

MILLIMETER WAVE SPECTRUM OF METHYL KETENE AND ITS SEARCH IN ORION

CELINA BERMÚDEZ, L. MARGULÈS, R. A. MOTIYENKO, *Laboratoire PhLAM, UMR 8523 CNRS - Université Lille 1, Villeneuve d'Ascq, France*; BELÉN TERCERO, JOSE CERNICHARO, *Molecular Astrophysics, ICMM, Madrid, Spain*; J.-C. GUILLEMIN, *UMR 6226 CNRS - ENSCR, Institut des Sciences Chimiques de Rennes, Rennes, France*; Y. ELLINGER, *Laboratoire de Chimie Théorique (UMR 7616), Université Paris 6, Paris, FRANCE*.

The knowledge of synthetic routes of complex organic molecules is still far to be fully understood. The creation of reliable models is particularly challenging. Hollis et al.^a pointed out that the observations of molecular isomers provides an excellent tool to evaluate the hypothesis of the synthetic pathways. In the group of isomers C₃H₄O that contains two unsaturations, the three most stable are cyclopropanone, propenal (also known as acrolein) and methyl ketene. Among these isomers, only propenal was tentatively detected in Sgr B2(N)^b. Spectroscopic measurements of methyl ketene CH₃CHCO are limited to the microwave domain^c. We extended the measurements into millimeter waves in order to provide accurate frequency predictions suitable for astrophysical purposes. Methyl ketene has one more carbon atom than acetaldehyde (CH₃CHO) and in terms of rotational spectroscopy is quite similar to acetaldehyde. The analysis of the rotational spectrum of methyl ketene is complicated due to internal rotation of the methyl group, that is characterized by the barrier of intermediate height $V_3 = 416 \text{ cm}^{-1}$, and by quite large value of the coupling parameter $\rho = 0.194$. The spectroscopic results and the searches of methyl ketene in Orion will be presented.

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^aHollis, J. M.; et al., 2006, *ApJ* **642**, 933

^bHollis, J. M.; et al., 2006, *ApJ* **643**, L25

^cBak, B.; et al., 1966, *J. Chem. Phys.* **45**, 883