# 3-D SUBMILLIMETER SPECTROSCOPY FOR ASTROPHYSICS AND SPECTRAL ASSIGNMENT.

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We have previously discussed an experimental spectroscopic approach that makes possible the calculation of lower state energy levels and transition strengths without the need for spectral assignment [a]. The approach is based on the recording of intensity-calibrated spectra over a range of temperatures and calculating appropriate ratios of spectral intensity. Ordinarily, spectra contain 2-D information: intensity as a function of frequency. However, this approach provides a third dimension, the lower state energy, an especially useful tool in the assignment of complex spectra. In this talk we will discuss and quantify the additional experimental challenges, including the need for intensity calibration, well characterized temperatures, and chemical and spectrometer stability over the data acquisition time. Experimental and theoretical results will be presented.

[a] "An experimental approach to the prediction of complete millimeter and submillimeter spectra at astrophysical temperatures: Applications to confusion-limited astrophysical observations," I. R. Medvedev and F. C. De Lucia, Ap. J. 656, 621-628 (2007).