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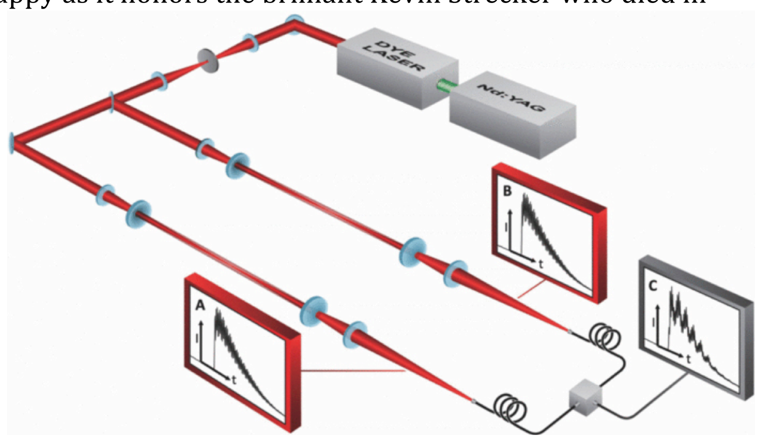
CRF Article Chosen by *The Journal of Chemical Physics* to Commemorate 80th Anniversary

A 2012 article by CRF researchers David Chandler (in Sandia's Transportation Energy Center) and the late Kevin Strecker, "Dual-etalon frequency-comb cavity ringdown spectrometer," was chosen by *The Journal of Chemical Physics* as one of 80 articles to highlight the 80 years of outstanding work published in the journal.

"I am honored that this paper was selected to highlight the research that *The Journal of Chemical Physics* is proud of and wants to attract. I am especially happy as it honors the brilliant Kevin Strecker who died in 2012, soon after this paper was published," said David. "Kevin and I designed, demonstrated, and patented this new type of Fourier transform spectrometer that when fully developed it will be a new tool for the study of many sorts of spectroscopy and the monitoring of chemical systems."



A schematic of Chandler and Strecker's dual-etalon frequency-comb cavity ringdown spectrometer. A beam from a broadband laser is first spatially filtered and then a beam splitter separates the light pulse into two beams that are coupled into the two arms of the spectrometer. One spectrometer arm is a confocal etalon containing an absorbing medium (the absorption arm). The other arm contains an empty confocal etalon with a slightly different length (readout arm). The two arms' outputs are combined using fiber optics, and the intensity is monitored using a fast photomultiplier tube. A digitizing scope records the photomultiplier current and Fourier transforms it to obtain the signal. (a) and (b) show the signal from both the absorption arm and readout arm, respectively. The combined signal (c) shows a visible low-frequency modulation. [The data in (a)–(c) are for illustrative purposes.] Low reflectivity cavity mirrors were used to spoil the cavity ringdown time such that the modulation and the cavity ringdown have similar time scales. This spectrometer should find application in high-resolution absorption and fluorescence spectroscopy as well as time-resolved, multi-spectral, imaging studies.

Recently retired CRF researcher Steve Binkley is an author on a 1982 paper also named among the journal's 80th Anniversary Collection: "Self-consistent molecular orbital methods. XXIII. A polarization-type basis set for second-row elements."

The 80th Anniversary Collection includes seminal papers dating back to 1933 on

- electronic structure methods,
- potential energy surfaces,
- transition states and reaction pathways,
- Monte Carlo and molecular dynamics simulation methods and applications,
- time-dependent methods in quantum dynamics,
- electron transfer reactions, advances in nuclear magnetic resonance methods, and
- spectroscopic methods and formalisms including multidimensional techniques with applications ranging from water to proteins.

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