THZ MEASUREMENTS OF PROPANE

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Propane is the simplest alkane with a permanent dipole moment. The relatively light atom framework causes the strongest transitions to appear in the submillimeter wavelength range and the molecule has yet to be observed in the interstellar medium. Telescopes at high altitude (ALMA) or above the earth's atmosphere (HSO) are likely be sensitive enough for detection of the species in the interstellar medium, planetary nebulae, hot cores and/or planetary atmospheres. We present the rotational spectra of propane in its ground and first two excited torsional states, measured to 1.6 THz. The ground state submillimeter spectra approximate the semi-rigid rotor well. This data has been combined with high resolution centimeter wavelength data[1] to enable analysis of the equivalent dual-hindered rotor torsional substates using a simplified version of Groner's symmetric two-top Hamiltonian[2]. The same model has been applied to the torsionally excited states that experience more large-amplitude motion and require additional tunnelling parameters.

1) G. Bestmann, W. Lalowski, H. Dreizler, Z. Naturforsch. Teil A 40 (1985) 271-273.
2) P. Groner, S. Albert, E. Herbst, F.C. De Lucia, Astrophys. J. 500 (1998) 1059-1063.