pressure [1]. We report a comparison of the low-temperature magnetoresistance and anomalous Hall effect in $CeSi_{1.81}$ with the uniform magnetization and specific heat. The longitudinal magnetoresistance suggests the additional formation of a density wave below $T_x \approx 3\,K$. We also find that the spontaneous anomalous Hall effect initially tracks the ordered moment, where deviations below $\sim T_C/2$ suggests the emergence of additional magnetic modulations. Well below T_C a small hysteresis in the Hall effect exists up to $B_m \sim 4\,T$, the location of an S-shaped increase in the magnetization that is naively interpreted as itinerant metamagnetism. This may hint at a novel interplay between itinerant metamagnetism and structural defects. [1] S. Drotziger, et al., Phys. Rev. B **73**, 214413 (2006).

TT 6.5 Mon 10:30 EB 202

A precursor state to unconventional superconductivity in the heavy fermion superconductor $CeIrIn_5$ — •Sunil Nair[1], S. Wirth[1], M. Nicklas[1], J. L. Sarrao[2], J. D. Thompson[2], Z. Fisk[3], and F. Steglich[1] — [1]Max Planck Institute for Chemical Physics of Solids, Noethnitzer Str. 40, Dresden 01187, Germany. — [2]Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA. — [3]University of California, Irvine, California 92697, USA.

The $CeMIn_5$ (where M: Co, Rh or Ir) family of heavy fermion systems is currently in vogue; not only for the host of novel properties they exhibit in its normal and superconducting states, but also for the rather striking resemblance many of these properties have with the cuprate high temperature superconductors. Here, we present sensitive measurements of the Hall effect and magnetoresistance in $CeIrIn_5$, in the temperature range $0.05\,K \leq T \leq 2.5\,K$ and magnetic fields up to 15 T. The magnetoresistance is used to demarcate the presence of a low temperature Kondo coherent state. Furthermore, by means of Kohler's scaling plots, the crossover from a Landau-Fermi liquid to a non-Fermi liquid regime is inferred. The functional form of the Hall resistivity is observed to be in concurrence with that expected for a compensated metal. The most striking observation pertains to the presence of a precursor state to superconductivity characterized by a change in the Hall scattering rate, in similarity to the pseudogap state in the cuprates. Moreover, the critical fields of the precursor state and the superconducting one can be scaled on to each other, implying that they could arise from the same underlying physical mechanism.

TT 6.6 Mon 10:45 EB 202

Pressure and concentration tuning of $CeNi_xPt_{1-x}$ compounds — •Nadezda Bagrets[1], Veronika Fritsch[1], and Hilbert v. Löhneysen[1,2] — [1]Physikalisches Institut, Universität Karlsruhe (TH), D-76128 Karlsruhe, Germany — [2]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe

The intermetallic alloys $CeNi_xPt_{1-x}$ are examples of heavy-fermion compounds that can be tuned to the quantum critical point (QCP) by applying hydrostatic pressure [1] or by changing the ratio between Pt and Ni constituents (chemical pressure). The pure CePt compound orders ferromagnetically (FM). With increasing Ni content, FM order is suppressed and disappears completely at x = 0.95 possibly indicating a QCP [2]. CeNi is a Pauli paramagnet. At the same time, these compounds have orthorhombic CrB type of crystal structure for all compositions. We compare the effects of hydrostatic and chemical pressure on the magnetic properties of the series $CeNi_xPt_{1-x}$ in the whole concentration range between x = 0 and 1 and, in particular, in the vicinity of the QCP. We have performed measurements of the magnetization in the temperature range 2.5 - 300 K in magnetic field up to 0.1 T under hydrostatic pressure up to 1.2 GPa for $CeNi_xPt_{1-x}$ samples with different Ni content.

[1] J. Larrea at al., Phys. Rev. B 72, 035129 (2005)
[2] J. Espeso at al., Phys. Rev. B 63, 014416 (2000)

15 min. break

TT 6.7 Mon 11:15 EB 202

Relevance of the pseudogap for the thermopower of CeNiSn — •Ulrike Köhler[1], Peijie Sun[1], Toshiro Takabatake[2], Silke Paschen[3], Niels Oeschler[1], and Frank Steglich[1] — [1]MPI for Chemical Physics of Solids, Dresden, Germany — [2]Hiroshima University, Japan — [3]Vienna University of Technology, Austria

CeNiSn has been classified as a correlated semimetal with a low charge carrier concentration. The opening of an anisotropic pseudogap below 10 K has been confirmed from various experimental probes. The gap formation can be suppressed significantly by application of magnetic fields of 10 T along the easy a axis.

We performed thermopower and Nernst effect measurements on high-purity single crystals of CeNiSn in the temperature range between 1.5 K and 200 K and in magnetic fields up to 7 T. Special care has been taken to correct the thermopower S for contributions from transverse components in a magnetic field. Our data clearly demonstrate the relevance of the pseudogap for the low-T thermopower. $S(T)$ exhibits a large negative minimum below the temperature, at which the gap opens. Upon increasing magnetic field the minimum shifts to lower T wheras the absolute values at the minimum increase. We apply a simple model to describe this unusual field dependence of the thermopower.

TT 6.8 Mon 11:30 EB 202

The new Heavy Fermion System CeFePO: A ^{31}P NMR study — •Eva Maria Brüning, Michael Baenitz, Cornelius Krellner, Christoph Geibel, and Frank Steglich — Max-Planck-Institut für Chemische Physik fester Stoffe

Among the CeTPO system (T = Ru, Os, Co, Fe), CeFePO is particular interesting because it presents Heavy Fermion behavior. Specific heat measurements above 400 mK clearly show the absence of magnetic order and a strongly enhanced Sommerfeld ratio $\gamma = 700\,mJ/molK^2$, comparable to $CeCu_2Si_2$. ^{31}P NMR field sweep measurements were performed at different fields (4.4 T and 1.5 T) and temperatures (2 K to 300 K). ^{31}P Knight shift $^{31}K(T)$ shows a field independent Curie-Weiss like behavior above 100 K consistent with $\chi(T)$ measurements, whereas towards lower temperatures a saturation occurred due to Kondo interaction. $^{31}K(T)$ vs. $\chi(T)$ gives a hyperfine coupling constant of $A_{hf} = 2\,kOe/\mu_B$. $^{31}(1/T_1)$ measurements were carried out at different fields (4.4 T and 1.5 T). $^{31}(1/T_1T)(T)$ is field independent and shows a strong increase towards lower temperatures and a saturation towards an enhanced Korringa value for $T \rightarrow 0$, indicating a large $N(E_F)$ value. $^{31}(1/T_1T)$ is qualitatively similar to the ^{29}Si NMR results on $CeCu_2Si_2$ (7 T). Using ^{31}P as a local probe, our ^{31}P NMR results strongly confirm the Heavy Fermion scenario for this new compound.

TT 6.9 Mon 11:45 EB 202

ESR Study on CeRuPO single crystals — •Tobias Förster, Jörg Sichelschmidt, Cornelius Krellner, and Christoph Geibel — Max Planck Institut f. Chemische Physik Fester Körper, Nöthnitzer Str. 40, 01187 Dresden, Germany

Until 2003 it was believed that the Electron Spin Resonance signal (ESR) from a Kondo ion in a dense Kondo system is not observable, because of the strong broadening due to 4f/5f- conduction electron hybridization. Hence the first observation of such a signal in $YbRh_2Si_2$ was a big surprise[1]. Very recently we found further Yb- and Ce-compounds that show well defined ESR signals [2].
In this contribution we will concentrate on single crystal data from the ferromagnetic Kondo-lattice system CeRuPO[3]. The recorded spectra show an asymmetry which is related to the local Ce^{3+}ion (Γ_6 wave function) in tetragonal point symmetry. This is surprising because to the best of our knowledge an ESR signal due to dense Ce^{3+} magnetic moments in an environment with conduction electrons has only been reported for CeP. This unexpected result is neither specific to Ce-based compounds nor to compounds with Kondo-like properties nor to the proximity of a (quantum) critical point. It turns out that strong ferromagnetic correlations in the electronic system are essential for the ESR observability of concentrated magnetic ions in intermetallic systems.[2]
[1] J. Sichelschmidt et al., Phys. Rev. Lett. 91, 156401 (2003)
[2] C. Krellner et al., submitted to Phys. Rev. Lett.
[3] C. Krellner et al., Phys. Rev. B 76,104418 (2007)

TT 6.10 Mon 12:00 EB 202

Low-temperature thermodynamic and magnetic properties of the geometrically frustrated Kondo lattice $Pr_2Ir_2O_7$ — •Jan Guido Donath[1], Philipp Gegenwart[2], Satoru Nakatsuji[3], and Yo Machida[3] — [1]Max-Planck-Institute for Chemical Physics of Solids, 01187 Dresden, Germany — [2]I. Physikalisches Institut, Georg-August-Universität Göttingen, Friedrich-Hund-Platz 1, 37077 Göttingen, Germany — [3]Institute for Solid State Physics, University of Tokyo, Kashiwa 277-8581 Japan

The ground state of f-electron Kondo-lattice systems is determined by the interplay of the Kondo- and the RKKY interaction, leading to a quantum critical point separating long-range magnetic order from paramagnetism. The interesting question arises, how this situation is modified in the presence of strong magnetic frustration. Here, we focus on the iridate $Pr_2Ir_2O_7$ which crystallizes in the highly frustrated