High-resolution spectrum of methyl formate in the microwave and far infrared region

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Methyl formate molecule ($HCOOCH_3$) is a molecule with a high spectral density that is commonly found in the high mass star forming regions. Recently it has been observed in a very young low mass star formation region. We succeeded in assigning rotational spectra up to the second torsional excited state of using microwave spectroscopy. Based on this result[1], unidentified lines in the interstellar space were successfully assigned to this state [2]. There are other low-lying vibrational modes, COC deformation and skeletal tortion. Observation of this molecule even in the vibrational excited states are highly expected. To assign these states, we have been working on the microwave and far-infrared spectroscopy. So far, our assigned rotational spectra in the microwave region was confirmed to be due to the excited COC deformation by combining the data in the far-infrared region. We will report our current status.

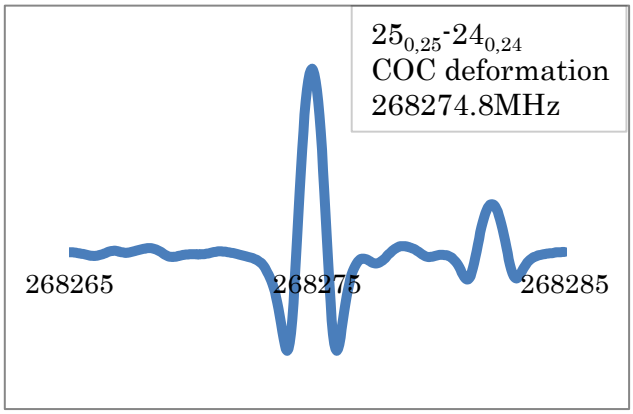

Figure : An example of microwave spectrum in the 268 GHz region.

References

[1] K. Kobayashi, K. Ogata, S. Tsunekawa, S. Takano. 2007, ApJ, 657, L17.

[2] S. Takano, Y. Sakai, S. Kakimoto, M. Sasaki, K. Kobayashi. 2012, PASJ. 64. 89.