as well as thermal expansion measurements indicate the possible existence of a tetracritical point at $x \approx 0.25$. For higher and lower Ge concentrations exists a first order transition below the Néel temperature, whereas for $x = 0.25$ both transitions seem to be degenerate. Furthermore, the anomalies in the thermal expansion have opposite signs below and above $x = 0.25$ suggesting a different magnetic stucture. We performed extensive neutron diffraction on $CeCu_2(Si_{1-x}Ge_x)_2$ single crystals with $x = 0.16$ and 0.45, i.e. on either site of $x = 0.25$. Both samples show antiferromagnetic order with slightly different propagation vectors followed by a lock-in transition. This suggests a modified nesting of the Fermi surface. The magnetic structure will be discussed in comparison to macroscopic measurements.

TT 16.19 Sa 11:00 Poster TU C

Distribution of the Kondo temperature in strongly coupled two-level systems: an NRG study — •Christian Kolf — kolf@th.physik.uni-bonn.de

Conductance measurements on quantum point contacts show zero-bias anomalies in the differential conductance which are consistent with the presence of two-channel Kondo (2CK) impurities and which are difficult to explain by any other known microscopic mechanism. The 2CK effect has been proposed by degenerate two-level systems. As one of the unresolved problems within the two-channel Kondo scenario, however, the experimental results indicate a very narrow distribution of the Kondo temperature T_K, $P(T_K)$. We argue by general renormalization group arguments that a wide distribution of the Kondo coupling constant J – which is expected for a nanoscopic point contact – leads to a peaked distribution of the resulting T_K, if the distribution of J extends beyond the region $J \ll D$ where D is the characteristic high energy scale, i.e. the band width. We investigate the distribution $P(T_K)$ by means of explicit numerical renormalization group (NRG) calculations.

TT 16.20 Sa 11:00 Poster TU C

Multi-level Kondo effect in single-wall carbon nanotubes (SWNT) — •Theresa Hecht, Michael Sindel und Jan von Delft — Department of Physics and Center for NanoScience, LMU München, Theresienstr. 37, 80333 München

Recently Herrero et al. investigated the Kondo effect [1] in SWNTs. In absence of a magnetic field an (approximate) orbital as well as a spin degeneracy is present in those SWNT. Herrero et al. were able to identify two consequences of this degeneracy, namely the so-called SU(4) Kondo effect [2] and a purely orbital Kondo effect [3]. A finite magnetic field was found to remove both spin and orbital degeneracy, reflected by multiple splittings of the Kondo resonance. Moreover, a particular magnetic field might even result in a degeneracy between adjacent orbital levels, giving rise to a purely orbital Kondo effect [3]. In some samples, the Kondo resonance is split even in the complete absence of a magnetic field, suggesting that the orbital states are weakly coupled, lifting their degeneracy.

Motivated by these experiments, we study a two-level Anderson model by means of Wilson's numerical renormalization group method. We investigate both magnetic field and energy dependence of the spectral function and propose a mechanism that leads to the various types of splittings of the Kondo resonance.

[1] P. Jarillo-Herrero et al., submitted to Nature
[2] L. Borda et al., PRL 90, 026602, (2003)
[3] P. Jarillo-Herrero et al., to be published

TT 16.21 Sa 11:00 Poster TU C

Phase Transitions in the Pseudogap Anderson and Kondo models — •Lars Fritz, Marijana Kircan, and Matthias Vojta — Institut für Theorie der Kondensierten Materie, Universität Karlsruhe,76128 Karlsruhe

The Pseudogap Kondo problem, describing quantum impurities coupled to fermionic quasiparticles with a pseudogap density of states, $\rho(\omega) \propto |\omega|^r$, shows a rich zero-temperature phase diagram, with different screened and free moment phases and associated transitions. We analyze both the particle-hole symmetric and asymmetric cases using renormalization group techniques. In the vicinity of $r = 0$, which plays the role of a lower critical dimension, an expansion in the Kondo coupling is appropriate. In contrast, $r = 1$ is the upper-critical dimension in the absence of particle-hole symmetry, and here insight can be gained using an expansion in the hybridization strength of the Anderson model. As a by-product, we show that the particle-hole symmetric strong coupling fixed point for $r < 1$ is described by a resonant level model, and corresponds to an intermediate-coupling fixed point in the renormalization group language. Interestingly, the value $r = \frac{1}{2}$ plays the role of a second lower-critical dimension in the particle-hole symmetric case, and there we can make progress by a novel expansion performed around a resonant level model. The different expansions allow a complete description of all critical fixed points of the models and can be used to compute a variety of properties near criticality, describing universal local-moment fluctuations at these impurity quantum phase transitions.

TT 16.22 Sa 11:00 Poster TU C

Magnetic field dependence of the electronic phase coherence length of diffusive nanowires with magnetic impurities — •Christian Schirm[1], Elke Scheer[1], Christian Paschke[2], Christoph Sürgers[2], and Hilbert v. Löhneysen[2] — [1]Fachbereich Physik, Universität Konstanz, D-78464 Konstanz — [2]Physikalisches Institut and DFG Center for Functional Nanostructures (CFN), Universität Karlsruhe, D-76128 Karlsruhe

For the study of the electronic phase coherence length l_φ of diffusive metal structures at very low temperatures, Mohanty et al. [1] propose to investigate the conductance fluctuations (CF) at high magnetic fields. The authors claim that the possible presence of small amounts of magnetic impurities should be detectable by analyzing the field dependence of the fluctuations. In [2] the CF of diffusive Cu nanowires, intentionally contaminated with Mn impurities in the ppm range, were investigated. We had observed a complex field and concentration dependence of l_φ. We re-evaluated the data of [2] with a refined numerical treatment. The influence of the signal to noise ratio (SNR) of the conductance measurements on the determination of l_φ is discussed. Although the SNR in [2] is of the same order or better than in [1] we obtain a wide range of possible values for l_φ depending on the treatment of the background and other numerical or physical parameters. Thus, the absence of a magnetic field dependence of l_φ cannot be taken as evidence against the presence of magnetic impurities limiting l_φ for $T \to 0$.

[1] P. Mohanty et al., Phys. Rev. Lett. 91, 066604 (2003)
[2] H. v. Löhneysen et al., Physica B 284-288, 1858 (2000)

TT 16.23 Sa 11:00 Poster TU C

Self-energy near Pomeranchuk instability — •Luca Dell'Anna and Walter Metzner — Max Planck Institut fuer FKF, D-70569 Stuttgart

Electron-electron interaction can induce Fermi surface deformations. We study the decay rate behavior for single particle excitations near d-wave Pomeranchuk instability in two dimensions.

TT 16.24 Sa 11:00 Poster TU C

Delocalization of electrons in disordered films induced by parallel magnetic field and film thickness — •R.K. Brojen Singh, V.Z. Cerovski, and M. Schreiber — Institut für Physik, Technische Universität, D-09107 Chemnitz, Germany

We present results of the investigation of delocalization of non-interacting electrons in disordered thin films induced by parallel magnetic field B and film thickness b. We compare two procedures within the framework of self-consistent theory of localization for weak fields generalized to situations lacking time reversal invariance by (a) taking the diffusion constants, D^{pp} and D^{ph} corresponding to particle-particle and particle-hole channels respectively as equal, and (b) taking $D^{pp} \neq D^{ph}$. The two procedures give different results, the main one being that (a) gives the metal-insulator transition (MIT) at $T = 0$ induced by the magnetic field and film thickness, but (b) does not. In the insulating regime we find the localization length as a function of B, b and λ (disorder strength) and calculate critical values of B, b and λ. In the metallic regime we calculate conductivity as a function of these parameters. At $T > 0$ both procedures give an MIT.

TT 16.25 Sa 11:00 Poster TU C

Density of states of the three dimensional Bernoulli-Anderson model — •P. Karman, V. Z. Cerovski, and M. Schreiber — Institut für physik, Technische Universität Chemnitz, D-09107 Chemnitz

The density of states of the Bernoulli-Anderson model, defined as the tight-binding Hamiltonian of non-interacting electrons with disorder introduced by the random distribution of only two on-site energies, is studied using the large scale numerical diagonalization of Hamiltonians. In particular, we determine the band structure and the propreties of the band tail states and compare the results with the Anderson model of disorder.