A GLOBAL FREQUENCY ANALYSIS OF $^{13}CH_3CH_3$ INCLUDING DATA FROM THE LOWEST FOUR VIBATIONAL STATES

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Accuracy of the retrieved abundances for ethane from planetary atmospheres is directly linked to the quality of the spectroscopic parameters which are obtained from laboratory studies. For this reason, we have made several detailed studies of the lowest four vibrational states of ethane. We have previously reported global fits including data from the torsional bands in the ground vibrational state, the ν_9 and ν_3 fundamentals, the $\nu_9 - \nu_4 - \nu_4$ hot band, and the $\nu_{12} - \nu_9$ difference band.

Because measurements of $^{12}C/^{13}C$ and other isotope ratios are used to study the fractionation processes and to make inferences regarding the evolution of the planetary atmospheres, it is desirable to also have high quality spectroscopic parameters for the lowest four vibrational states of $^{13}CH_3CH_3$. We have already reported a global fit which included data from the torsional bands, and the ν_{12} and ν_5 fundamentals.[a] In this work we describe a global fit which also includes data from $\nu_{12} + \nu_6 - \nu_6$ and $\nu_{11} - \nu_{12}$ bands.

[a] N. Moazzen-Ahmadi, R.Z. Martinez, and D. Bermejo, J. Mol. Phys. 269 (2011) 151.