CAVITY RING DOWN ABSORPTION OF HD AT 90K

CARLOS E. MANZANARES and YASNAHIR PEREZ-DELGADO, *Department of Chemistry and Biochemistry, Baylor University, Waco, Texas, 76798*.

Cavity ring down is an ideal technique to detect weak molecular absorptions because of the long optical path lengths (order of km) that can be achieved. Coupling the method to a custom fitted cryostat allows gas phase molecules to be studied at cryogenic temperatures in a thermally isolated vacuum chamber. A novel design is described to construct the complete instrument. With optical cavities of length between 10 cm $\leq (\ell) \leq$43 cm, optical path lengths between 200 m and 8 km have been achieved. High vibrational overtones H-D $(\Delta\nu = 4)$ are measured at 90 K. The experimental set up can be used to study kinetics and spectroscopy of atmospheric molecules, planetary atmospheres, and molecular complexes in the gas phase at temperatures below 298 K using liquid He or liquid N_2 as cryogens.