interface regions, where modifications of bulk magnetic order [1] and roughness occur. Using resonant magnetic soft x-ray scattering at the Eu-M_5 resonance, we studied the temperature-dependent magnetization of the individual layers in monocrystalline films of the magnetic semiconductor EuSe with thicknesses of 20 and 40 monolayers. These films exhibit AFM, ferri- (FiM) and FM phases depending on temperature and applied magnetic field [2]. Due to the high magnetic sensitivity at resonance [3], very intense AFM and FiM Bragg peaks could be recorded that are characterized by pronounced Laue oscillations over a large range of momentum transfer. These permit a detailed characterization of temperature-dependent interface-induced disorder for different types of magnetic structures (AFM, FiM) in a single material. Preliminary analyses point to a much stronger influence of the interface on the FiM structure than on AFM order.

[1] K. Binder, P. C. Hohenberg, Phys. Rev. B 9, 2194 (1974)
[2] R. T. Lechner et al., Phys. Rev. Lett. 94, 157201 (2005)
[3] E. Weschke et al., Phys. Rev. Lett. 93, 157204 (2004)

MA 32.28 Fri 11:15 Poster E

Magnetic properties of epitaxial Fe/GaAs(110) — •Igor Barsukov, Cihan Tomaz, Ralf Meckenstock, Jürgen Lindner, and Michael Farle — Fachbereich Physik and Center for Nanointegration (CeNIDE) Universität Duisburg-Essen, Lotharstrasse 1, 47048 Duisburg, Germany

Epitaxial Fe films in a thickness range from 15 to 30 monolayers (ML) were grown by in-situ molecular beam epitaxy on GaAs(110) at room temperature. The growth and structure of the films were characterized by Auger spectroscopy, low energy electron diffraction (LEED) and IV-LEED. In-situ angular dependent ferromagnetic resonance measurements (FMR) were performed to obtain a full set of anisotropy parameters. Beside the well known film thickness dependent magnetic reorientation transition [1], the investigation shows a characteristic change of anisotropies due to thermal tempering, by direct heating or by covering with flash-evaporated Ag atoms. The comparison of the two characteristic FMR angular dependences reveals that the magnetic transition is driven by a 90° rotation of uniaxial anisotropy axis; the higher order parameters being unchanged. A morphologic explanation of this phenomenon is discussed. This work was supported by DFG, SFB491.

[1] J. Appl. Phys. 89, 11, 7136-7138

MA 32.29 Fri 11:15 Poster E

Effects of wet-chemical etching on MnAs/GaAs hybride structures probed by HX-PES — •Benjamin Schmid[1], Sebastian Engelbrecht[1], Michael Sing[1], Jan Wenisch[2], Charles Gould[2], Karl Brunner[2], Lorenz Molenkamp[2], Wolfgang Drube[3], and Ralph Claessen[1] — [1]Experimentelle Physik IV, Universität Würzburg, Würzburg, Germany — [2]Experimentelle Physik III, Universität Würzburg, Würzburg, Germany — [3]HASYLAB, DESY, Hamburg

Ferromagnet-semiconductor hybride structures represent a promising approach to spintronic applications. Utilizing not only the charge but also the spin degree of freedom would lead to a new generation of computing devices. One promising candidate for spin-injectors or aligners compatible with conventional semiconductors is MnAs. It provides a high Curie temperature of 317 K and a compatibility to GaAs. Moreover, thin films of MnAs can be grown epitaxially on GaAs by MBE with monolayer accuracy.
In order to fabricate tailor-made spintronic devices it is essential to test established surface preparation methods. Obtaining clean surfaces during the fabrication process of heterostructures by wet-chemical etching is a standard method in today's semiconductor industry. We investigated the effects of etching with either HCl or H_2SO_4 on MnAs thin films using photoemission spectroscopy in the hard X-ray regime (HX-PES). HCl removes contaminations such as oxygen and carbon. After etching the surface appears to be covered with an As layer. In contrast, H_2SO_4 leads to a complete destruction of the MnAs thin film.

MA 32.30 Fri 11:15 Poster E

Recovery of the metal-insulator transition in electron-doped $La_{0.7}Ce_{0.3}MnO_{3-\delta}$ films by photoexcitation — •Andreas Thiessen[1], Elke Beyreuther[1], Stefan Grafström[1], Kathrin Dörr[2], and Lukas M. Eng[1] — [1]Institut für Angewandte Photophysik, TechnischeUniversität Dresden, D-01062 Dresden — [2]Institut für Metallische Werkstoffe, IFW Dresden,Postfach 270116, D-01171 Dresden

The question whether electron-doped mixed-valence manganites, such as $La_{0.7}Ce_{0.3}MnO_3$, can be synthesized as single-phase compounds has been under debate for a decade. Meanwhile it has become clear that electron doping can indeed be achieved in epitaxial thin films [Mitra et al., JAP 89 (2001) 524]. However, as-prepared films often suffer from overoxygenation and concomitant hole doping, which can be overcome by deoxygenation through a post-deposition annealing procedure. Disappointingly, those reduced samples do not exhibit the typical metal-insulator transition (MIT) any longer [Wang et al., PRB 73 (2006) 144403].
In the present work, we show that the MIT of $La_{0.7}Ce_{0.3}MnO_{3-\delta}$ films can be recovered by exposition to visible light. Our films turn out to be highly photoconductive: Laser illumination at 514 nm with a power of 400 mW gave rise to a dramatic resistance drop of around seven orders of magnitude at 100 K as compared to the dark state, while illumination had no impact on the conductivity of an as-prepared reference film.

MA 32.31 Fri 11:15 Poster E

Epitaxial strain and magnetic anisotropy in $LaCoO_3$ thin films — •Erhan Arac[1,2], Dirk Fuchs[1], and Rudolf Schneider[1] — [1]1 Forschungszentrum Karlsruhe, Institut für Festkörperphysik, — [2]Physikalisches Institut, Universität Karlsruhe

$LaCoO_3$ (LCO) thin films do show a strain induced ferromagnetic phase transition below 85K. In order to elucidate the coupling between strain and magnetization, we have grown epitaxial LCO thin films on (001), (111) and (110) oriented $(LaAlO_3)_{0.3}(Sr_2AlTaO_6)_{0.7}$ single crystal substrate with different film thickness. The films were grown by pulsed laser depositions and are differently strained because of the grown direction. The magnetization reversal loops were recorded by light modulated magneto-optical Kerr effect (MOKE) magnetometry whereas strain characterization was carried out by reciprocal space mapping on a four-circle x-ray diffractometer. The magnetic anisotropy as a function of strain is studied . Preliminary results will be presented.

MA 32.32 Fri 11:15 Poster E

Scanning tunneling spectroscopy on $La_{0.75}Ca_{0.25}MnO_3$ thin film in external magnetic fields — •Thomas Mildner, Sigrun Köster, Bernd Damaschke, Vasily Moshnyaga, and Konrad Samwer — I. Physikalisches Institut, Universität Göttingen, Friedrich-Hund-Platz 1, 37077 Göttingen

Manganite thin films show a colossal magnetoresistance effect (CMR) combined with a metal-insulator transition (MIT). The MIT is observed not only as a function of temperature but also in an external magnetic field. The transition may be discussed in terms of an electronic phase separation with possible contributions of polaronic ordering.

In this work an A-site ordered $La_{0.75}Ca_{0.25}MnO_3$ thin film was grown by metalorganic aerosol deposition (MAD) technique on a MgO substrat. The scanning tunneling spectroscopy measurements were performed in UHV at various temperatures in the vicinity of the MIT and external magnetic fields. Regions with different tunneling conductivity at the Fermi level increases with external magnetic fields leading to a CMR-like effect also in the tunneling conductivity.

The work is supported by the DFG via SFB 602, TP A2

MA 32.33 Fri 11:15 Poster E

Exchange shift of stripe domains in antiferromagnetically coupled superlattices — Nikolay S. Kiselev[1,2], Igor E. Dragunov[2], •Ulrich K. Rössler[1], and Alexei N. Bogdanov[1,2] — [1]IFW Dresden — [2]Donetsk Institute for Physics and Technology

Recently synthesized antiferromagnetically coupled superlattices with perpendicular anisotropy display qualitatively new physical properties. Competition between the weak interlayer exchange and dipolar coupling yields unusual domain structures and magnetization processes. Understanding and control of these properties may lead to new applications of such perpendicular multilayers. Within a general phenomenological approach we calculate the existence regions and the geometrical parameters of equilibrium stripe and bubble domains, and their evolution in a bias field. A *shifted* phase characterized by a redistribution of magnetization between adjacent magnetic layers exists in a broad range depending on the ratio of magnetic and nonmagnetic layer thicknesses and strengths of interlayer coupling [1]. The transition from the antiferromagnetic monodomain state to the *shifted* phase and coexistence of metastable states was observed in recent experiments [2]. Qualita-