Contribution ID: **16** Type: **Talk**

Chiral recognition in the gas phase using polarization-tailored two-color ionization

Thursday 15 February 2018 12:20 (20 minutes)

The asymmetry of photoelectron angular distributions (PADs) from randomly oriented enantiomers of chiral molecules in the ionization with circularly polarized light arises in forward/backward direction with respect to the light propagation. This effect is known as Photoelectron Circular Dichroism (PECD) and has so far been investigated using synchrotron radiation [1]. By employing resonance enhanced multi-photon ionization, we observed highly structured asymmetries in the range of ± 10% on bicyclic Ketones and were able to study dependency on laser parameters [2, 3, 4, 5].
Two-color fields can be used to drive electrons into trajectories usually not accessible by using a single-color field with elliptical or linear polarization. Our goal is to study to what extent two-color field geometries can be used to control electron dynamics in chiral molecules.
In this talk, we give an overview over the experimental results using a phase-locked, two-color ionization scheme on noble gases as well as chiral specimen with different laser intensities covering the multi-photon up to the region close to the tunneling regime.

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Session Classification: Chirality 2

Track Classification: Contributed talk