.
47	1078.	1085.	1040.	1098.	1088.	1053.	1073.	1036.	1032.	986.
48	975.	1017.	1014.	997.	968.	978.	1024.	963.	995.	1004.
49	986.	937.	906.	925.	909.	898.	970.	924.	933.	957.
50	929.	903.	935.	942.	984.	894.	911.	897.	911.	930.
51	951.	939.	923.	878.	932.	869.	829.	848.	897.	885.
52	910.	911.	874.	908.	870.	836.	857.	884.	801.	840.
53	856.	882.	818.	891.	867.	862.	846.	876.	886.	872.
54	866.	840.	842.	828.	868.	840.	759.	864.	846.	855.
55	912.	806.	831.	824.	860.	804.	786.	869.	813.	884.

56	881.	813.	841.	852.	902.	904.	855.	842.	847.	772.
57	935.	807.	883.	813.	844.	801.	818.	828.	860.	832.
58	825.	793.	885.	855.	811.	896.	850.	914.	858.	819.
59	785.	806.	865.	849.	827.	814.	816.	812.	846.	785.
60	846.	813.	824.	793.	762.	787.	850.	792.	862.	817.
61	829.	846.	822.	833.	805.	830.	843.	774.	872.	847.
62	858.	826.	807.	814.	806.	822.	808.	841.	829.	843.
63	866.	867.	835.	845.	841.	856.	883.	838.	927.	867.
64	935.	871.	914.	872.	917.	950.	907.	979.	956.	904.
65	980.	1002.	966.	952.	984.	1035.	1078.	1181.	1100.	1296.
66	2169.	4759.	8027.	7617.	2997.	1056.	716.	756.	741.	716.
67	800.	718.	733.	729.	778.	770.	790.	770.	728.	764.
68	779.	708.	738.	702.	733.	732.	771.	731.	712.	813.
69	858.	775.	795.	758.	699.	719.	776.	721.	746.	776.
70	672.	697.	723.	733.	768.	724.	715.	761.	739.	791.
71	714.	731.	751.	777.	783.	760.	740.	793.	767.	739.
72	826.	800.	771.	862.	932.	851.	836.	785.	752.	725.
73	774.	782.	746.	791.	748.	747.	751.	732.	719.	706.
74	752.	757.	711.	761.	770.	778.	776.	793.	735.	813.
75	747.	751.	821.	718.	801.	797.	802.	755.	763.	767.
76	762.	740.	801.	789.	769.	800.	810.	839.	774.	793.
77	763.	783.	822.	788.	765.	782.	809.	953.	1334.	1874.
78	1800.	1158.	832.	728.	764.	806.	712.	760.	762.	803.
79	758.	716.	738.	744.	769.	808.	722.	770.	728.	756.
80	756.	736.	747.	772.	757.	751.	770.	802.	777.	781.
81	796.	784.	787.	813.	776.	780.	754.	793.	805.	794.
82	792.	792.	748.	785.	784.	796.	766.	782.	780.	817.
83	754.	745.	727.	765.	748.	755.	790.	782.	792.	834.
84	791.	784.	805.	800.	825.	772.	800.	797.	809.	794.
85	772.	770.	799.	820.	772.	808.	788.	794.	787.	780.
86	828.	780.	790.	790.	801.	833.	902.	1029.	1087.	982.
87	837.	816.	836.	919.	898.	835.	799.	782.	846.	825.
88	801.	822.	805.	801.	822.	786.	838.	865.	870.	844.
89	853.	795.	937.	856.	817.	856.	859.	835.	816.	869.
90	823.	812.	865.	868.	770.	832.	858.	857.	807.	815.
91	845.	888.	847.	807.	869.	773.	896.	825.	861.	896.
92	821.	847.	885.	850.	874.	901.	873.	869.	837.	873.
93	804.	853.	874.	841.	858.	853.	914.	873.	907.	853.
94	837.	884.	873.	874.	836.	834.	934.	865.	916.	871.
95	901.	826.	890.	908.	860.	830.	919.	910.	886.	882.
96	885.	901.	1003.	1246.	1581.	1548.	1156.	844.	807.	721.
97	729.	707.	702.	731.	683.	711.	699.	719.	692.	675.
98	757.	683.	686.	713.	670.	683.	695.	647.	730.	664.
99	687.	713.	669.	636.	708.	708.	688.	779.	625.	652.
100	661.	671.	652.	703.	755.	782.	746.	688.	633.	630.
101	646.	618.	645.	600.	636.	602.	600.	564.	648.	614.
102	629.	605.	635.	570.	593.	624.	578.	596.	653.	601.
103	581.	647.	591.	607.	600.	593.	599.	559.	623.	600.
104	654.	618.	637.	603.	589.	580.	568.	584.	642.	608.
105	594.	574.	586.	615.	599.	556.	646.	595.	545.	572.
106	597.	558.	587.	593.	544.	582.	569.	566.	603.	568.
107	550.	585.	598.	589.	598.	536.	608.	603.	598.	596.
108	630.	591.	560.	623.	723.	957.	1147.	1094.	827.	718.
109	731.	677.	626.	578.	617.	560.	592.	594.	570.	566.
110	569.	572.	607.	632.	603.	585.	599.	644.	650.	674.
111	736.	948.	1224.	1241.	936.	661.	621.	557.	544.	551.
112	544.	502.	516.	564.	513.	450.	496.	484.	483.	483.
113	444.	473.	454.	471.	455.	448.	426.	441.	439.	441.
114	467.	457.	478.	456.	458.	452.	492.	479.	483.	398.
115	504.	485.	486.	506.	511.	446.	514.	498.	511.	477.
116	507.	557.	559.	557.	595.	566.	536.	668.	726.	776.

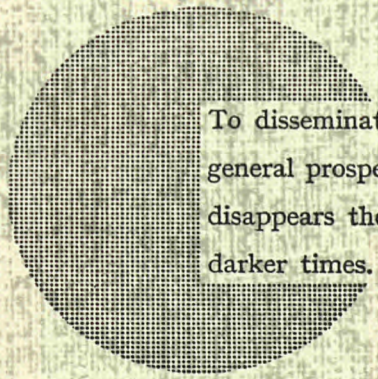
117	1148.	2211.	4963.	8871.	9931.	5901.	1896.	509.	274.	251.
118	258.	265.	251.	245.	258.	243.	237.	235.	239.	236.
119	214.	222.	235.	241.	198.	203.	208.	183.	186.	221.
120	209.	194.	205.	202.	173.	196.	189.	188.	197.	183.
121	158.	174.	200.	222.	220.	190.	185.	164.	162.	160.
122	161.	165.	173.	166.	155.	154.	174.	145.	154.	161.
123	158.	151.	141.	167.	148.	143.	147.	111.	154.	139.
124	127.	134.	141.	136.	134.	145.	141.	154.	156.	140.
125	145.	156.	144.	141.	140.	151.	141.	149.	132.	133.
126	137.	136.	153.	144.	129.	128.	139.	144.	130.	143.
127	148.	163.	157.	224.	251.	311.	218.	219.	142.	153.
128	145.	162.	154.	166.	157.	167.	149.	148.	159.	166.
129	140.	130.	167.	167.	172.	164.	175.	192.	187.	223.
130	259.	210.	200.	169.	176.	169.	209.	171.	164.	189.
131	202.	220.	190.	203.	199.	218.	231.	226.	252.	254.
132	265.	261.	294.	283.	316.	345.	375.	423.	497.	709.
133	1416.	3409.	6487.	8574.	6345.	2505.	569.	122.	57.	61.
134	49.	45.	55.	45.	53.	37.	50.	41.	36.	40.
135	47.	55.	50.	38.	36.	59.	36.	46.	42.	46.
136	39.	42.	28.	38.	33.	50.	59.	46.	45.	42.
137	36.	45.	54.	48.	47.	43.	37.	42.	53.	40.
138	51.	40.	43.	39.	51.	45.	54.	49.	45.	40.
139	50.	42.	59.	56.	55.	55.	54.	68.	50.	49.
140	53.	55.	73.	73.	87.	118.	240.	486.	814.	754.
141	482.	156.	83.	51.	42.	43.	42.	39.	46.	34.
142	45.	41.	34.	37.	40.	32.	34.	36.	31.	35.
143	32.	39.	32.	38.	39.	35.	33.	39.	28.	27.
144	44.	41.	39.	41.	31.	41.	37.	37.	41.	40.
145	23.	37.	30.	32.	33.	22.	36.	50.	55.	39.
146	27.	37.	31.	31.	23.	23.	24.	22.	29.	27.
147	24.	24.	23.	32.	29.	30.	23.	31.	21.	31.
148	22.	28.	29.	21.	22.	19.	24.	27.	30.	22.
149	17.	32.	15.	15.	31.	27.	24.	32.	21.	23.
150	23.	30.	35.	30.	38.	22.	20.	24.	22.	19.
151	23.	35.	24.	37.	29.	28.	29.	30.	20.	29.
152	25.	26.	28.	37.	28.	33.	19.	38.	59.	41.
153	42.	50.	37.	21.	22.	24.	18.	29.	16.	16.
154	20.	19.	20.	28.	19.	20.	20.	22.	16.	17.
155	17.	22.	26.	24.	22.	21.	28.	18.	22.	10.
156	27.	19.	15.	13.	17.	22.	21.	16.	22.	21.
157	20.	24.	15.	14.	22.	17.	16.	21.	13.	19.
158	18.	18.	16.	22.	16.	23.	21.	14.	25.	27.
159	16.	14.	18.	22.	16.	29.	22.	23.	27.	19.
160	17.	19.	15.	26.	29.	23.	30.	23.	14.	15.
161	18.	22.	18.	9.	16.	26.	12.	12.	14.	13.
162	13.	24.	19.	19.	28.	13.	13.	25.	15.	20.
163	9.	31.	20.	22.	19.	21.	17.	19.	13.	19.
164	20.	23.	19.	16.	25.	17.	21.	14.	19.	10.
165	16.	18.	13.	18.	22.	18.	16.	24.	14.	16.
166	17.	21.	16.	17.	19.	18.	21.	24.	19.	13.
167	18.	19.	21.	15.	15.	21.	17.	22.	11.	8.
168	17.	15.	19.	12.	13.	19.	8.	18.	16.	16.
169	18.	19.	22.	17.	13.	20.	15.	11.	13.	13.
170	12.	18.	18.	19.	13.	19.	20.	18.	16.	20.
171	15.	12.	15.	20.	22.	14.	20.	15.	18.	15.
172	15.	13.	20.	21.	14.	24.	17.	22.	16.	15.
173	10.	19.	24.	21.	22.	12.	10.	15.	17.	11.
174	15.	18.	16.	16.	13.	14.	18.	11.	13.	17.
175	22.	10.	16.	22.	16.	18.	13.	11.	15.	21.
176	12.	12.	17.	16.	18.	22.	13.	15.	11.	12.
177	17.	12.	16.	18.	17.	14.	15.	8.	19.	16.

178	15.	15.	14.	17.	14.	18.	15.	19.	16.	17.
179	12.	19.	12.	15.	16.	10.	21.	11.	11.	9.
180	8.	11.	12.	14.	15.	10.	14.	14.	14.	16.
181	15.	16.	15.	17.	20.	8.	13.	19.	19.	15.
182	13.	13.	13.	15.	13.	11.	14.	21.	19.	20.
183	18.	18.	22.	11.	10.	15.	15.	17.	21.	13.
184	17.	11.	14.	16.	12.	10.	13.	16.	18.	8.
185	13.	15.	15.	12.	16.	16.	11.	17.	13.	14.
186	19.	18.	18.	14.	14.	14.	11.	10.	15.	14.
187	8.	16.	18.	14.	17.	12.	14.	12.	18.	5.
188	8.	15.	14.	10.	11.	11.	13.	10.	15.	17.
189	16.	18.	10.	17.	17.	13.	13.	18.	6.	6.
190	14.	10.	18.	8.	8.	12.	13.	11.	16.	11.
191	18.	13.	13.	14.	15.	11.	17.	12.	11.	9.
192	10.	12.	16.	10.	14.	14.	9.	13.	16.	7.
193	14.	12.	8.	15.	9.	13.	10.	10.	12.	17.
194	16.	13.	13.	10.	17.	13.	14.	13.	10.	13.
195	7.	14.	5.	12.	6.	14.	8.	9.	14.	10.
196	13.	13.	18.	16.	19.	11.	9.	16.	17.	12.
197	10.	10.	10.	13.	12.	9.	10.	10.	10.	11.
198	7.	16.	16.	10.	8.	18.	12.	9.	8.	11.
199	20.	12.	12.	11.	12.	16.	7.	8.	12.	18.
200	13.	13.	18.	13.	13.	13.	11.	9.	7.	13.
201	9.	10.	14.	9.	11.	15.	11.	12.	12.	14.
202	12.	7.	13.	14.	12.	8.	5.	9.	11.	11.
203	11.	4.	11.	10.	14.	12.	6.	8.	11.	13.
204	11.	12.	13.	8.	8.	7.	7.	6.		

- IRRAGGIAMENTO - 7772 34302.000 MINUTI DATA 1973 5 30 16 0 FLUSSO 4.9500E 12
- MISURA - TEMPO CONTEGGIO 15.000 MINUTI DATA 1973 7 12 12 12 DECADIMENTO 61692.000 MINUTI
- CAMPIONE - 1A PESO 0.07830000 G CALIB. Y= 1.001*X+ -2.540 PROBLEMA ACQUA DI MARE

ELEM	P.P.M.	ERR.0/0	VALORE A	KEV (T)	KEV (S)	LS	WT	C P M	AREA ZERO	UGM	AT/CC
L1AG 110	4.847E 01	1.16	6.911E 08	657.80	661.54	659	9	1.491E 03	1.671E 03	3.795E 00	2.705E 17
L2CA 47	(1.660E 06)		5.761E 13	489.50							2.493E 22
L1CA 47	(2.535E 06)		9.274E 13	807.40							3.808E 22
L2CA 47	6.624E 05	77.15	1.130E 14	1296.40	1293.71	1292	2	4.331E 00	PRIMO (1293.71 1299.97)		9.950E 21
L2CA 47	2.982E 06	37.76	1.130E 14	1296.40	1299.97	1296	11	1.950E 01	9.910E 03	2.335E 05	4.479E 22
L2CE 141	(7.885E-01)		1.736E 09	145.40							3.387E 15
L2CO 60	1.753E 01	0.95	2.612E 07	1173.20	1173.45	1167	17	2.183E 03	2.217E 03	1.372E 00	1.791E 17
L1CO 60	1.709E 01	0.89	2.893E 07	1332.40	1332.96	1325	19	1.922E 03	1.952E 03	1.338E 00	1.747E 17
L2CR 51	(9.527E-01)		2.406E 09	320.00							1.103E 16
L2CS 134	(1.058E-01)		4.100E 07	604.70							4.794E 14
L1CS 134	(1.410E-01)		5.683E 07	795.00							6.386E 14
L1FE 59	(1.226E 02)		3.914E 11	1098.60							1.322E 18
L2FE 59	4.098E 01	77.15	5.812E 11	1291.50	1293.71	1292	2	4.331E 00	PRIMO (1293.71 1299.97)		4.417E 17
L2FE 59	1.845E 02	37.76	5.812E 11	1291.50	1299.97	1296	11	1.950E 01	3.750E 01	1.445E 01	1.989E 18
L2HG 203	(4.044E-01)		1.018E 09	279.10							1.213E 15
M2LA 140	(1.442E 06)		4.769E 08	328.60							6.249E 21
M2LA 140	(8.236E 05)		3.030E 08	486.80							3.569E 21
M2LA 140	(1.748E 05)		3.561E 08	1595.40							7.577E 20
L1RB 86	(2.255E 01)		3.972E 10	1076.60							1.588E 17
L1RU 103	(6.820E-01)		2.034E 09	497.00							4.061E 15
L1RU 103	(1.004E 00)		3.004E 09	610.20							5.976E 15
L2SB 124	(2.043E-01)		5.952E 08	602.60							1.010E 15
L1SB 124	(1.826E-01)		2.976E 09	1690.70							9.026E 14
L1SC 46	(1.052E-02)		2.427E 07	889.40							1.407E 14

ELEM		P.P.M.	ERR.O/O	VALORE A	KEV (T)	KEV (S)	LS	WT	C P M	AREA ZERO	UGM	AT/CC
L2SC	46	(1.078E-02)		2.926E 07	1120.30							1.442E 14
L2SR	85	(5.212E 01)		1.395E 11	514.00							3.581E 17
L2ZN	65	(5.994E 01)		6.458E 10	511.00							5.519E 17
L2ZN	65	5.839E 01	11.13	6.818E 09	1115.40	1112.25	1105	18	1.917E 02	2.164E 02	4.572E 00	5.377E 17
L1ZR	95	1.881E 02	27.88	1.877E 11	724.00	723.49	720	11	5.513E 01	8.698E 01	1.473E 01	1.241E 18
L2ZR	95	(5.223E 01)		1.509E 11	756.60							3.447E 17



To disseminate knowledge is to disseminate prosperity — I mean general prosperity and not individual riches — and with prosperity disappears the greater part of the evil which is our heritage from darker times.

Alfred Nobel

SALES OFFICES

The Office for Official Publications sells all documents published by the Commission of the European Communities at the addresses listed below, at the price given on cover. When ordering, specify clearly the exact reference and the title of the document.

UNITED KINGDOM

H.M. Stationery Office
P.O. Box 569
London S.E. 1 — Tel. 01-928 69 77, ext. 365

BELGIUM

Moniteur belge — Belgisch Staatsblad
Rue de Louvain 40-42 — Leuvenseweg 40-42
1000 Bruxelles — 1000 Brussel — Tel. 12 00 26
CCP 50-80 — Postgiro 50-80

Agency :
Librairie européenne — Europese Boekhandel
Rue de la Loi 244 — Wetstraat 244
1040 Bruxelles — 1040 Brussel

DENMARK

J.H. Schultz — Boghandel
Møntergade 19
DK 1116 København K — Tel. 14 11 95

FRANCE

Service de vente en France des publications des Communautés européennes — Journal officiel
26, rue Desaix — 75 732 Paris - Cédex 15e
Tel. (1) 306 51 00 — CCP Paris 23-96

GERMANY (FR)

Verlag Bundesanzeiger
5 Köln 1 — Postfach 108 006
Tel. (0221) 21 03 48
Telex: Anzeiger Bonn 08 882 595
Postscheckkonto 834 00 Köln

GRAND DUCHY OF LUXEMBOURG

Office for Official Publications of the European Communities
Boîte postale 1003 — Luxembourg
Tel. 4 79 41 — CCP 191-90
Compte courant bancaire: BIL 8-109/6003/200

IRELAND

Stationery Office — The Controller
Beggar's Bush
Dublin 4 — Tel. 6 54 01

ITALY

Libreria dello Stato
Piazza G. Verdi 10
00198 Roma — Tel. (6) 85 08
CCP 1/2640

NETHERLANDS

Staatsdrukkerij- en uitgeverijbedrijf
Christoffel Plantijnstraat
's-Gravenhage — Tel. (070) 81 45 11
Postgiro 42 53 00

UNITED STATES OF AMERICA

European Community Information Service
2100 M Street, N.W.
Suite 707
Washington, D.C., 20 037 — Tel. 296 51 31

SWITZERLAND

Librairie Payot
6 rue Grenus
1211 Genève — Tel. 31 89 50
CCP 12-236 Genève

SWEDEN

Librairie C.E. Fritze
2, Fredsgatan
Stockholm 16
Post Giro 193, Bank Giro 73/4015

SPAIN

Libreria Mundi-Prensa
Castello 37
Madrid 1 — Tel. 275 51 31

OTHER COUNTRIES

Office for Official Publications of the European Communities
Boîte postale 1003 — Luxembourg
Tel. 4 79 41 — CCP 191-90
Compte courant bancaire: BIL 8-109/6003/200

OFFICE FOR OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES
Boîte postale 1003 — Luxembourg 6456