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TECHNISCHE UNIVERSITÄT WIEN
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Einladung zum Seminar

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"Quantum phase transitions induced by high pressures: from Heavy Fermions to Quantum Magnets"

We study the pressure tuned quantum phase transition in CePt and $YbFe_2Ge_2$ heavy fermions using electrical transport measurements under high pressure (P). CePt is a FM Kondo lattice with TC =6K at P=0. The application of high pressures drives to a vanishing of FM ordering at the critical pressure PC=12 GPa determining the quantum critical point (QCP) of this system. CePt has been so far the first FM Kondo lattice to show a direct FM-quantum phase transition.
Different to CePt, $YbFe_2Ge_2$ is a moderate Heavy Fermion with non-magnetic ground state. A characteristic coherence temperature (T_{coh}) associated to the truly Fermin liquid (FL) behavior is driven towards to zero at PC=9.4 GPa. Beyond that, a magnetic ordering is observed. In the vicinity of PC, a linear temperature dependence of the resistivity is observed over more than two decades of temperatures. This feature might be ascribed to the presence of a pressure tuned AF-QCP around PC. A microscopic scenario of two dimensional spin fluctuations is taking into account to describe the quantum criticality of both CePt and $YbFe_2Ge_2$ compounds.
Finally, I will present very recent measurements of AC-specific heat as a function of hydrostatic pressure and temperature (Cp(T)) in the 2D dimmer spin system $SrCu_2(BO_3)_2$, which is a physical realization of the Shastry-Sutherland model. For the case of AC-specific heat complementary measurements under magnetic field up to 14T were performed. The results evidence a lowering of the spin gap with increasing pressure up to 16 kbar which determines the critical pressure PC where the Quantum phase transition sets in. Beyond PC, we observed sharp peaks in the specific heat which might be ascribed to the formation of exotic and magnetic ordered phases.

Host: S. Bühler-Paschen

Freitag, 18. September 2009, 11:00 Uhr
Seminarraum 138B, 7. OG, Turm C (rot)
Wiedner Hauptstraße 8-10
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