PRELIMINARY WORK TO ALMA: SUBMILLIMETER WAVE SPECTROSCOPY OF ^{18}O AND D SPECIES OF METHYL FORMATE[a]

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New radiotelescopes, working in the submillimeter range, will be operating in the next few years: ALMA, Herschel, and SOFIA. A large amount of laboratory work is required in order to account for the increased resolution and accuracy needed to analyze the numerous data which will be obtained with these new instruments. There is a strong interest of the astrophysical community in isotopic species for two main reasons: (*i*) Their detection provides us with key information about interstellar chemical modeling, especially for complex organic molecules, like methyl formate, as their formation mechanisms is not well understood yet. (*ii*) They are responsible for a large fraction of U-lines and their assignments are necessary to allow the detection of new species.
In this context we continue a systematic study of the isotopic species of methyl formate ($HCOOCH_3$) initiated with $H^{13}COOCH_3$.[b] Our next investigation of $HCOO^{13}CH_3$ allowed us the detection of 500 lines in Orion.[c] The treatment of the data concerning methyl formate is not obvious due to the internal rotation of the methyl group. This treatment is different in case of a symmetric (CH_3) or an asymmetric (CHD_2) rotor part. We will report here on recent results obtained for $DCOOCH_3$, $HCOOCHD_2$, $HC^{18}OOCH_3$, and $HCO^{18}OCH_3$.

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[b]Willaert, Møllendal, Alekseev, *et al. J. Mol. Struct.* **795** (2006) 4
[c]Carvajal, Margules, Tercero, *et al. Astron. Astrophys.* (2009) in press