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EINLADUNG zum IFP-SEMINAR

Probing spin textures of topological chalcogenide materials

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Host: Gaku Eguchi

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Ort: Institut für Festkörperphysik, TU Wien
Wiedner Hauptstraße 8-10, 1040 Wien
Seminarraum DC rot 07 (roter Bereich, 7. OG)

Two-dimensional chalcogenide materials, including topological insulators and semimetals, have attracted a great deal of attention in terms of spin-orbit coupled topological phenomena. Topological insulators are characterized by edge or surface states that emerge as a result of bulk-boundary correspondence. A spin helical texture of the surface states, where the electron-spin is locked to its momentum, is a manifestation of 3D version of topological insulators. Topological Dirac or Weyl semimetals show linear dispersion around nodes, termed the Dirac or Weyl points, as the three-dimensional analogue of graphene. Topological surface states connecting the Weyl points, the Fermi arcs, should have a spin texture, which could lead to exotic surface transport and contribute to extremely large magnetoresistance.
In order to experimentally confirm their topological natures, spin- and angle- resolved photoemission spectroscopy (SARPES) is one of the most powerful tools. The SARPES apparatus is equipped at the ESPRESSO end station attached to the APPLE-II type variable polarization undulator beam line (BL-9B) at Hiroshima Synchrotron Radiation Center (HSRC). The VLEED-type spin detector utilized in the ESPRESSO machine achieves a 100 times higher efficiency compared to that of conventional Mott-type spin detectors [1]. This technique has been applied to some topological insulators [2, 3], transition-metal dichalcogenides [4] as well as Weyl semimetals [5]. In this seminar talk, some of our recent results will be presented.

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[1] T. Okuda and A. Kimura, J. Phys. Soc. Jpn. **82**, 021002 (2013).
[2] K. Kuroda et al., Phys. Rev. B **91**, 205306 (2015).
[3] G. Eguchi et al., Phys. Rev. B **90**, 201307(R) (2014).
[4] R. Suzuki et al., Nature Nanotechnology **9**, 611 (2014).
[5] E. Haubold et al., submitted.