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Title	VizieR Online Data Catalog: Lab measurements for C-cyanomethanimine (Melosso+, 2018)
Authors	Melosso, M.; Melli, A.; Puzzarini, C.; CODELLA, CLAUDIO; Spada, L.; et al.
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Portal Simbad VizieR Aladin X-Match Other Help

J/A+A/609/A121 Lab measurements for C-cyanomethanimine (Melosso+, 2018)

Laboratory measurements and astronomical search for cyanomethanimine.
Melosso M., Melli A., Puzzarini C., Codella C., Spada L., Dore L.,
Degli Esposti C., Lefloch B., Bachiller R., Ceccarelli C., Cernicharo J.,
Barone V.
<Astron. Astrophys. 609, A121 (2018)>
=2018A&A...609A.121M (SIMBAD/NED BibCode)

ADC_Keywords: Atomic physics ; Interstellar medium

Keywords: ISM: molecules - molecular data - methods: data analysis -
methods: laboratory: molecular

Abstract:
C-cyanomethanimine (HNCHCN), existing in the two Z and E isomeric forms, is a key prebiotic molecule, but, so far, only the E isomer has been detected towards the massive star forming region Sagittarius B2(N) using transitions in the radio wavelength domain.
With the aim of detecting HNCHCN in Sun-like star-forming regions, the laboratory investigation of its rotational spectrum has been extended to the milllimeter-/submillimeter-wave (mm-/submm-) spectral window where several unbiased spectral surveys have been already obtained.
High-resolution laboratory measurements of the rotational spectrum of C-cyanomethanimine were carried out in the 100-420GHz range using a frequency-modulation absorption spectrometer. The C-cyanomethanimine spectral features were then searched for in the mm-wave range using the high-sensitivity and unbiased spectral surveys obtained with the IRAM 30-m antenna in the ASAI context, the earliest stages of star formation from starless to evolved Class I objects being sampled.

For both the Z and E isomers, the spectroscopic work has led to an improved and extended knowledge of the spectroscopic parameters, thus providing accurate predictions of the rotational signatures up to ~700GHz. So far, no C-cyanomethanimine emission has been detected towards the ASAI targets, and upper limits on the column density of 10^{11}-$10^{12}cm^{-2}$ could only be derived. Consequently, the C-cyanomethanimine abundances have to be less than a few 10^{-10} for starless and hot-corinos. A less stringent constraint, $\leq 10^{-9}$, is obtained for shocks sites. The combination of the upper limits on the abundances of C-cyanomethanimine together with accurate laboratory frequencies up to ~700GHz poses the basis for future higher sensitivity searches around Sun-like star forming regions. For compact

(typically less than 1 arcsec) and chemically enriched sources such as hot-corinos, the use of interferometers as NOEMA and ALMA in their extended configurations are clearly needed.

Description:

Table 2 contains measured rotational transitions and residuals from the fit for the two isomers of C-cyanomethanimine in the ground state.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table2.dat	80	1185	Measured rotational transitions and residuals from the fit for the two isomers of C-cyanomethanimine in the ground state

See also:

J/A+A/562/A56 : Cyanomethyl anion & its deuterated derivatives (Majumdar+ 2014)

Byte-by-byte Description of file: table2.dat

Bytes	Format	Units	Label	Explanations
1- 6	A6	---	Species	Isomer
8- 9	I2	---	N'	Upper N quantum number
11- 12	I2	---	Ka'	Upper Ka quantum number
14- 15	I2	---	Kc'	Upper Kc quantum number
17- 18	I2	---	I'	? Upper I quantum number (1)
20- 21	I2	---	F'	? Upper F quantum number (1)
23- 24	I2	---	N	Lower N quantum number
26- 27	I2	---	Ka	Lower Ka quantum number
29- 30	I2	---	Kc	Lower Kc quantum number
32- 33	I2	---	I	? Lower I quantum number (1)
35- 36	I2	---	F	? Lower F quantum number (1)
39- 49	F11.4	MHz	Freq	Observed frequency
53- 57	F5.3	MHz	Unc	Experimental uncertainty
61- 67	F7.4	MHz	O-C	Observed minus calculated frequencies
71- 74	F4.2	---	Weight	? Relative weight (2)
78- 80	A3	---	Ref	Reference (3)

Note (1): Omitted in cases of unresolved hyperfine components

Note (2): Given only for blended lines

Note (3): References as follows:
(a) = Zaleski et al. (2013ApJ...765L..10Z)
(b) = Takeo et al. (1986, CPL, 123, 229)
(c) = Takano et al. (1990, J. Mol. Spectr., 141, 13)
(d) = This work

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(End) Patricia Vannier [CDS] 17-Oct-2017