凝縮系物理学ゼミナール

Condensed Matter Seminar

Location: **Room 413**, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: **13:30-15:00**, Wednesday, 7 November 2018

“Impact of Rashba spin-orbit coupling on f-electron materials (and the bulk fermi arc in f-electron materials)”

Speaker:

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Abstract:

We study the interplay between Rashba spin-orbit coupling (RSOC) and the Kondo screening in noncentrosymmetric f-electron materials. We show that the Kondo interaction of the f-electrons becomes anisotropic at high temperatures due to the RSOC in these materials leading to a suppression of the Kondo temperature. However, an isotropic Kondo effect is restored at low temperature which leads to a complete Kondo screening. We furthermore demonstrate that the Kondo effect has influence on the Rashba splitting in the band structure, which becomes temperature dependent. With decreasing temperature, the Kondo screening occurs, which leads to drastic changes in the band structure. Remarkably, these changes in the band structure depend on the helical spin polarization. For strong RSOC, we observe that one of the helical bands becomes gapped at low temperature and a helical half-metal is formed.

Moreover, we observed “bulk fermi arc” at several parameters. “Bulk fermi arc” can emerge when the system is described by the effective non-hermite Hamiltonian. Effective non-hermite Hamiltonian can be introduced in the context of "open quantum systems". In this talk, if i have time, i will explain the relationship between "strongly correlated electron systems" and “open quantum systems" and why we can see the "bulk fermi arc" in the f-electron materials in the context of "open quantum systems".