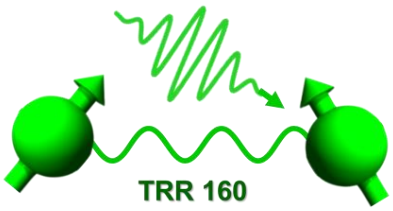

Sonderforschungsbereich TRR 160
Kohärente Manipulation wechselwirkender Spinanregungen
in maßgeschneiderten Halbleitern
Integrated Research Training Group (IRTG)

Seminarankündigung

Dienstag, 27.04.2021, 14:15 Uhr

https://tu-dortmund.zoom.us/j/94705306167?pwd=elJrQTFlaDdaenVOSThzVHBqbVAwQT09

"Uncovering non-Fermi-liquid behavior in Hund metals"

Vortragende/r: Prof. Jan von Delft
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Abstract:

Hund metals are multiorbital materials with broad bands which are correlated via the ferromagnetic Hund coupling J, rather than the Hubbard interaction U. They are characterized by spin-orbital separation (SOS), a two-stage Kondo-type screening process in which spin screening occurs at much lower energy scales than spin screening. By contrast, Mott-correlated metals, dominated by U rather than J, lie close to the phase boundary of a metal-insulator transition, where the SOS window becomes negligibly small. We study the interplay between Hund and Mott physics for a minimal model for Hund metals, the orbital-symmetric three-band Hubbard-Hund model (3HHM) for a lattice filling of 1/3. Using Dynamical Mean-Field Theory and the Numerical Renormalization Group as real-frequency impurity solver, we identify numerous fingerprints distinguishing Hundness from Mottness in the temperature dependence of various physical quantities.

The SOS regime of Hund metals features almost fully screened orbital degrees of freedom coupled to almost free spin degrees of freedom with anomalously strong spin fluctuations. Experimentally, this regime shows bad-metal behavior. This has been conjectured to result from an underlying non-Fermi-liquid (NFL) fixed point. We clarify its nature by modifying the self-consistent impurity model underlying the DMFT treatment of the 3HHM in such a way that the NFL energy window becomes very wide. The dynamical spin and orbital susceptibilities then show anomalous NFL power law behavior, with power law exponents matching predictions from conformal field theory for a SU(2)xSU(3) spin-orbital Kondo model.