Some time ago a dependence of the resistive superconducting transition temperature on the current direction in UNi_2Al_3 thin films was observed. Although a qualitative explanation can be given, fundamental questions about this phenomenon are still open, which motivated more detailed studies.

Morphological investigations by AFM and STM seem to rule out a growth mechanism induced origin. By using a specially designed photomask we were able to measure the transition down to current densities of 0.1 A/cm^2 and observed no vanishing of the difference in T_c. However, the magnitude of the splitting of the sc transition varies from sample to sample without any correlation to the defect density as determined by the residual resistance ratio. V(I) characteristics in the superconducting state were measured at various magnetic fields, indicating anisotropic pinning. For the current direction I‖c a thermally activated flux flow region could be identified.

Additional measurements with higher current densities prove that the observations in the relevant range are not generated by heating effects. The shift in T_c as a function of current density agrees well with the expectation for pairbreaking critical current from Ginzburg-Landau theory.

TT 20.6 Wed 14:00 Poster A

Magnetic order in $CeIn_{3-x}Sn_x$ investigated by μSR measurements — •Julia Arndt[1], Astrid Schneidewind[2], Oliver Stockert[1], Daniel Andreica[3], Nubia Caroca-Canales[1], Christoph Geibel[1], and Michael Loewenhaupt[2] — [1]MPI f. Chemische Physik fester Stoffe, D-01187 Dresden — [2]Inst. f. Festkörperphysik, TU Dresden, D-01062 Dresden — [3]Laboratory for Muon Spin Spectroscopy, PSI, CH-5232 Villigen

We report on zero-field muon spin rotation (μSR) measurements on single crystals of the cubic heavy-fermion compound $CeIn_{3-x}Sn_x$. $CeIn_3$ orders antiferromagnetically below $T_N = 10.2$ K. Substituting Sn for In suppresses the magnetic order until $T_N = 0$ at a critical concentration $x_c = 0.67$ [1]. For $x < 0.2$ the specific heat C exhibits the typical λ shaped anomaly at T_N, whereas for $x > 0.2$ C shows a broad maximum in the vicinity of the phase transition, which is taken as a sign for a change in the magnetic structure [2]. So far it has not been accomplished to detect magnetic intensity by means of neutron scattering in this region [3]. In contrast, μSR with its sensitivity to small local magnetic fields in the sample gives the opportunity to probe if magnetic order is present for $x > 0$ at all. All $CeIn_{3-x}Sn_x$ samples investigated ($x = 0; 0.2; 0.4; 0.55$) show a Kubo-Toyabe shaped μSR signal with high depolarisation below T_N and very weak damping above. This is interpreted as the first detection of a clear signature of magnetic order in $CeIn_{3-x}Sn_x$ for $x > 0$.

[1] T. Rus *et al.*, Physica B, **359-361**, 62 (2005); [2] P. Pedrazzini *et al.*, Eur. Phys. J. B, **38**, 445 (2004); [3] O.Stockert *et al.*, unpublished

TT 20.7 Wed 14:00 Poster A

Deposition of $CeCoIn_5$ thin films by co-sputtering and evaporation — •Jochen Geerk[1], Alexander Zaitsev[1], Rainer Fromknecht[1], Andre Beck[1], and Hilbert v. Löhneysen[1,2] — [1]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, P.O.B. 3640, D-76021 Karlsruhe, Germany — [2]Physikalisches Institut, Universität Karlsruhe

Thin films of the heavy fermion superconductor $CeCoIn_5$ were prepared on sapphire substrates with different orientations by combining sputtering (Ce and Co) and evaporation (In). The sputter targets of Ce and Co were arranged in a face-to-face geometry with a magnetic field applied perpendicular to the target surface thus providing an oscillatory movement of the secondary electrons between the targets the latter acting as electric mirrors. Indium was evaporated from a BN oven. In the course of our studies the composition of the films, controlled by RBS and EDX, was varied between ± 30 % for the three elements and the growth temperature ranged from 500 to 750 ° C. The films obtained so far showed transition temperatures between 1.5 and 2.0 K and the characteristic maximum in resistivity near 40 K.

TT 20.8 Wed 14:00 Poster A

High pressure resistivity studies on $YbIr_2Si_2$ — •Monica Macovei[1], Michael Nicklas[1], Cornelius Krellner[1], Zakir Hossain[2], Christoph Geibel[1], and Frank Steglich[1] — [1]Max Planck Institute for Chemical Physics of Solids, Nöthnitzer Str. 40, 01069 Dresden, Germany — [2]Departament of Physics, Indian Institute of Technology, Kampur 208016, India

We investigated the high pressure phase diagram on high-quality single crystals of $YbIr_2Si_2$. Electrical resistivity,ρ, was measured in the pressure range up to 10 GPa and for temperature 0.05 K $< T <$ 300 K. Ambient pressure specific heat and resistivity studies confirmed a Fermi liquid ground state below $\sim$ 200 mK [1]. The Fermi liquid ground state is persisting at low pressure $p < 2$ GPa. However, with further increasing pressure the low-temperature dependence of the resisitivity changes from a T^2 dependence to $\rho = \rho_0 + AT^n$ with $n < 2$, indicating non-Fermi liquid behavior. By applying a magnetic field the Fermi liquid ground state is stabilized again. For $p > 7$ GPa magnetic order is developing marked by a kink in resistivity similar like in other Yb based heavy fermion compounds, e.g. $YbRh_2Si_2$, $YbCu_2Si_2$ and $YbNi_2Ge_2$.

[1] Z.Hossain *et al.* Phys. Rev. B **72**, 094411 (2005).

TT 20.9 Wed 14:00 Poster A

$YbNi_2Si_3$: a new Yb based intermetallic compound — Alexander Cosceev[1], Marc Uhlarz[1], Thomas Wolf[2], Peter Adelmann[2], •Kai Grube[2], Peter Schweiss[2], Georg Roth[3], Rainer Fromknecht[2], Christoph Sürgers[1], and Hilbert v. Löhneysen[1,2] — [1]Physikalisches Institut, Universität Karlsruhe, Germany — [2]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, Germany — [3]Institut für Kristallographie, RWTH Aachen, Germany

We have synthesized a new intermetallic compound $YbNi_2Si_3$ which crystallizes in the space group *Immm* with the metric $a = 3.860$Å, $b = 3.862$Å, and $c = 24.068$Å. Single crystals have been grown from Sn flux in a closed SiO_2 glass ampoule. Clean free-standing crystals could be obtained after dissolving the solid flux with liquid gallium and cleaning with a solution of iodine in dimethyl formamide. The magnetic dc susceptibility was measured parallel and perpendicular to the c axis. We find a rather strong anisotropy of the Curie-Weiss-like susceptibility down to 2.3 K. Measurements of the specific heat will be reported as well.

TT 20.10 Wed 14:00 Poster A

High-field ESR on the Kondo-system $YbRh_2Si_2$ — •Uwe Schaufuss[1], V. Kataev[1], B. Büchner[1], J. Sichelschmidt[2], C. Krellner[2], C. Geibel[2], and F. Steglich[2] — [1]Leibniz Institute for Solid State and Materials Research IFW Dresden — [2]Max Planck Institute for Chemical Physics of Solids, Dresden

$YbRh_2Si_2$ is a Kondo–system with a Kondo temperature $T_K \sim 25$ K [1] . It is located very close to a quantum critical point related to a very weak AFM order below $T_N = 65$ mK and a critical magnetic field of $B_C = 0.06$ T at ambient pressure. Surprisingly an ESR signal typical of a local Yb^{3+} spin has been observed below T_K at fields $B \leq 0.7$ T [2] . The occurrence of the ESR signal is unexpected because at $T \ll T_K$ the Yb^{3+} moments should be screened. In order to obtain a deeper insight in this unusual behaviour we have performed ESR measurements on single crystals of $YbRh_2Si_2$ at much higher fields (5 to 7.5 T) at temperatures from 3 to 25 K, i.e. in the region where one expects a crossover from a Non–Fermi liquid(NFL) to a Fermi–liquid (FL) phase [3] . We observe a strongly anisotropic signal which can be assigned to Yb^{3+} moments. The signal exhibits a pronounced dependence on temperature and the magnetic field. We discuss the puzzling controversy between the observation of ESR which shows properties characteristic of a local Yb^{3+} moment and the Kondo state of $YbRh_2Si_2$.

1 O. Trovarelli *et al.*: Phys. Rev. Lett. **85,** 626 (2000)
2 J. Sichelschmidt *et al.*: Phys. Rev. Lett. **91,** 156 401 (2003)
3 K. Ishida *et al.*: Phys. Rev. Lett. **89,** 107 202 (2002)

TT 20.11 Wed 14:00 Poster A

Magnetotransport across the field-induced quantum phase transition in $CeCu_{5.8}Au_{0.2}$ — •Marc Uhlarz[1], Moritz Röger[1], Tihomir Tomanic[1], and Hilbert v. Löhneysen[1,2] — [1]Physikalisches Institut, Universität Karlsruhe (TH), D-76128 Karlsruhe — [2]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe

We report on magnetoresistivity and Hall effect of $CeCu_{0.58}Au_{0.2}$, magnetic field B applied along the hard direction (b axis in orthorhombic notation) and current I along the a axis. At $B = 0$, $CeCu_{0.58}Au_{0.2}$ orders antiferromagnetically below $T_N = 0.25$ K [1]. As observed previously [1], the longitudinal electrical resistivity $\rho_{xx}(T)$ rises towards lower T below T_N for current directions containing a component of the magnetic ordering vector $\mathbf{Q} = (0.625, 0, 0.275)$. With increasing B, the rise of $\rho_{xx}(T)$ becomes smaller and T_N shifts to lower T, vanishing at $B_c = 3.6$ T. Likewise, the field derivative of the transverse resistivity $d\rho_{xy}/dB$ (independent of B at high temperatures) becomes