THZ SPECTROSCOPY OF ^{13}C ISOTOPIC SPECIES OF A "WEED": ACETALDEHYDE

L. MARGULÈS, and R. A. MOTIYENKO, *Laboratoire PhLAM, CNRS UMR 8523, Université de Lille 1, 59655 Villeneuve d'Ascq Cedex, France*; and J.-C. GUILLEMIN, *Sciences Chimiques de Rennes, UMR 6226 CNRS-ENSCR, Avenue du Général Leclerc, CS 50837, 35708 Rennes Cedex 7, France*.

Our studies of the isotopic species of ^{13}C and D isotopologues of methyl formate ($HCOOCH_3$), have allowed the detection of more than 600 lines in Orion[a,b]. This confirms that many observed U-lines are coming from isotopic species of one of the most abundant molecules in space. Since its first detection in 1976 in SgrB2 and in Orion A, acetaldehyde (CH_3CHO) was detected in many other numerous objects[c]. If its deuterated species (CD_3CHO[d] and CH_3CDO[e]) have been previously studied in the millimeterwave range, the data concerning the ^{13}C species are limited to few lines measured in 1957 up to 40 GHz[f]. In this context we decided to study the ^{13}C species of acetaldehyde.

Acetaldehyde molecule displays a large amplitude motion: the hindered rotation of the methyl group with respect to the rest of the molecule. The analysis is performed with the Rho Axis Method[g]. Recent versions of the codes include high orders term in order to reproduce the observed frequencies for large quantum numbers values as J-values as high as 70[a,b,h]. Measurements and analysis of the rotational spectra of ^{13}C isotopic species are in progress in Lille with a solid-state submillimetre-wave spectrometer (50-950 GHz), the first results will be presented. *This work is supported by the contract ANR-08-BLAN-0054 and by the Programme National de Physico-Chimie du Milieu Interstellaire (PCMI-CNRS).*

[a] Carvajal, M.; Margulès, L.; Tercero, B.; et al.*A&A* **500**, (2009) 1109
[b] Margulès, L.; Huet, T. R.; Demaison J.; et al.,*ApJ* **714**, (2010) 1120
[c] Ikeda, M.; Ohishi, M.; Nummelin, A.; et al., *ApJ*, **560**, (2001) 792
[d] Kleiner, I.; Lopez, J.-C.; Blanco, S.; et al.*J. Mol. Spectrosc.* **197**, (1999) 275
[e] Elkeurti M.; Coudert, L. H.; Medvedev, I. R.; et al.*J. Mol. Spectrosc.* **263**, (2010) 145
[f] Kilb, R.W.; Lin, C.C.; and Wilson, E.B.*J. Chem. Phys.* **26**, (1957) 1695
[g] Kleiner, I. *J. Mol. Spectrosc.* **260**, (2010) 1
[h] Ilyushin, V.V.; Kryvda, A; and Alekseev, E;*J. Mol. Spectrosc.* **255**, (2009) 32