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## Integriertes Seminar

Aktuelle Probleme dimensionsreduzierter Festkörper

Ort: Seminarraum 718 (Wilhelm-Klemm-Straße 10)

Zeit: Mittwoch, 08.02.2017, 10:15 Uhr

# Mapping of spin and orbital wavefunction under interband hybridization of giant Rashba surface states

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Recently, we have constructed a new spin- and angle-resolved photoemission spectroscopy system combined with a vacuum ultraviolet laser (Laser-SARPES) at the Institute for Solid State Physics (ISSP), University of Tokyo [1, 2]. The system consists of two VLEED spin detectors and enables us to analyze the spin vector of a photoelectron in three dimensions with high resolution. Moreover, laser polarization can be easily controlled by a half or a quarter waveplate. Our system is a powerful tool for direct investigations of orbital-dependent electronic structures and their spin polarizations. In my talk, I will present my recent results for Rashba surface states of Bi/Ag(111) by using our Laser-SARPES. In contrast to general band mapping by photoemission, the spin and orbital components of the surface wavefunction are directly mapped into momentum space by linearly polarized light [Fig. 1]. Moreover, it is revealed that the interband spin-orbit hybridization between two spin-split surface bands strongly modifies the spin and orbital texture of Bi/Ag(111). The visualized spin-orbital entanglement with unconventional spin texture shows good agreement with our DFT calculation.

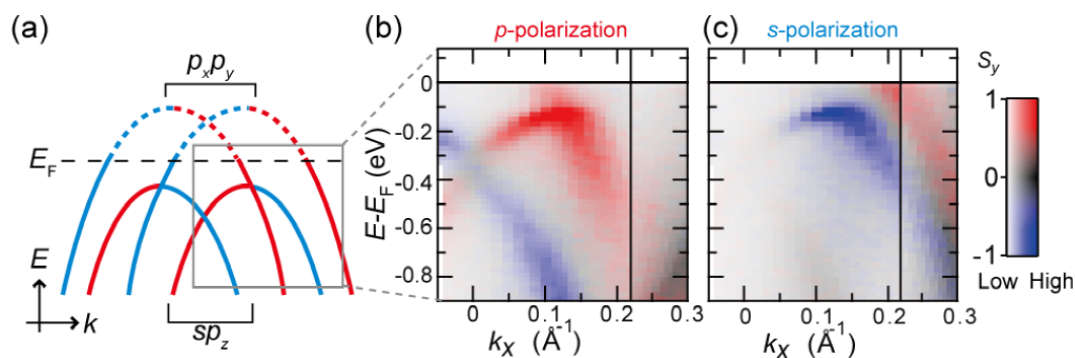


Fig. 1 (a) Schematic illustration of the surface band structure of Bi/Ag(111). (b) and (c) Spin-resolved band structure of symmetric orbitals measured by  $p$ -polarized light and antisymmetric orbitals measured by  $s$ -polarized light, respectively.

[1] T. Shimozima, K. Okazaki, S. Shin, J. Phys. Soc. Jpn. **84**, 072001 (2015)

[2] K. Yaji, A. Harasawa, K. Kuroda, F. Komori, S. Shin *et al.*, Rev. Sci. Instrum. **87**, 053111 (2016)

Einladender: Donath