The reflectometer Super ADAM at ILL — •Max Wolff[1,2,3], Kyrill Zhernenkov[1], Andrew Wildes[2,3], Philipp Gutfreund[1,2], Jörg Meermann[1], Hakan Rundlof[3], Boris Toperverg[3], Adrian Rennie[3], Björgvin Hjörvarsson[3], and Hartmut Zabel[1] — [1]Institute for Solid State Physics/EP IV, Ruhr-University Bochum, Germany. — [2]Insitute Laue-Langevin, Grenoble, France. — [3]Materials Physics, Uppsala University, Sweden.

The angle dispersive neutron reflectometer ADAM at the ILL offers high flux combined with an excellent Q resolution and full polarization analysis with privileged access for the German and Swedisch user comunity. We will give a brief overview on the most recent improvements and most outstanding results obtained during the last years.

Presently a major update of the reflectometer to Super ADAM is in progress. It will combine two possible setups. A high resolution and a high intensity mode on the same monochromatic instrument. To account for this we will use a intercalated graphite monocromator. We expect unique possibilities for the investigation of magnetic thin films due to the high flux, the low background and excellent polarization analysis. A brief report on the status of the project will be given.

MA 13.8 Tue 10:15 P1A

In situ low temperature ac-susceptibility measurements on ion bombarded AlFe thin films — •Moritz Trautvetter, Ulf Wiedwald, and Paul Ziemann — Universität Ulm, Institut für Festkörperphysik, 89069 Ulm, Germany

In its chemically ordered state (B2) Al_xFe_{1-x} is paramagnetic at room temperature in the composition range of $30 < x < 50$ at% and can be switched to a ferromagnetic behavior by inducing chemical disorder [1]. For this purpose, ion irradiations are performed at various temperatures. In detail, thin films (ca. 60 nm) of AlFe (composition range as given above) were grown on Sapphire by Pulsed Laser Deposition at 300 K. As prepared $Al_{45}Fe_{55}$films are ferromagnetic with μ= 0,77 μ_B/per formula unit indicating a high degree of disorder. After annealing at 600°C for 2h under hydrogen atmosphere, a reduction of the magnetization to μ= 0,16 μ_B/f.u. is observed in accordance with the formation of an at least partially ordered B2 structure (bcc). The disorder due to the subsequent ion irradiation with 200 keV Ar^+ ions leads to an enhancement of the AlFe magnetization. This effect is studied in situ as a function of ion fluence and temperature by means of low temperature ac-susceptometry.

[1] P. Shukla, M.Wortis, Phys Rev B 21, 159 (1980)

MA 13.9 Tue 10:15 P1A

Growth of epitaxial $CaRuO_3$ films — •Markus Wissinger[1,2], Dirk Fuchs[1], Rainer Fromknecht[1], Rudolf Schneider[1], and Hilbert v.Löhneysen[1,2] — [1]Institut für Festkörperphysik, Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe, Germany — [2]Universität Karlsruhe, 76128 Karlsruhe, Germany

In this work we report on the growth of $CaRuO_3$ films by the pulsed laser deposition (PLD) technique. The films were deposited from stoichiometric targets which were produced by standard solid state reaction. Powder X-ray diffraction (XRD) demonstrated the impurity free orthorhombic Pbnm structure of the targets. The films were grown on (001) oriented $(LaAlO_3)_{0.3}(SrAl_{0.5}Ta_{0.5}O_3)_{0.7}$ and (110) $NdGaO_3$ single crystal substrates. The growth mode and film thickness were studied by in-situ reflection high energy electron diffraction. The composition of the films was checked by electron dispersive x-ray analysis and Rutherford backscattering spectrometry. The substrate temperature, Ts, the oxygen partial pressure, P(O2), and the target-substrate distance, d, were optimized with respect to the crystallinity of the films. The mosaic spread of the films and the of-plane lattice constant were determined from rocking curves and $\theta/2\theta$ scans on 00l reflections, respectively.

MA 13.10 Tue 10:15 P1A

crystallographic structure and magnetic properties of electrodeposited Co- rich Co-Pt films — •manvendra khatri[1,2], heike schlörb[1], ludwig schultz[1,2], and sebastian fähler[1,2] — [1]IFW Dresden, Institute for Metallic Materials, P.O. Box 27 00 16, D-01171 Dresden, Germany — [2]Institute for Solid State Physics, Department of Physics, Dresden University of Technology, 01062 Dresden, Germany

Co- rich Co-Pt alloy films have been grown by electrodeposition on Au seed layers. The influence of deposition current density on chemical composition, structure, microstructure and magnetic properties of the films has been investigated. Due to the superposition of the fcc Co-Pt (111) and hcp Co-Pt (002) planes the information supplied by XRD in conventional Bragg Brentano geometry was of limited value. Hence detailed texture measurements have been performed in order to understand the dependence of magnetic properties on phase composition and texture perfection. By comparing the integrated intensity ratio of fcc (200) to hcp (002) and fcc (111) reflections taken from pole figure measurements, it is possible to estimate the formation of hcp phase in the films with respect to current density. The integrated intensity ratio decreases with current density, which indicates the increase in the (002) texture of hcp in the film. The presence of (002) pole of hcp at higher current density indicates the textured growth of the film with c-axis out of plane. The decrease in the integrated intensity ratio is accompanied by an improvement of the out-of plane magnetic properties.

MA 13.11 Tue 10:15 P1A

Epitaxial $RECo_5$ single layer and bilayer films — •Marietta Seifert, Felix Fleischhauer, Ajit Patra, Volker Neu, and Ludwig Schultz — IFW Dresden, Helmholtzstr. 20, 01069 Dresden, Germany

Intermetallic RECo phases are widely used in permanent magnet applications due to their large magnetocrystalline anisotropy. Therefore in previous work we developed epitaxial growth of thin $SmCo_5$ and $PrCo_7$ films on Cr buffered MgO(110) substrates with high coercivity or energy density [1,2]. $RECo_5$ phases with RE = Pr or Nd are also known to exhibit spin reorientation transition from an uniaxial state into easy-cone or easy-plane arrangement and are thus interesting from a fundamental point of view.

In this work we present the temperature and field dependent magnetic behaviour of epitaxial $NdCo_5$, $SmCo_5$ and $PrCo_5$ single layer films and bilayers. Epitaxial $NdCo_5$ films grow with the same single orientation of the *c*-axis established for $SmCo_5$ and exhibit an easy-axis to easy-plane transition. Bilayers of $PrCo_5$ and $SmCo_5$ likewise grow epitaxially with one common orientation of the *c*-axis throughout the layer stack. Despite their largely different coercivity when grown as single layers the bilayer films reverse magnetization in one large irreversible step indicating a strong interlayer exchange coupling.

[1] A. Singh, V. Neu, R. Tamm, K. Rao, S. Fähler, W. Skrotzki, L. Schultz, B. Holzapfel, JAP **99** 08E917 (2006)

[2] A. Patra, V. Neu, S. Fähler, L. Schultz, J. Phys. D: Appl. Phys. **40** (2007) 7261-7266

MA 13.12 Tue 10:15 P1A

Epitaxial Fe_3Si films: Structure, electrical and magnetic properties — •Joachim Schumann[1], Hartmut Vinzelberg[1], Christoph Deneke[1], Dieter Elefant[1], Jürgen Thomas[1], Ernest Arushanov[1,2], and Oliver G. Schmidt[1] — [1]IFW Dresden, P.O.Box 270116, D-01171 Dresden, Germany — [2]Institute of Applied Physics, 277028 Chisinau, Moldowa

Epitaxial Fe_3Si films have been prepared by means of UHV electron beam co-evaporation on GaAs (100) substrates for studies on planar [1] and cylindrically shaped [2] samples. High resolution TEM shows that the films are grown with a high crystalline quality and a good interface perfection what makes them comparable with the best Fe_3Si MBE layers. The electrical measurements present a low-temperature T^3 term describing the anomalous single-magnon scattering processes in half-metallic materials. So, the hypothesis of half-metallic ferromagnetism in Fe_3Si can be considered as confirmed [1]. The films have an anisotropic magnetoresistance in low magnetic fields. In high magnetic fields a negative longitudinal and transverse magnetoresistance (MR) was found. In the vicinity of 200 K the MR shows a maximum of about 1.5% at fields of about 8 T. The magnetic moment was determined as 0.86 μ_B/atom close to the bulk value of Fe_3Si.

[1] H. Vinzelberg et al., J. Appl. Phys. **104**, 093707 (2008).
[2] C. Deneke, et al., phys.stat.sol.(c) **5**, 2704 (2008).

MA 13.13 Tue 10:15 P1A

Sputtering deposition of epitaxial $Co_2Mn_{1-x}Fe_xSi$ and Co_2MnAl films — •Enrique Vilanova Vidal, Horst Schneider, and Gerhard Jakob — Institut für Physik, Johannes Gutenberg-Universität Mainz

Recently it has been discussed whether the Heusler compounds $Co_2Mn_{0.5}Fe_{0.5}Si$ and Co_2MnAl are halfmetallic systems. The comparison of band structure calculations with experimental results indicate that electron correlations play an important role in this question. In order to gain further insight into the electronic structure