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Cavity-Enhanced Nonlinear Vibrational Spectroscopy

ABSTRACT:
Various Cavity Enhanced Spectroscopy methods have become widely used in molecular spectroscopy, particularly for gas phase samples, with applications allowing detection of novel spectra and analytical chemistry applications.   They typically provide dramatic improvements in sensitivity compared to other absorption-based methods.   However, in many potential applications, optical transitions of the target species are buried by dense overlapping lines due to other compounds in the sample.   I will present two novel cavity-enhanced techniques to overcome these limitations.   One is resonant enhanced, Doppler-Free two-photon rovibrational spectroscopy. The other is double resonance spectroscopy where a frequency comb is used for the probe, allowing the absorption of tens of thousands of spectral frequencies to be simultaneously detected.

BIO:
Kevin Lehmann was born and raised in Northern NJ. He graduated with highest honors from Cook College, Rutgers University with BS in both Chemical Physics and Mathematics. Kevin received his Ph.D. in Chemical Physics from Harvard University under the supervision of William Klemperer. He was a Harvard Junior Fellow (and independent research fellowship) and then joined the Chemistry Dept. of Princeton University. After 20 years at Princeton, he moved the University of Virginia in 2005 as a Professor of Chemistry and Physics. He holds the W.R. Kenan Chair in Chemistry at UVa and is a Fellow of both the American Physical Society and Optica. To date, Kevin has 191 peer-reviewed publications and twelve U.S. patents.