TT 25.77 Wed 14:30 P1

^{119}Sn solid state NMR as a local probe for correlations in $CeRu_4Sn_6$ — •Eva Maria Brüning[1], Michael Baenitz[1], Andrei Gippius[2], André Strydom[3], Silke Bühler-Paschen[1], and Frank Steglich[1] — [1]Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany — [2]Moscow State University, Faculty of Physics, Moscow, Russia — [3]Department of Physics APK, University of Johannesburg, South Africa

A ^{119}Sn NMR study on the tetragonal semimetal $CeRu_4Sn_6$ and the metallic structural homologue $LaRu_4Sn_6$ is presented. At low fields (1.8 T, 28.5 MHz) a broad NMR line with small (-0.33%) and nearly independent negative Knight shift $K(T)$ is observed, whereas at larger fields (up to 7.5 T) a structure in the spectra could be resolved. The NMR spectra are well represented by a superposition of two broadened anisotropic S=1/2 lines, consistent with the two different Sn sites in the tetragonal structure. The behavior of the spin-lattice relaxation rate $1/T_1$ at 28.5 MHz above approximately $T = 20$ K is consistent with a narrow-gap semiconductor ($1/T_1 \sim T\exp(-\Delta/k_BT)$, $\Delta/k_B = 33$ K). The formation of correlations become apparent below $T^* = 10$ K where an upturn is observed in $1/T_1T$. This is consistent with the specific heat results in the framework of the Korringa model where $(T_1T)^{-1} \propto K^2 \propto N_{EF}^2 \propto (C/T)^2$ is valid. $1/T_1$ investigations at higher fields show the supression of the low-temperature upturn. In conclusion the results for $CeRu_4Sn_6$ suggest the formation of a ground state of strongly correlated quasiparticles within a low-carrier density.

TT 25.78 Wed 14:30 P1

Quantum Critical Behavior in $CeNi_{9-x}Cu_xGe_4$. — •E. –W. Scheidt[1], W. Scherer[1], G. Hilscher[2], and H. Michor[2] — [1]Chemische Physik und Materialwissenschaften, Universität Augsburg, 86159 Augsburg, Germany — [2]Institut für Festkörperphysik, TU Wien, 1040

$CeNi_9Ge_4$ exhibits unusual non-Fermi liquid (nFl) behavior with the largest ever recorded value of the electronic specific heat $\Delta c/T \cong 5.5\,\mathrm{JK^{-2}mol^{-1}}$ without showing any trace of magnetic order [1]. Specific heat measurements show that the logarithmic increase of the Sommerfeld coefficient flattens off below 200 mK indicating coherent effects, whereas substitution of Ce by La in $CeNi_9Ge_4$ supports a single ion scenario as the main reason for the nFL behavior. Here we report on new substitution experiments replacing Ni by Cu. Specific heat and susceptibility results will discussed in the framework of a quantum critical phase transition scenario.

[1] U. Killer, E.-W. Scheidt, G. Eickerling, H. Michor, J. Sereni, Th. Pruschke, S. Kehrein, Phys. Rev. Lett. **92**, 27003 (2004)

TT 25.79 Wed 14:30 P1

Suppression of magnetic order in $YbNiSi_{3-x}Ge_x$ — •K. Grube[1], W. Knafo[1], C. Meingast[1], S. Drotziger[2], M. Uhlarz[2], Th. Wolf[1], P. Adelmann[1], and H. v. Löhneysen[1,2] — [1]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, Germany — [2]Physikalisches Institut, Universität Karlsruhe (TH), Germany

$YbNiSi_3$ shows moderately heavy-fermion behaviour with antiferromagnetic long-range order below $T_N = 5.1$ K. We have studied the thermodynamic and transport properties of single crystals grown using the flux method with specific heat, DC magnetization, and resistivity measurements in magnetic fields up to 14 T. The magnetic order is suppressed in a magnetic field of 8 T. On the other hand, $YbNiGe_3$ shows a very small magnetic susceptibility and no sign of magnetic order down to the lowest measured temperature of 1.9 K, indicating an intermediate-valent state. Preliminary experiments on polycrystalline $YbNiSi_2Ge$ samples exhibit signs of magnetic ordering below 3 K. We report on the magnetic phase diagram of $YbNiSi_3$ and the dependence of the specific heat on the Ge content.

TT 25.80 Wed 14:30 P1

High temperature specific heat and crystal field of the non-Fermi-Liquid system $YbRh_2Si_2$ — •J. Ferstl, C. Geibel, O. Stockert, and F. Steglich — Max-Planck-Institute for Chemical Physics of Solids, Nöthnitzer Straße 40, 01187 Dresden, Germany

The heavy fermion system $YbRh_2Si_2$ has attracted considerably interest in the last years, being located very close to a quantum critical point (QCP). Strong Kondo-like fluctuations lead to a very weak magnetic order with a transition temperature of only $T_N = 70$ mK at ambient pressure. A lot of physical investigations were done in the low temperature region, but much less investigations and analysis were devoted to the behaviour at higher temperatures. We shall present measurements of the specific heat C_p at higher temperatures. The results are analysed in view of crystal field (CEF) effects and discussed in comparison with results from inelastic neutron scattering. C_p of $YbRh_2Si_2$ and $LuRh_2Si_2$ were measured in the temperature range 2 K $\leq$ T $\leq$ 300 K. From the difference we deduced the contribution C_{4f} of the Yb-4f-electrons. We confirm the presence of a broad maximum between 40 K and 80 K in C_{4f}. This maximum can be related to the first excited CEF level which, according to neutron data, is located around 17 meV. While C_{4f} is more conclusive than neutron data for this lowest excited CEF level, $C_{4f}(T)$ is less conclusive for the higher levels, for which neutron data gave rather precise excitation energies of 25 meV and 43 meV. Thus the combination of specific heat and neutron data allows a more reliable determination of the whole CEF scheme.

TT 25.81 Wed 14:30 P1

How many Kondo-ions are seen by the electron spin resonance in $Yb_{1-x}R_xRh_2Si_2$? — •J. Wykhoff[1], J. Sichelschmidt[1], S. MaQuilon[2], L. Pham[2], Z. Fisk[2], C. Krellner[1], J. Ferstl[1], H.-A. Krug von Nidda[3], C. Geibel[1], and F. Steglich[1] — [1]Max-Planck-Institut für Chemische Physik fester Stoffe, D-01187 Dresden, Germany — [2]Department of Physics, University of California, Davis, CA 95616 USA — [3]Experimentalphysik V, Elektronische Korrelationen und Magnetismus, Institut für Physik, Universität Augsburg, 86135 Augsburg, Germany

The heavy-fermion compound $YbRh_2Si_2$ is located very close to a magnetic field induced quantum critical point. The unexpected observation of electron spin resonance (ESR) of the Kondo-ion Yb^{3+} *below* the Kondo temperature ($T_K \simeq 25$ K) might be a direct verification of the localized moment scenario of quantum criticality [1].

We present the ESR of $Yb_{1-x}R_xRh_2Si_2$, R = La, Lu. The ESR-line observed below ≈ 30 K vanishes with increasing Lu-concentration. Taking advantage of an improved crystal growth process, we found that the crystal quality and the residual linewidth of the ESR signal are closely related. This suggests that the so-called ESR-bottleneck effect is important for the observability of the ESR-line well below the Kondo temperature. We found that the ESR signal intensity also depends on the Yb-concentration.

[1] J. Sichelschmidt et al., Phys. Rev. Lett. 91, 156401 (2003)

TT 25.82 Wed 14:30 P1

Possible critical pressure-induced valence fluctuation in $EuCu_2Ge_2$ — •Gabriel Alejandro Dionicio[1], Heribert Wilhelm[1], Zakir Hossain[2], and Christoph Geibel[1] — [1]Max-Planck-Institute for Chemical Physics of Solids, 01187 Dresden, Germany — [2]Department of Physics, Indian Institute of Technology, Kanpur-208016, India

By means of electrical resistivity measurements under pressure, we investigated the possibility of inducing a valence fluctuating regime in $EuCu_2Ge_2$ at low temperatures. The results are discussed in terms of a possible scenario for unconventional superconductivity driven by virtual exchange fluctuation of the charge density [1]. This mechanism was proposed to explain the high pressure superconducting dome in $CeCu_2(Si_{0.9}Ge_{0.1})_2$ [2]. Our porpuse is to look for further candidates where this model might be apply. Some Eu-compounds with the $ThCr_2Si_2$ structure have shown a thermal activated continuous crossover from a divalent to a trivalent state, due to the degeneracy of the f^7 and f^6 configuration. We would like to address the question whether such a degenerated state can be induced by pressure at very low temperatures in $EuCu_2Ge_2$, taking into account that this situation seems to be achieved in $EuCu_2(Si_{0.7}Ge_{0.3})_2$. The electrical resistivity measurements were performed up to 10 GPa in the temperature range 100 mK $< T <$ 300 K. A tentative phase diagram is presented and the results are compared with the studies peformed in the alloy $CeCu_2(Si_xGe_{1-x})_2$.

[1] K. Miyake, H. Maebashi; J. Phys. Soc. Jpn. 71 (2002) 1007
[2] H. Q. Yuan *et al*; Science 302 (2003) 2104

TT 25.83 Wed 14:30 P1

Fading of the magnetic order transition in $CePt_3$ Si under pressure — •Johannes Spehling[1], Olaf Zelesnik[1], Andreas Eichler[1], and Ernst Bauer[2] — [1]Inst. f. Angewandte Physik, TU Braunschweig, D-38106 Braunschweig, Germany — [2]Inst. f. Festkörperphysik, TU Wien, A-1040 Wien, Austria

We have carried out specific heat measurements on $CePt_3$ Si at low temperatures from ambient pressure up to 1.5 GPa. A maximum of