$\frac{C}{T}$ around 2.2 K is observed which is commonly attributed to an antiferromagnetic transition. From our results it appears to consist of two superimposed anomalies separated by about 0.2 K. The pressure dependence of the lower anomaly can be described by a second order power law $T_1(p)$, which leads to a critical pressure of nearly $p_c = 2.4$ GPa. The second anomaly near the higher temperature T_2 is also weakened under pressure.

TT 25.84 Wed 14:30 P1

The quantum-functional properties of $Pr_{1-x-y}La_xPb_yTe$ — •T. Herrmannsdörfer[1], A. D. Bianchi[1], T. P. Papageorgiou[1], Y. Skourski[2], and J. Wosnitza[1] — [1]Institut Hochfeld-Magnetlabor Dresden (HLD), Forschungszentrum Rossendorf, D-01314, Dresden, Germany — [2]Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden, D-01069 Dresden, Germany

The intermetallic compound $Pr_{1-x-y}La_xPb_yTe$ shows a wide spectrum of physical phenomena. Depending on the metallurgical composition as function of x and y, the compound changes its behavior from nuclear magnetic order to super- or semiconductivity. In addition, there are interesting interplay effects between these ground states. In consequence, $Pr_{1-x-y}La_xPb_yTe$ may serve as an promising material for quantum-computing applications. Here we report our results of the superconducting and magnetic properties investigated in a wide temperature, 0.0001 K $\leq T \leq$ 350 K, and field range, $0 \leq B \leq 50$ T. We present data of the ac susceptibility, magnetization, and electrical conductivity of various compositions x and y, e.g. turning the system from a van Vleck paramagnet, $x = y = 0$ into either a superconductor, $x \geq 0.5$, or a doped semiconductor, $y \geq 0.999$. Recently we have measured the magnetization of $y = 0$, 0.50, and 0.90 in pulsed magnetic fields up to 50 T in order to investigate the influence of doping on the crystalline electrical-field properties.

TT 25.85 Wed 14:30 P1

Fermi Surface of the Half Heusler Compounds $Ce_{1-x}La_xBiPt$ — •A. D. Bianchi[1], J. Wosnitza[1], N. Kozlova[2], D. Eckert[2], L. Schultz[2], I. Opahle[2], S. Elgazzar[2], M. Richter[2], J. Hagel[3], M. Doerr[3], G. Goll[4], H. v. Löhneysen[4,5], G. Zwicknagl[6], T. Yoshino[7], and T. Takabatake[7] — [1]HLD, Forschungszentrum Rossendorf, Postfach 51 01 19, D-01314 Dresden — [2]IFW Dresden, D-01171 Dresden — [3]Institut für Festkörperphysik, Technische Universität Dresden, D-01062 Dresden — [4]Physikalisches Institut, Universität Karlsruhe, D-76128 Karlsruhe — [5]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe — [6]Institut für Mathematische Physik, Technische Universität Braunschweig, D-38106 Braunschweig — [7]Department of Quantum Matter, ADSM, Hiroshima University, Higashi-Hiroshima 739-8530, Japan

We report on the Fermi surface in the correlated half-Heusler compound $Ce_{1-x}La_xBiPt$. In CeBiPt we find a field-induced change of the electronic band structure as discovered by electrical-transport measurements in pulsed magnetic fields. For magnetic fields above ∼25 T, the charge-carrier concentration determined from Hall-effect measurements increases nearly 30%, whereas the Shubnikov–de Haas (SdH) signal disappears at the same field. In the non-4f compound LaBiPt the Fermi surface remains unaffected, suggesting that these features are intimately related to the Ce 4f electrons. Electronic band-structure calculations point to a 4f-polarization-induced change of the Fermi-surface topology. In order to test this hypothesis, we have measured the (SdH) signal in a $Ce_{0.95}La_{0.05}BiPt$ sample with a low La concentration.

TT 25.86 Wed 14:30 P1

Electronic structure of Fe_3O_4/MgO — •C. F. Chang[1], J. Schlappa[1], C. Schüssler-Langeheine[1], H. Ott[1], Z. Hu[1], E. Schierle[2], E. Weschke[2], G. Kaindl[2], A. Tanaka[3], and L. H. Tjeng[1] — [1]II. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937 Köln, Germany — [2]Institut für Experimentalphysik, Freie Universität Berlin, Arnimallee 14, 14195 Berlin, Germany — [3]Department of Quantum Matter, ADSM, Hiroshima University, Higashi-Hiroshima 739-8530, Japan

Magnetite thin films grown on flat and stepped MgO have been studied using transport and resonant soft x-ray diffraction measurements. Down to a thickness of 38 nm a clear 1st order Verwey transition is observed. Resonant soft x-ray diffraction at the Fe $L_{2,3}$ and O-K resonances was used to study the electronic structure in the low-temperature phase. The broadening of the diffraction peaks along the surface normal in thin films allowed us not only to study the $(00\frac{1}{2})$ superstructure peak at both resonances, but also the tail of the (001) diffraction peak, which cannot be reached at the Fe-$L_{2,3}$ resonance for bulk samples. The electronic origin of both peaks turns out to be clearly different. Possible models for the ordered phase will be discussed.

TT 25.87 Wed 14:30 P1

Tb magnetism in multiferroic $TbMnO_3$ — •Jörg Voigt, Jörg Persson, Michael Prager, Yixi Su, and Thomas Brückel — Institut für Festkörperforschung, Forschungszentrum Jülich, 52425 Jülich

Recently, there has been a debate on the origin of the ferroelectric transition in the Perowskite $TbMnO_3$ at 28 K. Some authors attribute the spontaneous polarization to a lock-in transition of the Mn^{3+} moments [1]. Kenzelmann et al. [2] observed an ordered Tb^{3+} magnetic moment at the ferroelectric phase transition by a high resolution single crystal neutron study. However, neutron scattering is not element specific and therefore his interpretation could be doubted. We report on X-ray resonance exchange scattering to probe the Tb magnetic order exclusively and time-of-flight neutron spectroscopy to derive the Tb crystal field level scheme above and below the ferroelectric transition.

[1] Kajimoto et al., PRB 70, 012401 (2004)
[2] Kenzelmann et al., PRL 95, 087206 (2005)

TT 25.88 Wed 14:30 P1

Coupling between spin and orbital order in $La_{0.5}Sr_{1.5}MnO_4$? — •C. F. Chang[1], M. Buchholz[1], C. Schüssler-Langeheine[1], M. Benomar[1], E. Schierle[2], E. Weschke[2], G. Kaindl[2], M. Braden[1], and L. H. Tjeng[1] — [1]II. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937 Köln, Germany — [2]Institut für Experimentalphysik, Freie Universität Berlin, Arnimallee 14, 14195 Berlin, Germany

In $La_{0.5}Sr_{1.5}MnO_4$ spin, orbital and charge order occurs at low temperatures. Resonant soft x-ray diffraction data show an increase in intensity for the superstructure peak related to orbital order below T_N, when the antiferromagnetic spin order sets in [1]. While this results indicates a coupling between antiferromagnetic order and orbital order, a recent study using polarization analysis assigned the gain in intensity to a magnetic scattering contribution to the orbital order peak intensity below T_N [2]. We studied the k-space around the orbital order peak and found a broad diffuse background of magnetic origin, which has considerable intensity at the position of the orbital order peak. The relative intensity of this background varies for different positions on the sample. Sample positions without magnetic background allowed us to study the resonance behavior of the orbital order peak above and below T_N.

[1] S. B. Wilkins et al., Phys. Rev. Lett. 91, 167205 (2003)
[2] U. Staub et al., Phys. Rev. B 71, 214421 (2005)

TT 25.89 Wed 14:30 P1

Electric-field-induced insulator-metal transition in thin films of $Pr_{0.68}Ca_{0.32}MnO_3$ — •Sebastian Schramm, Peter Moschkau, and Christian Jooss — Institut für Materialphysik, Universität Göttingen

Experimental analysis and understanding of electronic phase separation in hole-doped manganites offer a fascinating research area for the fundamental properties of correlated electrons in solids. That is why those manganites are of great interest and their behaviour in electric fields should be understood. In this work $Pr_{0.68}Ca_{0.32}MnO_3$(PCMO)-thin films prepared by Pulsed Laser Deposition on $SrTiO_3$-Substrates are examined concerning their electrical transport properties. In constant-current-measurements, a resistance collapse of several orders of magnitude is observed while cooling below 175K. The resistivity exhibits a huge temperature hysteresis, which depends on the electric history of the sample. In further research explicit indications will be sought whether this abnormal resistance behaviour is due to a homogeneous or inhomogeneous resistance change in the film. There are a number of experimental evidences in favour of the inhomogeneous model, where a metallic, possibly ferromagnetic filament emerges in an insulating paramagnetic matrix.