

Theoriekolloquium

Am **21. Oktober 2021 um 14.15 Uhr** hält

Herr Dr. Hamed Koochaki Kelardeh (Dresden)

im Raum **W2 1-143** einen Vortrag mit dem Titel

Topological strong-field optics of solids

I will talk about the interaction of an ultrafast and strong optical field with two-dimensional graphenelike materials. Primary emphasis is given on the topological aspects, namely the Pancharatnam-Berry phase, chirality and valley pseudospin.

Markedly, I will present the coupling mechanism of massless fermions to strong short laser pulses and demonstrate that excitation landscapes in momentum space exhibit a universal scaling with the square root of the wavelength. Thanks to our gained understanding, we can prove that simple linearly-polarized half-cycle pulses create valley polarization (VP) of more than 70%. Previously it was thought that only pulses with chiral characters could achieve VP in gapless systems.

The subsequent part of my talk is dedicated to the high-harmonic generation (HHG); in particular, I will present a study of the crystal-orientation dependence of HHG in transition-metal dichalcogenides. We find that the polarization direction of the odd-order harmonics smoothly follows the laser field irrespective of the crystal orientation, whereas the polarization of the even-order harmonics is fixed along the direction of the mirror planes. Furthermore, the polarization of the even-order harmonics shows a flip in the course of crystal rotation when the laser field lies between two of the crystal mirror planes.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Martin Holthaus