nal below the Kondo temperature T_K in the heavy-fermion compound $YbRh_2Si_2$ refutes a common believe that concentrated rare earth ions in Kondo-lattice intermetallic compounds would be ESR silent in the Kondo regime. The signal shows distinct properties of the Yb^{3+} $4f$ spin and, hence, should contain valuable microscopic information on the dynamical Kondo coupling to the conduction electrons [1]. We investigated the effect of tuning the $4f$ - conduction electron hybridization strength by Co-doping and hydrostatic pressure up to 3 GPa. Both stabilize antiferromagnetic order, lead to a reduction of T_K, and yield pronounced changes in the ESR parameters. By comparing the quantitatively different effect of pressure and Co doping on the ESR parameters we found a relation of the zero temperature residual ESR linewidth to the residual resistivity and the linear in temperature slope of the linewidth as was similarly reported for the La-doping case [1].

[1] J.W. *et al.* Physica C 460-462, 686 (2007); J.Sci.Tech.Adv.Mat. 8 389 (2007); J.S. *et al.* Phys. Rev. Lett. 91 156401 (2003).

TT 39.3 Thu 10:15 HSZ 304

Do heavy charge carriers entail a large Nernst coefficient? — •Ulrike Köhler[1,2], Cornelius Krellner[1], Niels Oeschler[1], Christoph Geibel[1], and Frank Steglich[1] — [1]MPI for Chemical Physics of Solids, Dresden, Germany — [2]present address: Leibniz Institute for Solid State and Materials Research (IFW) Dresden, Germany

The Nernst effect is the development of a transverse thermal voltage in a magnetic field perpendicular to a heat current. During the past years unusually large Nernst coefficients ν have been observed in several Ce- and U-based heavy-fermion (HF) compounds. It has been speculated, that the huge Nernst signals are related to the enhanced effective charge carrier masses $m^\star$ of these systems. So far, however, investigations on Yb-based HF metals are lacking to corroborate this picture. We therefore studied the Nernst effect in $YbRh_2Si_2$, an archetype non-Fermi-liquid compound with a Kondo temperature T_K of 20 K. The Nernst coefficient is presented between 6 K and 200 K, i.e. covering the crossover from low effective charge carrier masses above T_K to the HF regime at $T \ll T_K$. ν is found to be negative with a minimum close to T_K, thus supporting the speculation about a relation between large ν and enhanced $m^\star$. The absolute values of the Nernst coefficient, however, are more than one order of magnitude smaller than in other HF systems. We discuss our findings in consideration of recent investigations on the correlated semiconductor CeNiSn, which point to a predominant importance of a low charge carrier density instead of a large $m^\star$ for the occurrence of a strong Nernst effect.

TT 39.4 Thu 10:30 HSZ 304

Concentration tuning of magnetic order in $CePd_{1-x}Ni_xAl$ compounds — •Nadezda Bagrets[1], Veronika Fritsch[1], Gernot Goll[1], and Hilbert v. Löhneysen[1,2] — [1]Physikalisches Institut, Universität Karlsruhe, 76128 Karlsruhe, Germany — [2]Institut für Festkörperphysik, Forschungszentrum Karlsruhe, 76021 Karlsruhe, Germany

The intermetallic alloys $CePd_{1-x}Ni_xAl$ are examples of antiferromagnetic (AF) heavy-fermion compounds which can be tuned to quantum critical point (QCP). CePdAl is well known as geometrically frustrated Kagomé-like lattice [1]. The substitution of Pd with Ni in CePdAl induces chemical pressure. The transition temperature decreases with increasing Ni content [2]. We performed specific-heat measurements on $CePd_{1-x}Ni_xAl$ compounds down to 30 mK. The AF transition is still visible for x=0.1. From the T_N vs. x dependence we expect the QCP at about $x = 0.12 - 0.13$. Surprisingly, our measurements show that the magnetic moment per formula unit at low temperature increases with increasing Ni content (chemical pressure) in contrast to a hydrostatic pressure [3]. We will present the specific heat and susceptibility measurements at very low temperatures as well as magnetization measurements up to a room temperature.

[1] H. Kitazawa, *et al.*, Physica B **199/200**, 28 (1994).
[2] Y. Isikawa, *et al.*, Physica B **281/282**, 365 (2000).
[3] S. Hane, *et al.*, Physica B **281/282**, 391 (2000).

TT 39.5 Thu 10:45 HSZ 304

Magnetic Anisotropy in Tetragonal Rare Earth Compounds — •Veronika Fritsch[1], Michael Marz[1], and Hilbert v. Löhneysen[1,2] — [1]Physikalisches Institut, Universität Karlsruhe, 76128 Karlsruhe, Germany — [2]Institut für Festkörperphysik, Forschungszentrum Karlsruhe, 76021 Karlsruhe, Germany

We have investigated single crystals of RAu_2Ge_2 with R = Ce and Pr as well as Ce_2MGa_{12} with M = Ni, Pd and Pt, grown by a flux growth method with Au-Ge flux for RAu_2Ge_2 and Ga flux for Ce_2MGa_{12}. The latter crystallizes in a tetragonal structure with layers of Ce atoms separated by segments of Ga only alternating with $GaPd_6$ segments [1]. Measurements of the dc susceptibility χ revealed a strong magnetic anisotropy. For the magnetic field along the c-axis, antiferromagnetic order sets in at 9.6 K (Ni), 10.6 K (Pd) and 5.7 K (Pt), as evidenced by sharp maxima in $\chi(T)$, for the magnetic field perpendicular to the c-axis $\chi(T)$ continues to increase monotonically down to 2 K. In RAu_2Ge_2 compounds, crystallizing in the considerably simpler $ThCr_2Si_2$ structure [2], a similar situation was found: with the magnetic field parallel to the c-axis antiferromagnetic order was found at 11.9 K (Ce) and 10.8 K (Pr), but with the magnetic field aligned perpendicular to the c-axis, no evidence for magnetic order is found down to 2 K. We will present measurements of magnetization and electrical resistivity exploring the possible proximity of these systems to a field-induced quantum critical point.

[1] R. T. Macaluso *et al.*, J. Sol. State Chem. **178** (2005) 3547.
[2] A. Loidl *et al.*, Phys. Rev. B **46** (1992) 9341.

15 min. break

TT 39.6 Thu 11:15 HSZ 304

Low-energy optics of the heavy-fermion compound UNi_2Al_3 — •Marc Scheffler[1], Julia Ostertag[1], Katrin Steinberg[1], Martin Dressel[1], and Martin Jourdan[2] — [1]1. Physikalisches Institut, Universität Stuttgart, Stuttgart, Germany — [2]Institut für Physik, Johannes Gutenberg Universität, Mainz, Germany

Heavy-fermion materials are intermetallic compounds with unusual metallic behavior at low temperatures. From the optical point of view, the Drude response (the transport relaxation time is enhanced in the same way as the effective mass) and the so-called hybridization gap (a signature of the peculiar band structure due to electronic interactions) are of particular interest. The low energy scales of heavy fermions call for optics at very low frequencies and in a broad range, but the only material studied in detail so far is UPd_2Al_3, where we found an extremely narrow Drude response (around 5GHz) and an optical excitation at 100GHz in the antiferromagnetic state.

To generalize those previous results, we focus here on the related heavy-fermion compound UNi_2Al_3. We have grown high-quality thin films and studied them with a combination of microwave and optical techniques in a very broad frequency range. At temperatures below 30K, we find a strongly frequency-dependent optical conductivity: the Drude roll-off resides below 20GHz, but above 100GHz another broad conductivity maximum occurs. In addition to the frequency and temperature dependence of the conductivity, we also present its anisotropy, and we discuss them in the context of the different energy scales of this material.

TT 39.7 Thu 11:30 HSZ 304

Superconductivity in $CeCu_2Si_2$: evidence of fermisurface change — •Enrico Faulhaber[1], Oliver Stockert[2], Wolfgang Schmidt[3,4], Karin Schmalzl[3,4], Christoph Geibel[2], Frank Steglich[2], and Michael Loewenhaupt[1] — [1]TU Dresden; Institut für Festkörperphysik; D-01062 Dresden — [2]Max-Planck-Institut für Chemische Physik fester Stoffe; D-01187 Dresden — [3]Forschungszentrum Jülich GmbH; Institut für Festkörperforschung; D-52425 Jülich — [4]Institut Laue-Langevin; F-38042 Grenoble

The first discovered heavy fermion superconductor $CeCu_2Si_2$ has been investigated for nearly 30 years now. Key properties of the material are an antiferromagnetic order below 1 K dominated by a nesting of the Fermi surface and a superconducting phase below ≈0.6 K. This phase seems to depend on the magnetism in the material, possibly pointing towards a magnetically mediated superconductivity.

In a recent experiment we investigated the delicate relationship between the magnetic and superconducting phases. We used the neutron scattering technique to observe the magnetic propagation vector. Also, the instrument was complemented with a unique in-situ *ac*-susceptibility setup to record the superconductivity of the sample during the neutron diffraction. Applying a magnetic field, we found an unexpected change of the magnetic propagation vector which correlates well with the superconducting volume. This shift is absent in non-superconducting samples, indicating a strong entanglement of both phenomena (superconductivity and magnetism) and might point to a change of the Fermi surface caused by the superconductivity.

TT 39.8 Thu 11:45 HSZ 304

Investigation of $Yb_2Pt_6AL_{15}$ single crystals: heavy fermion