

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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^aF. 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.