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Studies on the torsionally excited state of t-ethyl methyl ether by microwave spectroscopy

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Organic molecules with internal rotation are very good candidates of interstellar molecule. Molecules in torsionally excited states are more difficult to assign than the ground state because the splitting caused by the internal rotation is larger and weaker signal. Trans-ethyl methyl ether was discovered in W51e2. In t-ethyl methyl ether, there are two methyl groups; one is bonded to the oxygen and the other is bonded to the carbon. We succeeded to assign the transitions due to t-ethyl methyl ether in the torsionally excited state related to the oxygen-bonded methyl group by using Stark-type microwave spectrometer. The analysis considering two methyl groups will be presented.

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t-

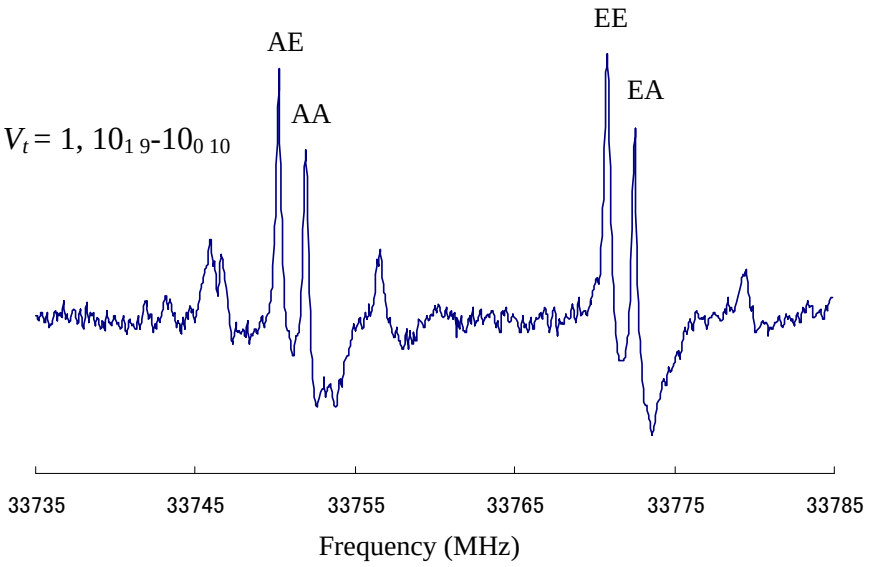
W51e2[1]

2

248 cm^{-1} 278 cm^{-1}

[ ]

Stark



1

[ ]

Stark K = 1

– 0

N,N-dimethylacetamide

[2] tunneling matrix formalism

Q, R-branch 164 rms = 39 kHz

K

[1] G. W. Fuchs, U. Fuchs, T. F. Giesen, and F. Wyrowski, *Astron & Astrophys.*, **444**, 521 (2005).
[2] M. Fujitake, Y. Kubota, N. Ohashi, *J. Mol. Spectrosc.*, **236**, 97 (2006).