MA 20: Micro- and Nanostructured Magnetic Materials I

Time: Wednesday 12:45–13:15 Location: HSZ 403

MA 20.1 Wed 12:45 HSZ 403

Magnetization reversal of single submicron NiFe rectangles — •Hendrik Spahr, André Kobs, Daniel Stickler, Sebastian Hankemeier, and Hans Peter Oepen — Institut für Angewandte Physik, Universität Hamburg, Jungiusstr. 11, 20355 Hamburg, Germany

The magnetization reversal of single submicron NiFe rectangles with aspect ratio of two has been investigated by means of magnetotransport measurements using anisotropic magnetoresistance (AMR). The structures have been carved into a Cr(10nm)/NiFe(20nm) double layer utilizing a highly focused ion beam (FIB). The material surrounding the rectangles has been rendered paramagnetic by applying an ion dose of 6000 μC/cm^2, which destroys ferromagnetism without decreasing the electric conductivity much. To perform *in situ* two-point MR measurements the structures have been contacted via a tungsten tip attached to a micromanipulator [1]. To investigate the hard- and easy-axis hysteresis loops, measurements have been performed with varying orientation of magnetic field with respect to current and main axis of the rectangles. The magnetization behaviour of the rectangles is mainly determined by the uniaxial shape anisotropy. The shape anisotropy constant can be estimated from the hard axis loops. The state in remanence of the rectangles has been investigated via scanning electron microscopy with polarization analysis (SEMPA).

[1] Daniel Stickler et al., Rev. Sci. Instr. **79**, 103901 (2008)

MA 20.2 Wed 13:00 HSZ 403

Magnetic properties of exchange-coupled $L1_0$-FePt/Fe nanostructures — •Achim Breitling, Thomas Bublat, and Dagmar Goll — MPI für Metallforschung, Stuttgart, Germany

Nanopatterned $L1_0$-FePt/Fe composite media with perpendicular magnetization are considered to be one of the most straightforward concepts to achieve ultrahigh storage densities in magnetic recording. The hard magnetic component $L1_0$-FePt guarantees thermal stability for smallest dot sizes whereas the soft magnetic component Fe reduces the coercivity and thus enables conventional write heads to store information in such patterns.

To optimize the $L1_0$-FePt/Fe nanopatterns the influence of the microstructure and of the composition on the magnetic properties of the $L1_0$-FePt part has been studied systematically within the ferromagnetic temperature range. Furthermore a technique has been developed to manipulate the character of the $L1_0$-FePt/Fe interface resulting in a gradual change of the material parameters. The nanostructures have been fabricated by advanced lithography methods and by annealing at elevated temperatures.