INFRARED SPECTRA OF N_2-BROADENED $^{13}CH_4$ AT TITAN ATMOSPHERIC TEMPERATURES

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High-resolution spectra of the ν_4 fundamental band of $^{13}CH_4$ broadened by N_2 at temperatures relevant to the atmosphere of Titan (80 K to 296 K) have been recorded using new temperature-controlled absorption cells installed in the sample compartment of a Bruker (IFS-125HR) Fourier Transform spectrometer (FTS) at the Jet Propulsion Laboratory (JPL). Details of the cells and spectrometer performance have been discussed in the previous talk.[a] Early analysis of these spectra using multispectrum fitting has determined half widths, pressure-induced shifts, line mixing parameters and their temperature dependences for R-branch transitions from R(0) through R(6). In addition to the initial R(2) study mentioned in the previous talk, the analysis for the other J-manifolds examined in detail whether or not the N_2-broadened half width coefficients follow the simple power-law temperature-dependence over the entire temperature range from 80 K to 296 K. The results are compared with other published measurements of N_2-broadened methane parameters at low temperatures.[b]

[a] A. W. Mantz *et al.*, Closed-cycle He-cooled absorption cells designed for a Bruker IFS-125HR: First results between 79 K and 297 K, this session.

[b] Research described in this paper was performed at Connecticut College, the College of William and Mary, NASA Langley Research Center and the Jet Propulsion Laboratory, California Institute of Technology, under contracts and cooperative agreements with the National Aeronautics and Space Administration.