

MILLIMETER AND SUBMILLIMETER SPECTROSCOPY OF ISOBUTENE

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Propene is among the largest saturated or nearly saturated hydrocarbons that have been detected not only toward TMC-1^a, but also in the warmer environment of the solar-type protostellar system IRAS 16293-2422^b. Isobutene, also known as 2-methylpropene, $(\text{CH}_3)_2\text{C}=\text{CH}_2$, is thus a promising candidate to be searched for in space. Its rotational spectrum was studied in the microwave region to some extent^c. In this work, we have extended the measurement up to 370 GHz employing the Cologne (Sub-)Millimeter spectrometer. The molecule has two equivalent methyl rotors. The barrier height of the tops is high enough that the internal rotation splittings could either not be resolved or occur as symmetrical triplets. A few quartets are also assigned, where splittings are up to ~ 10 MHz. The analysis has been carried out with the ERHAM program^d using the previous data as well. We have accessed transitions up to $J = 60$ and $K_c = 41$, greatly improving the spectroscopic parameters for this molecule and thus paving the way to search for it in space.

^aN. Marcelino et al., *ApJ* **665** (2007) L127.

^bS. Manigand et al., *A&A* **645** (2021) A53.

^cH. S. Gutowsky et al., *J. Mol. Spec.* **147** (1991) 91-99 and references therein.

^dP. Groner, *J. Chem. Phys.* **107** (1997) 4483-4498.