A NEW E-BAND (60 - 90 GHz) FOURIER TRANSFORM MILLIMETER-WAVE SPECTROMETER

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An E-band (60 - 90 GHz) cavity Fourier transform millimeter-wave (FTmmW) spectrometer system has been built and used for molecular measurements for the first time. These frequencies are the highest acheived using cavity FTM/mmW techniques. This new system, implemented as a millimeter frequency band on the current FTMW spectrometer of the Ziurys group, utilizes waveguide for radiation propagation and commercial E-band doublers and quadruplers to achieve continuous operation from 60 to 90 GHz. This system also employs an ALMA Band 2 low-noise amplifier (LNA), designed by NRAO. The Fabry-Perot cavity consists of two 170 mm diameter mirrors with a radius of curvature of 840 mm and a separation of 700 mm. The Q factor of the system is around 100,000. Using this system, the $N_{Ka,Kc} = 4_{04} \rightarrow 3_{03}$ transition of ScC_2 near 62 GHz has been recorded for the first time. These data, as well as other molecular lines, will be presented.