Paderborn Photonics Lecture

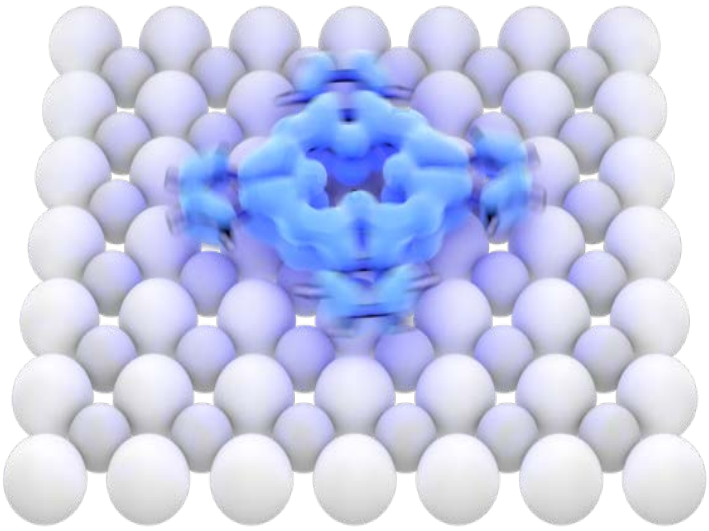
4.12.2019
Hörsaal O2
16:15

Ultrafast single-molecule videography and choreography

Prof. Dr. Rupert Huber
Institut für experimentelle und angewandte Physik
University of Regensburg

Abstract:

In order to understand how matter functions, we ultimately need to watch its atomic building blocks interact on their intrinsic length and time scales. Recently, lightwave electronics has made this long-standing dream come true. The idea is to exploit the carrier wave of light as an ultrafast, contact-free bias voltage to interrogate and control the nanoworld. I will first review how lightwaves drive electrons in solids into surprising sub-cycle quantum motion. By combining this idea with the sub-angstrom spatial resolution of scanning tunnelling microscopy we can record first atom-scale slow-motion movies of individual vibrating molecules. By directly exerting femtosecond atomic forces one may even selectively choreograph a coherent structural motion of a single-molecule switch. This radically new way of accessing the world of individual atoms and molecules allows us to tailor key elementary dynamics in physics, chemistry and biology, on their intrinsic spatio-temporal scales.



CeOPP
Center for Optoelectronics and Photonics Paderborn

TRR 142
Tailored Nonlinear Photonics