EIGENSTATE RESOLVED INFRARED AND MILLIMETER WAVE - INFRARED DOUBLE RESONANCE STUDY OF METHYLAMINE IN THE N-H STRETCH OVERTONE REGION

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The infrared spectrum of methylamine, CH_3NH_2, was recorded in the region of the $\nu_1 + \nu_{10}$ N-H stretching overtone (6600 cm^{-1}), using a molecular beam laser spectrometer with optothermal detection. This molecule is an interesting benchmark for the study of intramolecular vibrational energy redistribution (IVR) because of its two large amplitude internal motions: CH_3 rotation and NH_2 wagging that are coupled together. However this also makes assigning the spectrum a challenge due to its extreme congestion. The single photon spectrum yields a density of approximately 1000 lines/cm^{-1}. Millimeter wave-infrared double resonance has been used to isolate the contributions from a single ground state. Preliminary inspection of the double resonance spectrum suggests that the IVR rates are faster than those observed for molecules of comparable structure and size.[b] Analysis of the data is in progress, and further results will be presented at the conference.

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[b]Talk RK11, 1995.