

HIGH RESOLUTION INFRARED CAVITY ENHANCED ABSORPTION AT LOW TEMPERATURES

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A high-resolution cavity enhanced absorption spectroscopy (CEAS) technique is presented for infrared absorption studies at temperatures between 77K and 300 K. An optical cavity with a pathlength of several kilometers is attached to a low temperature cryostat. The spectra are obtained with a tunable diode laser with resolution 0.0003 cm^{-1} . The output of the laser is modulated with an electro-optic modulator and coupled to an optical cavity. To illustrate the use of the technique, the first overtone of carbon monoxide at 298 K and 80 K and the first overtone transition of the acetylenic C-H stretch of propyne will be presented. The experiments are performed at pressures from 70 mTorr to 1 Torr. The combination of low pressures and temperatures makes this technique ideal for studies related to astrochemistry. The experimental set up will be used to simulate in the laboratory the kinetics and spectroscopy of molecules in the atmosphere of planets and satellites of the outer solar system.