NEW DATA AND ANALYSIS OF THE THz SPECTRUM OF METHANOL

ROGIER BRAAKMAN, *Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA 91125*; JOHN C. PEARSON, BRIAN J. DROUIN, *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109*; and GEOFFREY A. BLAKE, *Division of Geological and Planetary Science, California Institute of Technology, Pasadena, CA 91125*.

With both the SOFIA and Herschell observatories being commissioned in the next five years, the new access to the THz spectral region is expected to revolutionize the observational study of complex organic molecules. In preparation, it is therefore of great importance to characterize the THz spectra of molecules targeted for observational studies. Methanol is one of the most abundant molecules in Hot Core regions, where most of the complex organic molecules are observed. Methanol has several low lying torsional states that are populated at room temperature and which are also expected to be considerably populated at typical Hot Core temperatures. In addition, internal rotation of the methyl top can couple very effectively to the rotation of the molecule as a whole. These characteristics result in a mm and THz spectrum that is rich in very intense lines and therefore make it very important to accurately map these spectral regions. Towards this goal, sensitive observations were done in most of the 0.8-1.2 THz region and in smaller regions around 1.6, 1.8 and 2.5 THz. Well over a thousand new lines have been assigned in the ground state alone, and many more lines from the vt=1,2,3 states as well as from the CO stretching modes can additionally be seen in the spectra. Analysis of the ground state is underway and the fit is expected to be extended up to J=43 and K_a=15. This will be followed by analysis of the excited torsional states.