

Physikalisches Kolloquium

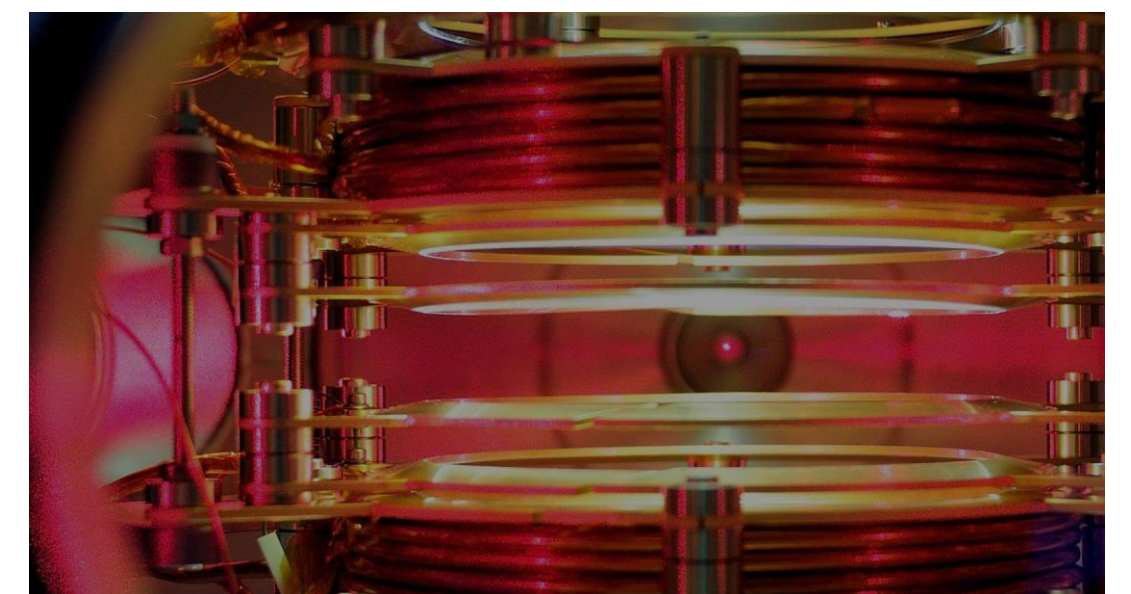
Thursday, 02.12.2021, 16:15
Digital Lecture Hall via Zoom

Prof. Dr. Daniel Fischer, Missouri S&T, Rolla, USA,
Prof. Dr. Klaus Bartschat, Drake University, Des Moines, USA:

Coherent control and analysis of atomic multi-photon ionization processes

Abstract

The study of the response of matter to external electromagnetic radiation has shaped our understanding of the structure and the dynamics of atoms, molecules, and solids like no other type of reaction throughout the past century. In recent decades, this research was boosted by the development of new types of light sources that have pushed the limits of accessible field parameters towards higher intensities, larger photon energies, shorter time scales, and towards better spectral, temporal, and phasal control. Exposing matter to the fields generated by these advanced light sources makes it possible to control and study reactions to hitherto unreachable precision, in particular, if simple atomic targets are used. In this talk we report on a joint experimental and theoretical project, where the multiphoton ionization of one of the simplest atoms in the periodic table – Lithium – was investigated. Fundamental questions about light-matter interaction were addressed, such as: How can the electron emission be controlled by the properties of the laser field? How can one extract phase and amplitude information on the ejected electrons' wave functions? How does the ionization dynamics depend on the relative orientation (or helicity) of the target and the ionizing laser field? Such experiments not only help to understand fundamental symmetries, which play a crucial role in many processes occurring in nature, but they provide versatile tools enabling coherent control of atomic dynamics.



All of you interested in physics are cordially invited!