HIGH-SENSITIVITY, BROADBAND SPECTRAL LINE SURVEYS OF STAR FORMING REGIONS WITH THE CSO

SUSANNA L. WIDICUS WEAVER, *Department of Chemistry, Emory University, Atlanta, GA 30322*; MATTHEW C. SUMNER, FRANK RICE, JONAS ZMUIDZINAS, *Division of Physics, Mathematics, and Astronomy, California Institute of Technology, Pasadena, CA 91125*; GEOFFREY A. BLAKE, *Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125*.

Spectral line surveys are powerful tools for astrochemistry because they circumvent the one-line-at-a-time approach that has historically hampered new molecule identification. Until recently, line surveys were typically motivated by the need to characterize the major components of interstellar clouds, i.e. the so-called "interstellar weeds." Previously reported surveys therefore often do not provide the sensitivity levels required for identification of new molecules with weak spectral signatures. The goal of our recent observations with the Caltech Submillimeter Observatory (CSO) is to shift the focus of spectral line surveys away from the interstellar weeds and toward detection of new interstellar molecules. We have obtained broadband, high-sensitivity spectra toward several star forming regions with the new λ=1 mm receiver at the CSO. When used with the facility AOS's, this receiver affords 4 GHz of DSB spectral coverage for each LO setting. We have employed a stepped frequency-offset approach to allow for full spectral deconvolution. The noise temperature of this receiver is $\sim$100 K (SSB), resulting in spectral RMS levels that far surpass those reported in similar previous studies. Our initial observations targeted the Orion and Sagittarius B2(N-LMH) hot cores and a collection of Class 0 sources. We have now completed our coverage of these initial targets, and upcoming observing time has been allocated for similar surveys of the hot cores W51 e1/e2 and G34.3+0.2. We have fully deconvolved 28 GHz of spectra on Orion with RMS levels of T_A^* $\sim$20 mK. Our coverage on Sgr was more limited, yielding $\sim$8 GHz of fully-deconvolved spectra to the same RMS level. In this talk, we will report on the data analysis for the Orion and Sgr observations, discuss our progress on line surveys of other star-forming regions, and discuss the implications of these results in the context of recent hot core astrochemical models.