# INTRACAVITY LASER ABSORPTION SPECTROSCOPY IN HIGHLY EXCITED OVERTONES OF HOCL: DENSITY OF STATES, INTRAMOLECULAR ENERGY REDISTRIBUTION, AND LIFETIMES

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The spectra of coupled vibrational overtone states in polyatomic molecules are of fundamental interest for the understanding of (intra) molecular dynamics and related phenomena, such as unimolecular reaction and internal vibrational redistribution (IVR), as spectroscopy on these highly excited eigenstates probes the features of the intramolecular potential which is relevant to these processes.

Using a combined Ti:Sapphire/Ring-Dye intracavity laser absorption spectrometer having a spectral resolution of 0.008 $cm^{-1}$, we were able to record the overtone and combination bands of HOCl molecule in the 12000-17000 $cm^{-1}$ range.

For the states very close to the dissociation threshold it turned out to be possible to do spectroscopic assignments and determine molecular constants. We derived the energy dependence of the density of states from a Dunham expansion used for band origin predictions and representation of vibrational states. Fermi resonance perturbations leading to the onset of IVR were investigated. We will discuss the possibility of determination of the lifetimes from linewidth measurements near the dissociation threshold.