

Cavity Ring-Down Spectroscopy: Targeting Transient Species and Molecular "Dark" States

Jinjun Liu

University of Louisville, Kentucky, U.S.A.

Thanks to its high sensitivity and large dynamic range, the cavity ring-down (CRD) spectroscopy technique has proven excellent for detecting transient species. In our laser spectroscopy lab, we have developed two CRD apparatuses with tunable pulsed laser sources for (i) room-temperature spectroscopy of reaction intermediates of low-temperature combustion and oxidation of hydrocarbons in the atmosphere and (ii) jet-cooled spectroscopy of organometallic molecules as candidates for laser cooling. I will present the experimental spectra, spectral assignment and simulation, and applications of our studies in fundamental and applied sciences. I will also introduce the new cavity-enhanced two-photon spectroscopy apparatus under construction in our lab. This new technique is designed to record hot transitions, understand polyads, and access molecular "dark states".