

¹³C-TRIPLY LABELED ETHYL CYANIDE SUBMILLIMETERWAVE STUDY WITH LILLE'S FAST SCAN DDS-BASED SPECTROMETER

A. PIENKINA, R. A. MOTIYENKO, L. MARGULÈS, *Laboratoire PhLAM, UMR 8523 CNRS - Université Lille 1, Villeneuve d'Ascq, France*; HOLGER S. P. MÜLLER, *I. Physikalisches Institut, Universität zu Köln, Köln, Germany*; J.-C. GUILLEMIN, *Institut des Sciences Chimiques de Rennes, UMR 6226 CNRS - ENSCR, Rennes, France*.

This study of the ¹³C-triply labeled species of ethyl cyanide (CH₃CH₂CN) follows our recent work on the three ¹³C-doubly-labeled that allowed their detection^a in the line survey recently obtained with ALMA (EMoCA)^b. The detection of isotopologues could improve the knowledge of the astrochemistry. The other goal is to clean the surveys from the lines of known molecules in order to detect new ones, this is especially important for the abundant complex organic molecules like ethyl cyanide. As in the case of the doubly substituted species, no spectroscopic studies exist up to now for ¹³CH₃¹³CH₂¹³CN, the first predictions were thus obtained from scaled ab initio calculations. The spectra were recorded and analyzed up to 1 THz. More than 5500 lines were fitted with quantum numbers *J* and *K_a* up to 95 and 25 respectively.

The spectra were obtained with the new version of the Lille's solid state spectrometers. This new version used Direct Digital Synthesizer in order to speed up acquisition time. We constructed a spectrometer covering a decade, from 150 to 1500 GHz, it scans the full range in 24 hours with high sensitivity and accuracy.

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^aMargulès, L.; *et al.* 2015, 69th International Symposium on Molecular Spectroscopy, **RI06**

^bBelloche, A.; *et al.* 2014, *Science*, **345**, 1584