

**30<sup>th</sup> April 2014 – 10:30 a.m.**  
 CFEL-bldg. 99, seminar room I and II (EG.076/078)

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### Absolute measurements of ultra-low densities of radical species using cavity-enhanced laser-induced fluorescence

The knowledge of absolute densities of dilute molecular gases is important in many disciplines. We have developed a simple combination of cavity-ring down spectroscopy (CRDS, an absolute technique) and laser-induced fluorescence (LIF, an indirect technique) using a single laser beam that we call cavity-enhanced laser-induced fluorescence (CELIF). Recording both signals simultaneously allows the calibration of the LIF signal via the absolute CRD measurement while the low limit of detection of LIF extends the dynamic range of the combined methods well below the capabilities of CRDS alone. Using a modestly developed apparatus we have measured densities of SD radicals down to  $10^5 \text{ cm}^{-3}$  with an absolute accuracy of 10% [Mizouri et al., PCCP 15, 19575 (2013)]. Currently, we are implementing the CELIF technique in our new cold molecules experiment that uses the photostop technique [Trottier et al., Mol. Phys. 109, 725 (2011)] in order to measure absolute densities of cold SD radicals in a permanent magnetic trap.

