CARL VON OSSIETZKY universität OLDENBURG
Institut für PHYSIK

PHYSICAL COLLOQUIUM

INVITATION

Monday, 04.12.2017, 4.15 p.m., W2-1-148

speaks

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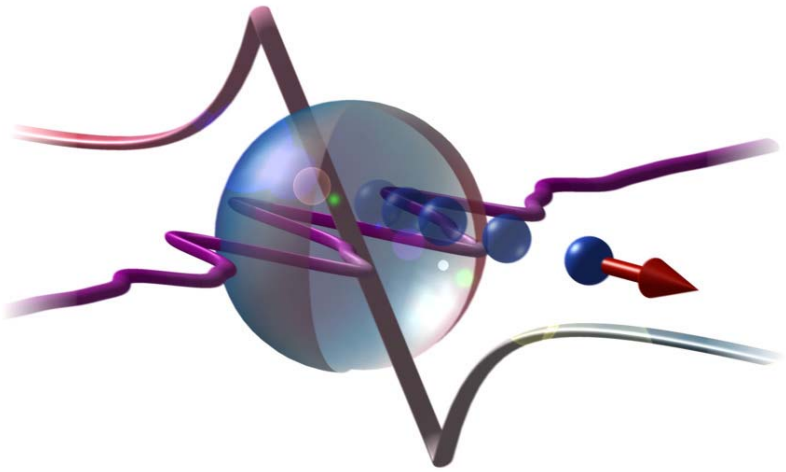
about

Attosecond control of electron dynamics in clusters



The highly nonlinear response of atoms and molecules to strong laser fields leads to various fascinating processes, including high-order above threshold photoemission and high harmonic generation, which have become fundamental tools in attosecond science. The underlying recollison picture [1] provides a powerful framework to develop protocols for controlling these processes via the sub-cycle electric field waveform. The motivation to explore how such strong-field dynamics take place at finite targets arises from the localization and enhancement of electromagnetic fields at laser driven nanostructures and the resulting hope for new physics.

In the case of strong-field photoemission, the physical picture for metallic nanotips [2] and nanospheres [3], however, was found to be surprisingly similar to the atomic case, with the dominant generation of fast electrons via elastic backscattering. However, for small clusters, where particularly energetic electrons have been observed for resonant plasmonic excitation, forward rescattering was predicted to be the dominant process [4,5]. Recently we could demonstrate control of the electron acceleration in clusters by forward rescattering with a bichromatic laser field [6], making this process to a potential candidate for purely optically controlled particle acceleration.

[1] P.B. Corkum, Phys. Rev. Lett. 71, 1994 (1993). [2] M. Krüger et al., Nature 475, 78 (2011). [3] S. Zherebtsov et al., Nat. Phys. 7, 656 (2011). [4] U. Saalmann, J.M. Rost, Phys. Rev. Lett. 100, 133006 (2008). [5] T. Fennel et al., Phys. Rev. Lett. 98, 143401 (2007). [6] Passig et al., Nat. Commun. 8, 1181 (2017).

All interested persons are cordially invited.
Sgd. Prof. Matthias Wollenhaupt