521

21

Ultrafast views of surface photocurrents on topological insulators in momentum space

*This lecture will be given in English.

:Prof. Ulrich Höfer

(Fachbereich Physik, Philipps-Universität Marburg, Germany)

:2018 5 18 16:30-

: C212

The Dirac-cone surface states of 3D topological insulators are characterized by a chiral spin texture in k-space with the electron spin locked to its parallel momentum. Ultrafast laser excitation can induce spin-polarized currents in such a topological surface state either by optical transitions between the occupied and unoccupied part of the Dirac cone or directly by accelerating the electrons in a strong THz field. We monitor the resulting asymmetric electron population in momentum space by time- and angle-resolved photoelectron spectroscopy. I will demonstrate that the surface photocurrents can be controlled on the femtosecond timescale by the strength and the polarization of the excitation pulses. The elastic scattering times of the electrons carrying the current reach values up to 2.5 ps corresponding to mean-fee pathways of 0.75 μm. Our results suggest that topological insulators are a promising platform for a novel, light-wave driven electronics.

5

7400

ECMP 創発的物性物理研究拠点

7653 6552
7021 7471
7741
5720

AMD