Doctoral Seminar

Graduate Research Training Group (GRK)

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INSTITUT FÜR PHYSIK

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Traditio et Innovatio

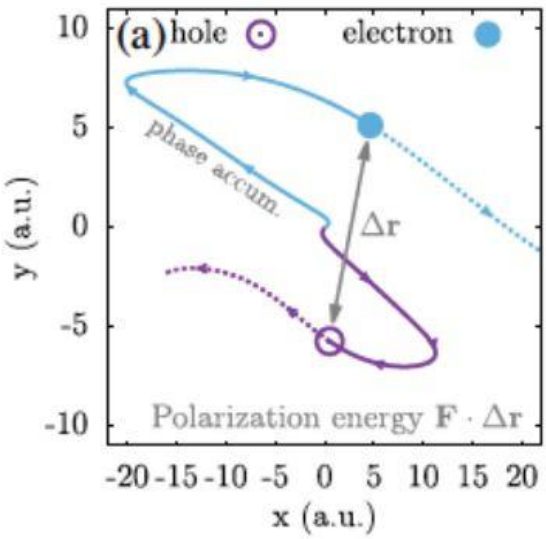
Universität Rostock

19th May 2022, 4:15 pm
Prof. Mette Gaarde
Louisiana State University

High-harmonic spectroscopy in 2D and 3D systems: Real-space and momentum-space pictures

HHG in solids has recently emerged as a topic of intense interest; for its potential as a compact ultrafast light source and as a probe of both structural and dynamical features of condensed-phase systems. The dynamical process underlying solid-state HHG can be understood by using a momentum-space, three-step semi-classical model that starts by an electron tunneling from the valence to the conduction band and is followed by acceleration of the electron and its hole by the strong field. In a real-space picture, this acceleration takes the form of laser-driven oscillations of highly delocalized electron and hole wave packets, extending over many unit cells of the lattice, which leads to emission of harmonic radiation when the electron and hole reencounter each other in space.

In this talk, I will give a brief introduction to the topic of HHG in solids and then discuss some recent work. In particular, I will talk about how the delocalized nature of the quantum wave packet discussed above means that even imperfect recollisions – when the center of the electron and hole wave packets do not exactly overlap – contribute significantly to the harmonic emission in both bulk and two-dimensional systems. I will also talk about recent results from a collaboration with the experimental group of M. Zürch at UC Berkeley, in which we found clear signatures of the contribution of multiple conduction bands to HHG in monolayer MoS_2.



Talk: English
Slides: English
Location: Zoom

https://uni-rostock-de.zoom.us/j/67191822515?pwd=UTVJSXVPaDVLV0ZSZW9LR3NRVWF2UT09