Approaching $T_c$, the correlation length of order parameter diverges: in a real Fe/GaAs-system it can exceed one micron. Thus, the critical behavior of submicron-particles should be affected massively by finite size effects. By means of the longitudinal Kerr effect large area ensembles of uniform nanostructures produced with EBL were investigated. We systematically varied structure size (below 100 nm to 1 micron), shape and the distance between the elements. The influence on the phase transition and the Curie temperature is discussed. The determined critical exponents are compared to theoretical models. Ref. [1] F. Bensch, JAP 89, 7133 (2001) [2] W. Kipferl, JAP 95, 7417 (2004)

MA 20.121 Mo 14:00 Poster TU C

**Oberflächenmagnetisierung an flüssigem $Co_{80}Pd_{20}$ in der Nähe der Curietemperatur** — •Lucian Isfan und Karl Maier — Helmholtz - Institut für Strahlen- und Kernphysik der rheinischen Friederich-Wilhelms Universität zu Bonn

Magnetisierungsverläufe an flüssigem $Co_{80}Pd_{20}$ wurden mit Hilfe des Magneto-Optischen Kerr-Effektes aufgenommen. Zu diesem Zweck wurden Proben mit 10-11mg Masse in einer reinen $H_2$-Atmosphäre mittels einer Kurzwellenlevitationsanlage prozessiert. Diese Anlage erlaubt eine Unterkühlung der Proben von mehr als $\Delta T = 350K$ unter ihre Liquidustemperatur (T = 1610K). Eine computergesteuerte Probenstabilisierung ermöglicht orstsgenaue optische Messungen auch in der Nähe der Curietemperatur. Auf der Probe wird ein linear polarisierter Laserstrahl fokussiert und an der Reflektion die Drehung der Polarisationsachse untersucht. Die Signaldifferenz der an zwei Dioden erfasste Intensität des Lichts ist ein Maßstab für die erfahrene Drehung der Polarisationsachse (Kerr-Winkel) und für die lokale Magnetisierung. Es wurden temperaturabhängige Messungen des Kerr-Winklels bis zur Curietemperatur durchgeführt. Die aufgenommenen Magnetisierungskurven weisen einen typischen Curie-Weiss Verlauf auf. Die Genauigkeit der Messmethode gibt Hoffnung auf ortsaufgelöste Untersuchungen der Domänenstruktur einer ferromagnetische Substanz in der flüssigen Phase.

MA 20.122 Mo 14:00 Poster TU C

**New model for conversion process in $R\mathrm{Cu}_2$ ($R$ = rare earth)** — •Sebastian Raasch[1,2], Mathias Doerr[1], Martin Rotter[3,1], Andreas Kreyssig[1], Jens-Uwe Hoffmann[2], and Michael Loewenhaupt[1] for the HMI Berlin - TUD collaboration — [1]TUD-IFP, D-01062 Dresden, Zellescher Weg 16 — [2]HMI Berlin, D-14109 Berlin — [3]Uni Wien-IPC, A-1090 Wien

Since the 1990s a magnetic field induced conversion effect in orthorhombic $R\mathrm{Cu}_2$ compounds (space group $Imma$) has been observed. To force the conversion a strong magnetic field (3 to 20 T) has to be applied in the *a-c* plane away from the magnetic easy axis. As the magnetization properties of the hard and easy axis exchange during the conversion, this effect has been misleadingly called *Ising axis conversion effect* based on a metamagnetic transition. Further a giant magnetostrictive effect of more than two percent due to the conversion has been found in 1996 by Takeuchi by macroscopic measurements. We present a new conversion model and its experimental proof: the twin-domain model. It explains the change of the easy axis by structural changes during the conversion. The atoms undergo a slight shift of either 0.29(1) Å or 0.50(1) Å in their atomic positions driven by the external field. Due to the *pseudo-hexagonal structure* the crystal decays into many small identical twin-domains of three different orientations. They are rotated along *b* direction by ±60.52 deg. Thereby the GMS effect of more than two percent in *a* direction can be explained. The structural changes due to the conversion have been studied intensely by neutron scattering.

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**A nuclear magnetic resonance study of $\mathrm{RMn_6Ge_{6-x}Ga_x}$-compounds** — •Jens Schnelzer und Elmar Dormann — Physikalisches Institut, Universität Karlsruhe (TH); D-76128 Karlsruhe

$^{73}$Ge-nuclear magnetic resonance spectra on the $\mathrm{RMn_6Ge_{6-x}Ga_x}$-series (R=rare earth metal) will be presented. All representatives of this series have the hexagonal $\mathrm{HfFe_6Ge_6}$-type structure in common. These compounds are characterized by ferromagnetic Mn Kagomé layers and by different interplane couplings giving rise to various magnetic ordering-phenomena such as antiferromagnetic, helical or ferrimagnetic structures, depending on the nature of the R element and the Ge/Ga-proportion. The main effect of this substitution is to enhance the relative strength of the ferromagnetic interaction with respect to the antiferromagnetic one and for critical Ga concentration ferromagnetic or ferrimagnetic structures are stabilized. The influence of these different magnetization configurations on the NMR spectra is analysed.

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MA 20.124 Mo 14:00 Poster TU C

**Magnetic structure of $Tb_2PdSi_3$: Investigation of long- and short- range magnetic order in external magnetic fields** — •Matthias Frontzek[1], Andreas Kreyssig[1], Mathias Doerr[1], Jens-Uwe Hoffmann[2], and Michael Loewenhaupt[1] — [1]TU Dresden, Institut für Festkörperphysik, D-01062 Dresden — [2]Hahn-Meitner-Institut, BENSC, Glienicker Straße 100, D-14109 Berlin

$Tb_2PdSi_3$, crystallizing in an $AlB_2$ derived hexagonal structure (space group P $6/mmm$) shows a very complex magnetic behavior due to low-dimensional magnetism as well as spin-glass like properties. The hexagonal structure allows the possibility of a 2-dimensional geometrical frustration which might be the cause of the observed spin-glass like behavior.

$Tb_2PdSi_3$ orders antiferromagnetically at $T_N = 23$ K and undergoes a spin-glass like transition at $T_2 = 9$ K. For the zero field long-range antiferromagnetic structure we determine a propagation vector (1/2, 1/2, 1/16) at T = 2 K. Additionally we observe intensity due to antiferromagnetic short-range order (SRO) with a correlation length of about 30 Å. The observed antiferromagnetic SRO is probably linked to the spin-glass like transition. The magnetic behaviour of $Tb_2PdSi_3$ investigated with ac susceptibility and magnetisation delivered ambiguous results and left open several questions. Using neutron diffraction in external magnetic fields we studied the microscopic cause of the hysteretic behaviour and the coexistence of different long-range and short range ordered magnetic phases up to a field of $\mu_0 H = 6.5$ T. In our contribution we will present and discuss the results.

MA 20.125 Mo 14:00 Poster TU C

**Thermodynamic and Transport Properties of the Antiferromagnetic Order in $EuZn_2Sb_2$** — •F. Weber[1,2], S. Drobnik[1,2], K. Grube[2], C. Pfleiderer[1,2], A. Cosceev[1], M. Uhlarz[1], H. v. Löhneysen[1,2] und A. Nateprov[3] — [1]Physikalisches Institut, Wolfgang-Gaede Str. 1, D-76128 Karlsruhe, Germany — [2]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe, Germany — [3]Institute of Applied Physics, Academei 5, MD-2028 Kishinev, Moldova

We report an experimental study of the specific heat, thermal expansion, magnetisation, Hall effect and resisitivty of $EuZn_2Sb_2$. Single crystals have been synthesized by means of a solid state reaction using carbon glass crucibles. The crystal structure of $EuZn_2Sb_2$ is trigonal, space group $P\bar{3}m1$. A second order phase transiton at $T_N = 13.27$ K bears all the Hall marks of 3$D$-XY antiferromagnetic order, where the high field magnetisation and evidence of a spin-flop transition at very low fields are consistent with a weak magnetic anisotropy. Microprobe analysis reveals, however, that the samples are Eu-deficient. Remarkably, the Eu-deficiency may be accounted for purely in terms of two metallurgically segregated phases, where one of the phases is stoichiometric $EuZn_2Sb_2$.

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**Effective spin description of crystal field effects in $NdAl_2$** — •Ulrich Köbler[1] and Andreas Hoser[1,2] — [1]IFF, FZ-Jülich — [2]Inst.f.Kristallographie, RWTH-Aachen

We propose a new analysis of the paramagnetic susceptibility and the spontaneous magnetization of the ferromagnet $NdAl_2$ (electronic configuration $^4I_{9/2}$ ). As a consequence of a large crystal field splitting the observed saturation magnetic moment of m=2.484$\mu_B$ per Nd is considerably smaller than the free $Nd^{3+}$ value of 3.273$\mu_B$. On the other hand, the effective magnetic moment of the high temperature Curie-Weiss susceptibility conforms well to the theoretical value of the $Nd^{3+}$ ion. We show that the number of relevant states, N, is the important quantity for the thermodynamics. This number is always an integer. The character of the states seems to be less important. Far above $T_c$=78K all states of the $Nd^{3+}$ are relevant, i. e. N=2J+1=10. For T→0 the effective spin is only $J_{eff}$=3, i. e. N=7. The decrease of N is in steps of unity. Each decrease of N is associated with a crossover phenomenon. This crossover can be in the paramagnetic phase as well as in the ordered state. The thermodynamics can therefore be considered as quantized. Depending on whether N is even or odd the temperature dependence of the spontaneous magnetization is according to different universality classes.