# Festkörperkolloquium und TRR 80 Kolloquium

**am Donnerstag, 19.04.2012**

**um 17:15 Uhr**

**spricht**

**Dr. Sven Friedemann**

**Cavendish Laboratory, University of Cambridge**

**über das Thema**

## Quantum Criticality in Heavy-Fermions and Transition-Metal Compounds

A continuous phase transitions induced by an non-thermal tuning parameter is governed by quantum fluctuations between the competing ordered states. At finite temperatures these quantum fluctuations can give rise to unconventional properties. In metallic systems this is manifested by deviations from Fermi-liquid behavior – the standard theory of metals. In addition, often new states of matter emerge in the vicinity of quantum critical points, like unconventional superconductivity. Many quantum critical points are driven by changes in the electronic structure. Moreover, quantum fluctuations will interact with the electrons on the Fermi surface dictating the electronic behavior and leading to new states. I will discuss quantum critical behavior in heavy-fermion materials and in transition metal compounds. Particularly, I will present studies on the prototypical heavy-fermion material YbRh2Si2 and its non-magnetic reference compound LuRh2Si2 as well as on the transition-metal quantum critical material NbFe2. These identify a Fermi surface reconstruction at the quantum critical point in YbRh2Si2 and establish the different routes towards quantum criticality arising in both NbFe2 and YbRh2Si2 when utilizing different tuning parameters. I will discuss similarities and differences between these complementary material classes. Finally, I will outline new developments for electronic and resonance measurements for investigations on correlated materials.

**im HS 3 im Physik Department**

**ab 17:00 Uhr Kaffee vor dem Hörsaal**

**Einführung: C. Pfleiderer**