



第 78 回トポロジカル物質科学セミナー Topological Materials Science Seminar (78)

Joint seminar with “Mixed-anion” project



EXOTIC QUANTUM MAGNETS AND COMPETING STATES

- Novel low carrier Kondo systems

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Date: October 26 (Fri), 2018

Time: 13:30 -14:40

Place: Room 525, Science Bldg. 5 (Physics), Kyoto University

Abstract:

The Yb and Ce Kondo compounds display complex magnetic and electronic behavior, from heavy fermion metals to Kondo insulators. Their properties are often the result of competing energy scales, such as crystal field effects, exchange interactions and strong electronic correlations. Spin orbit coupling (SOC) often adds another dimension to the materials' complexity, and can result in topologically protected states. Here I will discuss a novel regime in the area of strong correlated electron systems, that of fragile magnetism in two low carrier Kondo intermetallics based on Yb, Ir and Ge. Their crystal structures are drastically different (one is a 3-4-13 distorted cubic compound, the other is 1-3-7 rhombohedral system). However, a meaningful comparison can be drawn between such different systems, in light of the cubic rare earth sublattice in both. What sets the former compound apart from the known low carrier or Kondo insulators is that the underlying electronic properties are set by the non-magnetic analogue $\text{Lu}_3\text{Ir}_4\text{Ge}_{13}$, which is itself a low carrier semi-metal. $\text{Yb}_3\text{Ir}_4\text{Ge}_{13}$ is therefore the first experimental realisation of multi-site honeycomb model in the dilute Kondo carrier limit. The 1-3-7 compound is also a rare heavy fermion ferromagnet. While the SOC strength or the degree of frustration are currently unknown, their possible role will be discussed.

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