CAVITY RINGDOWN SPECTROSCOPY OF JET-COOLED TRANSIENT SPECIES

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This talk will describe a cavity ringdown spectrometer (CRDS) developed for the study of jet-cooled transient species. To date CRDS has been used in a variety of applications, from the study of weak overtone transitions of stable molecules [a] to the *in-situ* study of transient species in flames [b]. However, the majority of studies have been performed in either static or continous flow systems, yielding relatively high-temperature spectra. Use of CRDS with jet-cooled sources, so far, has been limited to a few species, *e.g.* metal-containing clusters[c], and carbon chain radicals[d]. These jet experiments, which use electrical discharge and laser ablation sources, have been performed in the regime where the radical sample duration is on a similar, or longer, time scale to that of the ringdown decay. Sample duration for photochemically produced transient species in jets is generally much shorter, *i.e.* 1-3 μs, than the best presently obtainable ringdown times ($>$100 μs); nevertheless the possibility of observing absorptions from a photochemical source of jet-cooled radicals would allow access to a number of species that might be denied to other production methods. To this end we have recorded the absorption spectrum of the $\widetilde{A}^2\mathrm{E}_{1/2} - \widetilde{X}^2\mathrm{A}_1$ electronic transition of the cadmium monomethyl radical ($CdCH_3$) from both an electrical discharge source (favorable time scale) and laser photolysis (mismatched time scale). We will show that even though the laser photolysis source is much shorter than the ringdown decay it is still possible to obtain good absorption spectra.

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[d] Linnartz H.; Motylewski T.; and Maier J. P., *J. Chem. Phys.*, **1998**, *109*, 3819.