frameworks, OOMMF, to simulate the influence of the local anisotropic magnetoresistance (AMR) on the total resistance of micrometer sized permalloy rectangles of varying thicknesses [1]. We compared the results with AMR-measurements done on permalloy ($Ni_{83}Fe_{17}$) samples with similar geometry. The simulated magnetization configurations and the concomitant magnetoresistances are in good agreement with the magnetic states observed in magnetic-force microscopy and resistance measurements. Finite–element calculations yield the local current density resulting from changes in resistance due to AMR [2].

[1] M. Steiner, C. Pels, M. Barthelmess, M. Bolte, U. Merkt, and G. Meier, to be published.
[2] M. Holz, O. Kronenwerth, and D. Grundler, Phys. Rev. B **67**, 195312 (2003).

MA 23.9 Di 12:30 TU H1028

Field dependence of colossal magnetoresistance in magnetic fields up to 50 T — •N. Kozlova, K. Dörr, K.-H. Müller, P. Reutler, R. Klingeler, B. Büchner, and L. Schultz — IFW Dresden, Postfach 270116, 01171 Dresden

The magnetoresistance of $La_{0.7}Sr_{0.3}MnO_3$ and $La_{0.7}Ca_{0.3}MnO_3$ epitaxial films and of a $La_{0.75}Ca_{0.25}MnO_3$ single crystal were investigated in pulsed magnetic fields up to 50 T over a wide temperature range. The Brillouin scaling model of Refs. [1] and [2] based on Mott hopping of electrons between magnetic clusters has been applied to analyze the magnetoresistance data. It has been shown that this model works well a) in the paramagnetic state above T_C and b) in a low temperature window ($0.2 < T/T_C < 0.9$). Near the ferromagnetic transition temperature T_C systematic deviations, in particular in larger fields, indicate that the model fails there, since neither the field dependence of magnetization nor resistance follows a Brillouin function. The temperature-dependent average magnetic moment of clusters is similar for all of our samples, but differs essentially from that obtained earlier for half-doped manganites.

[1] P. Wagner et. al., Phys. Rev. B 55 (1997) 3699.
[2] P. Wagner et. al., Phys. Rev. Lett. 81 (1998) 3980.

MA 23.10 Di 12:45 TU H1028

Transport properties of PCMO in magnetic and electrical fields — •Wilko Westhäuser und Christian Jooss — Institut für Materialphysik, Universität Göttingen

$Pr_{0,68}Ca_{0,32}MnO_3$ (PCMO) is very sensitive to certain external perturbations inducing a phase transition from a charge-ordered antiferromagnetic state to a charge-delocated ferromagnetic state. We investigate the electric field driven phase transition in comparison to the well-known colossal drop in resistance caused by an applied magnetic field (CMR) in several samples: poly-crystalline sintered pellets and epitaxial, laser-deposited thin films on single-crystalline SrTiO3- and MgO-substrates. In These samples we find significant differences in the metal-insulator (MI) transition which are due to strain and lattice defects. Evidences that the MI transition driven by electric fields is localized in a filamentary path are presented.

MA 24 Oberflächenmagnetismus

Zeit: Dienstag 10:30–12:30 Raum: TU A060

MA 24.1 Di 10:30 TU A060

Resonant x-ray emission applied to Mn-based Heusler alloys — •Max Theodor Kuchel[1], Jürgen Braun[1], Markus Donath[1], and Mikhail Yablonskikh[2] — [1]Physikalisches Institut, Westfälische Wilhelms-Universität Münster,Wilhelm-Klemm-Str. 10, 48149 Münster — [2]Department of Physics and Engineering Physics, University of Saskatchewan, Canada

We present resonant x-ray emission spectra calculated for a series of different Mn-based Heusler alloys. The fully relativistic calculations are based on the well known Kramers- Heisenberg formula [1] which describes second order optical excitation processes. The initial, intermediate and final states appearing in this formula were derived by use of the tight-binding linear muffin-tin orbitals method [2]. Comparing our theoretical spectra with corresponding experimental data we found a good agreement.

[1] A. Kotani, Rev. Mod. Phys. **73**, 203 (2001)
[2] O. K. Andersen and O. Jepsen, Phys. Rev. Lett. **53**, 2571 (1984)

MA 24.2 Di 10:45 TU A060

The effect of chemical disorder on the empty electronic states of NiMnSb — •Jürgen Braun[1], Hristo Kolev[1], Georgi Rangelov[1], Markus Donath[1], Sven Borneman[2], Jan Minar[2], and Hubert Ebert[2] — [1]Physikalisches Institut, Westfälische-Wilhelms-Universität Münster, Wilhelm-Klemm-Str. 10, 48149 Münster — [2]Institut für Physikalische Chemie, Ludwig-Maximilians-Universität München, Theresien Str. 37-41, 80333 München

The empty electronic states of the half-metallic semi Heusler alloy NiMnSb have been investigated by spin-resolved Appearance Potential Spectroscopy (SRAPS). Compared to fully relativistic SRAPS calculations our measurements reveal an unexpected low spin-polarization. To understand the physical origin of this discrepancy we performed a quantitative theoretical analysis of the influence of chemical disorder on the unoccupied density of states (DOS). Our theory describes the spectra as the self-convolution of the matrix-element weighted, orbitally-resolved unoccupied DOS, which was calculated by use of the ab-initio Coherent Potential Approximation (CPA) method.

MA 24.3 Di 11:00 TU A060

Ultrathin Ni films grown with O surfactant: Structure and Magnetism — •C. Sorg, N. Ponpandian, A. Scherz, R. Nünthel, T. Gleitsmann, K. Baberschke, and H. Wende — Institut für Experimentalphysik, Freie Universität Berlin, Arnimallee 14, D-14195 Berlin-Dahlem, Germany

We have studied ultrathin Ni films grown on Cu(100) and Cu(110) with and without O surfactant using element specific XAS and XMCD at the O K edge as well as at the Ni $L_{2,3}$ edges [1]. The O surfactant improves the growth mode of these films towards a better layer-by-layer growth and leads to a reduced surface roughness [2]. Since the O surfactant reduces also the surface anisotropy energy, the spin reorientation transition is shifted to a lower Ni thickness on Cu(100) [3]. On the more open and anisotropic Cu(110) surface an out-of-plane phase exists only if O is present on the Ni films. By means of XAS, we give final evidence that no bulk-like NiO is formed and that the O stays on top of the Ni films. We observe a charge transfer from Ni to O states. With XMCD we investigate the Ni orbital and spin moments. On the Cu(100) surface the total Ni magnetization of thinner films is reduced compared to the bulk. In contrast, on Cu(110) we observe an enhancement which is mainly carried by the orbital moment. Finally, we determine an induced magnetic orbital moment of the oxygen parallel to the one of Ni by analyzing the XMCD at the O K edge. – Supported by BMBF (05 KS4 KEB 5).

[1] C. Sorg *et al.*, Surf. Sci. **565**, 197 (2004).
[2] R. Nünthel *et al.*, Surf. Sci. **531**, 53 (2003); *ibid.* **566-568**, 100 (2004).
[3] J. Hong *et al.*, Phys. Rev. Lett. **92**, 147202 (2004).

MA 24.4 Di 11:15 TU A060

Tunable Magnetic Properties of Nanocrystalline Pd-Ni Alloy — •Sadhan Ghosh[1], Christian Lemier[1], Jörg Weissmüller[1,2], and Viswanath Raghavan Nadar[1] — [1]Forschungszentrum Karlsruhe, Institut für Nanotechnologie, Karlsruhe — [2]Fachrichtung Technische Physik, Universität des Saarlandes, 66041 Saarbrücken

Ferromagnetism is strongly related to the electronic structure density, therefore it is interesting to study how far one can modify the magnetic order of solids by changing their electron density. While this is usually done by alloying, one can also change the charge density reversibly by inducing space−charge regions at surfaces. This is particularly interesting in nanostructured materials, since the high surface to volume ratio maximizes the effect of the local property changes on the macroscopic materials behaviour [1]. It has been demonstrated that the polarized nanoporous metals exhibit large volumetric expansion and contraction in phase with the applied electrode potential [2]. In the present work, we report the variation of the magnetic moment of charged nanocrystalline Pd−Ni alloy, produced by the inert−gas condensation method, by in−situ magnetization experiments. We discuss the relative variation of charge−induced magnetization by changing the alloy composition as well as changing the electrochemical environment. [1] Gleiter H., Weissmüller J., Wollersheim O., Würschum R. Acta mater. 49 (2001), 737; [2] Weissmüller, J., Viswanath, R.N., Kramer, D., Zimmer, P., Würschum, R., Gleiter, H. Science 300 (2003), 312.