



3rd November 2016 - 10:00 h

CFEL – Building 99, seminar room I+II (ground floor)

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Non-traditional mass spectrometry and photodynamics experiments with clusters and molecules: systems of (not only) atmospheric and biological relevance

In my talk, I will introduce a complex CLUster Beam (CLUB) apparatus, which enables different experiments with molecular beams of clusters and nanoparticles in vacuum. In particular, we will focus on two topics:

- (1) photodissociation dynamics using velocity map imaging (VMI) technique,
- (2) cluster mass spectrometry implementing different ionization methods.

The first topic will be illustrated by an example of photodissociation of a simple diatomic HCl molecule. We will show that IR-UV pump-probe excitation can lead to the molecular alignment and a direct imaging of the (square of the) rotational wavefunction of the molecule. Also dynamics effects such as the dephasing in time due to a hyperfine structure will be demonstrated.

In the second part of the talk we will focus on the different ionization methods for cluster mass spectrometry, which can (or cannot) provide information about the neutral cluster species; their size, composition and also reactions in the clusters upon excitations with UV-photons or electrons. Several examples will be illustrated, which are relevant to atmospheric chemistry (ice nanoparticles doped by HNO₃ and N₂O), technology (dissociative electron attachment to Fe(CO)₅ deposited on cluster surfaces) and biology (electron attachment to uracil and thymine molecules microhydrated with a few waters).

Host: Jochen Küpper/ CFEL Molecular Physics Seminar