HIGH RESOLUTION INVESTIGATION OF THE ETHANE SPECTRUM AT 7 MICRON (1430 CM^{-1})

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Building upon our previous contributions,[a] we are re-investigating the ethane spectrum between 1330 and 1610 cm^{-1}. For this, spectral data were obtained at room and cold (130 K) temperatures with two Bruker Fourier transform spectrometers (at 0.002 cm^{-1} resolution in Brussels and at 0.003 cm^{-1} resolution in Pasadena). Over 3300 lines were assigned to ν_6, ν_8, $\nu_4+\nu_{12}$ and $2\nu_4+\nu_9$ cold bands, and one hot band ($\nu_4+\nu_8-\nu_4$). Note that ν_6, ν_8, ν_9, and ν_{12} are near 1379, 1472, 823, and 1195 cm^{-1}, respectively, and ν_4 is the torsional mode near 289 cm^{-1}. Our new analysis includes an improved implementation of the theoretical Hamiltonian needed to interpret the very complex spectral structures caused by numerous interactions between these 5 vibrational modes. From this, an empirical line list of positions and estimated intensities is being generated for planetary applications.

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[a] F. Lattanzi, C. Di Lauro, M. Herman, J. Vander Auwera, J. Mol. Spectrosc. 216 (2002) 308-314; F. Lattanzi, C. Di Lauro, V.-M. Horneman, M. Herman, J. Vander Auwera, Mol. Phys. 105 (2007) 733-740; F. Lattanzi, C. Di Lauro, J. Vander Auwera, J. Mol. Spectrosc. 248 (2008) 134-145.