24th February 2016 – 2 p.m.
CFEL Building (99), Ground Floor, SR II

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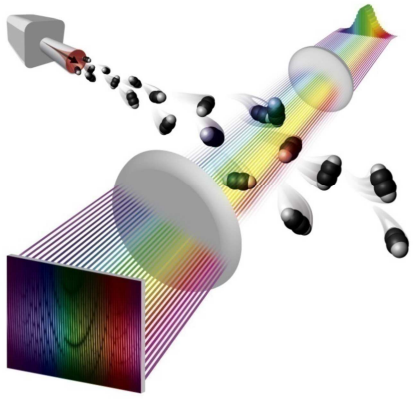
New Developments in Mid-IR Direct Frequency Comb Spectroscopy

Optical frequency comb spectroscopy has blossomed into a versatile tool for the broad-bandwidth and high-spectral-resolution study of molecules in the visible and near-infrared. Cavity-Enhanced Direct Frequency Comb Spectroscopy (CE-DFCS) enables measurements with a simultaneous bandwidth of up to hundreds of nm at a frequency resolution comparable to stable cw light sources. With our mid-IR frequency comb we have demonstrated Time Resolved Frequency Comb Spectroscopy (TRFCS). We study the transient radical DOCO, which plays a crucial and not yet fully understood role in combustion processes.

Furthermore, we have introduced buffer gas cooled molecules with CE-DFCS. This allows us to explore large molecules and drastically reduce the spectral complexity while improving resolution. This enables detailed high-resolution analysis of the infrared spectra of relatively heavy and complex molecules whose spectral features are irresolvable at room temperature. Here we show comb spectroscopy of cooled acetylene (C_2H_2) molecules down to a translational temperature of 10 K, which corresponds to a Doppler broadened linewidth of 90 MHz for the 1.5 µm CH stretch overtone transition.



FS-LA Seminar, Host: Ingmar Hartl