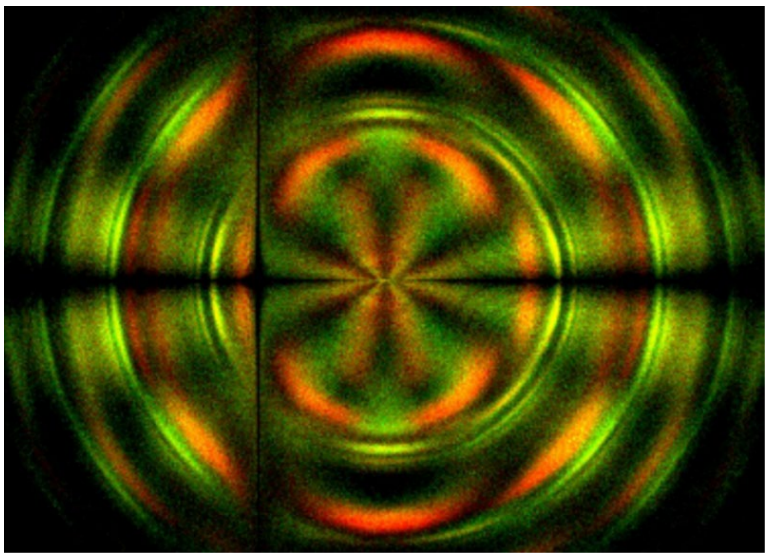
Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

PHYSIKALISCHES KOLLOQUIUM

AM 05. JUNI 2023 UM 17 UHR C.T.

IM GROßEN HÖRSAAL

AKTUELLE INFORMATIONEN FINDEN SIE HIER: WWW.PHYSIK.UNI-FREIBURG.DE



TIME-RESOLVED EXPERIMENTS WITH ATOMS AND MOLECULES USING XUV AND IR LASER PULSES

ROBERT MOSHAMMER

MAX-PLANCK-INSTITUT FÜR KERNPHYSIK

How does an atomic or molecular quantum system evolve in time and is it possible to visualize or even control the motion of its constituents? With modern technologies we are progressing towards the realization of this old dream from the early days of quantum mechanics. The key-tools for achieving the requested temporal resolutions of femto- or even attoseconds are intense and ultrashort laser pulses. Their interaction with atoms and small molecules will be discussed with emphasis on measurements based on fragment-imaging detectors (COLTRIMS or Reaction-Microscopes). In combination with state-of-the-art table-top lasers, or with high-harmonic radiation-sources based on IR up-conversion, or with large-scale free-electron lasers like FLASH in Hamburg we try to unravel the correlated multi-particle dynamics in small quantum systems on ultrashort time scales. For example, pump-probe experiments allow the observation of moving electronic wave-packets in bound sates of atoms and, in case of molecular targets, vibrational and electronic excitations as well as the transfer of energy within the molecule can be imaged in real time.