MA 20 Poster: Films(1-36) Transp(37-56) Ex.Bias(57-67) Spindyn(68-80) Micromag(81-95) Particle(96-109) Imag.+Surface(110-113) Spinelectr(114-122) Theory+Micromag(123-131) Spinstr+Aniso(132-142) MagMat(143-156) Meas(157,158) MolMag+Kondo(159-162) Postdead(163-)

Time: Tuesday 15:15–19:15 Room: P1

MA 20.1 Tue 15:15 P1

Preparation and Properties of thin Manganite-Titanate Composite-Films — •Kai Gehrke[1], Alexandr Belenchuk[2], Oleg Shapoval[2], Vasily Moshnyaga[1], and Konrad Samwer[1] — [1]1. Physikalisches Institut, Universität Göttingen, Friedrich-Hund-Platz 1, 37077 Göttingen — [2]Institute of Applied Physics, Academieis 5, MD-2028 Chisinau, Moldova

Multiferroic materials with coexistence of ferromagnetism and ferroelectricity are in the focus of modern fundamental and applied research. The coupling of these properties is believed to be very strong in nanocomposite films, containing epitaxial co-grown and elastically coupled Manganite and Titanate phases. The strain induced by the piezo effect of the Titanate phase should alter the magnetization of the CMR-Manganite phase. Thin Manganite-Titanate films were grown on MgO and STO substrates by Metalorganic Aerosol Deposition (MAD) technique. Manganites like La-Mn-O, La-Ca-Mn-O, La-Ce-Mn-O and La-Ba-Mn-O where combined with ferroelectric Barium Titanate. XRD, SEM (EDX) and TEM (EELS) where used to study the microstructure of the samples. Measurements of the temperature-dependence of both conductivity and the magnetic moment unveil a MI- and ferro-paramagnetic phase transition of the Manganite-phase. Dielectric spectroscopy in a wide range of frequencies and temperatures is used to determine the ferroelectric properties also in applied magnetic fields.

MA 20.2 Tue 15:15 P1

Investigation of manganite/strontium titanate interfaces by surface photovoltage spectroscopy — •Elke Beyreuther[1], Stefan Grafström[1], Christian Thiele[2], Kathrin Dörr[2], and Lukas M. Eng[1] — [1]Institut für Angewandte Photophysik, Technische Universität Dresden, D-01062 Dresden — [2]Institut für Metallische Werkstoffe, IFW Dresden, Postfach 270116, D-01171 Dresden

In the present study, we investigate the distribution of electronic interface states of three different perovskite oxide interfaces, formed by epitaxial thin films of $La_{0.7}Sr_{0.3}MnO_3$(LSMO), $La_{0.7}Ca_{0.3}MnO_3$(LCMO), and $La_{0.7}Ce_{0.3}MnO_3$(LCeMO) on $SrTiO_3$(100) substrates in the as-prepared state, as well as after an annealing procedure. We find that the annealing significantly reduced the number and density of interface trap states. Two different experimental techniques to comparatively inspect the surface photovoltage (SPV) spectra were employed: an approach based on X-ray photoelectron spectroscopy (XPS) and a capacitive approach. Advantages and limitations of both methods and their applicability to perovskite oxide interfaces are discussed critically.

MA 20.3 Tue 15:15 P1

Critical exponents of the ferromagnetic-paramagnetic phase transition of $La_{1-x}Sr_xCoO_3$ thin films — •Thorsten Schwarz[1,2], Dirk Fuchs[1], and Rudolf Schneider[1] — [1]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe — [2]Universität Karlsruhe, Fakultät für Physik, D-76128 Karlsruhe

The critical exponents of the second-order ferromagnetic-paramagnetic phase transition of $La_{1-x}Sr_xCoO_3$ thin films ($0.1 \leq x \leq 0.6$) and bulk materials are determined by magnetization measurements around the Curie temperature T_C ($-0.05 \leq \epsilon = (T-T_C)/T_C < 0.05$) applying fields from 0 T to 5 T. The $La_{1-x}Sr_xCoO_3$ thin films were grown on (001) $(LaAlO_3)_{0.3}(Sr_2AlTaO_6)_{0.7}$ (LSAT) single crystal substrates by pulsed laser deposition (PLD) and the bulk materials were made by standard solid state synthesis. T_C was determined by the derivative of the magnetization versus temperature, i.e., M vs. T, and $M_S \cdot (dM/dT)^{-1}$ vs. T. In order to determine the critical exponents β, γ and δ the following three different techniques have been applied for the evaluation: i) Scaling-Plots, ii) Kouvel-Fisher and iii) the modified Arrott-Plots technique. Best results for the critical exponents β, γ and δ were obtained by the modified Arrott-Plots which are presented for thin films and bulk-materials.

MA 20.4 Tue 15:15 P1

Resonant magnetic soft x-ray scattering from thin EuTe layers — •Enrico Schierle[1], Eugen Weschke[1], Alexander Gottberg[1], Günter Kaindl[1], Walter Söllinger[2], and Gunther Springholz[2] — [1]Institut für Experimentalphysik, Freie Universität Berlin, D-14195 Berlin, Germany — [2]Institut für Halbleiterphysik, Johannes Kepler University, A-4040 Linz, Austria

Magnetic structures and short-range correlations in thin EuTe(111) films [1] were studied by magnetic soft x-ray scattering at the Eu M_5 resonance. The prototypical Heisenberg antiferromagnet EuTe is ideally suited for a magnetic scattering study: (i) The high magnetic sensitivity at the lanthanide M_5 resonance [2] can be exploited and (ii) for the x-ray wavelength of the resonance, the magnetic signal appears exactly at the Brewster angle, which results in magnetic scattering virtually free of charge-scattering background. Magnetic diffraction provides well-resolved Laue profiles that permit a detailed reconstruction of the real-space magnetization profiles across the films, i.e. the temperature-dependent magnetization of the individual layers. The reduced values of the magnetization in the outer layers and the different temperature dependences compared to the inner layers are in good agreement with theoretical considerations. The high sensitivity of the method further permits even critical scattering studies above the ordering temperature in films with thicknesses down to 2 EuTe layers, revealing a transition to two-dimensional magnetic behavior around 3 EuTe layers.

[1] H. Kepa et al., Phys. Rev. B 68, 24419 (2003).
[2] E. Weschke et al., Phys. Rev. Lett. 93 (157204), 2004.

MA 20.5 Tue 15:15 P1

Magnetotransport in Sr_2CrWO_6 thin films — •Petra Majewski, Stephan Geprägs, Andrea Boger, Matthias Opel, and Rudolf Gross — Walther-Meissner-Institut, Bavarian Academy of Sciences, Walther-Meissner-Str. 8, 85748 Garching, Germany

We report on the fabrication and characterization of thin film samples of Sr_2CrWO_6 by PLD (Pulsed Laser Deposition). The growth process was monitored by RHEED (reflection high energy electron diffraction) and the high crystalline quality of the thin films was checked by X-ray diffraction. The Curie temperature T_C was found to exceed 400K from SQUID magnetization measurements. The magnetotransport properties of the samples were investigated in the temperature range from 5K to 300K and magnetic fields up to 14T. Hereby the magnetic field was applied in several directions with respect to the thin films. Preliminary results indicate that the transport properties are close to a metal-insulator transition. We also discuss an interesting fine structure in the MR at low fields, which is highly sensitive on the direction of the applied magnetic field.

This work is supported by the DFG (project GR 1132/13)

MA 20.6 Tue 15:15 P1

Multiferroic (La,A)MnO_3 / $PbZr_{0.52}Ti_{0.48}O_3$ bilayers: field effect vs. strain effect — •C. Thiele[1], K. Dörr[1], E. Beyreuther[2], A. A. Levin[3], W.-M. Lin[4], O. Bilani[1], and L. Schultz[1] — [1]IFW Dresden, PF 270116, 01171 Dresden — [2]IAPP, TU Dresden — [3]ISP, TU Dresden — [4]IFE, TU Dresden, 01062 Dresden

Magnetic transition metal oxides can be combined with ferroelectric titanates in epitaxially grown film structures [1]. This approach might offer effective access to the electric control of magnetic properties via electric field effect and induced elastic strain to the magnetic layers. Field effect transistor (FET) structures of epitaxial $PbZr_{0.52}Ti_{0.48}O_3$ / (La,A)MnO_3 / $SrTiO_3$(100) (A = Sr; Ca) have been prepared using off-axis PLD with a shadow mask technique. FETs with a $La_{0.8}Ca_{0.2}MnO_3$ channel show electrical modulation of the channel resistance proportional to the PZT electric polarization loop [2], which can be attributed to charge density modulation in the interface-near region of the manganite. Recording complete resistance (R) hysteresis loops in dependence on an applied gate voltage in FETs with $La_{0.7}Sr_{0.3}MnO_3$ channel has given evidence for butterfly-like hysteresis being typical for in-plane strain modulation in the manganite layer [3]. R modulation depending on channel