



# EINLADUNG zum IFP-SEMINAR

## Fermi surface instabilities in heavy fermion systems

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Host: Silke Bühler-Paschen  
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Wiedner Hauptstraße 8-10, 1040 Wien  
Seminarraum DC rot 07 (roter Bereich, 7. OG)  
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### Abstract:

Fermi surface instabilities have regained interest very recently as they are strongly connected to the change of the ground state in strongly correlated electron systems as function of tuning parameters like pressure, doping, or magnetic field. Usually the electronic band structure is a rather robust property of the metallic state especially when applying magnetic field. However, in heavy fermion systems, the Fermi energy scale is significantly reduced and Zeeman splitting of the flat bands crossing the Fermi level can be so strong that spin-split Fermi surface sheets can be continuously suppressed.

Here we will review Fermi surface instabilities in different heavy fermion Kondo lattice systems. In  $\text{CeRh}_2\text{Si}_2$  the first order metamagnetic transition induced a drastic Fermi surface change due to the change of the localization of the 4f electrons. In  $\text{YbRh}_2\text{Si}_2$  a cascade of Lifshitz transitions appear due to the de-renormalization of the quasiparticles under magnetic field.

Quantum oscillation experiments under magnetic field in  $\text{UCoGe}$  for a field along the easy magnetization axis show the occurrence of several Lifshitz transitions in the polarized phase. The possibility of a Fermi surface instability in  $\text{URhGe}$  and its feedback on superconductivity will be discussed.

Fermi surface properties of heavy-fermion systems can be easily tuned by magnetic field. The Lifshitz transitions can be decoupled from intersite correlations and be driven only by changes in the local fluctuations induced by reaching a critical magnetic polarization.