Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**$Fe_3O_4$/ZnO: a high-quality magnetic oxide-semiconductor heterostructure** ANDREAS MUELLER, MARKUS PAUL, DOMINIK KUFER, SEBASTIAN BRUECK, Experimentelle Physik 4, Universitaet Wuerzburg, EBERHARD GOERING, Max-Planck-Institut fuer Metallforschung, Stuttgart, MARTIN KAMP, Technische Physik, Universitaet Wuerzburg, JO VERBEECK, HE TIAN, Electron Microscopy For Materials Science, University of Antwerp, MICHAEL SING, RALPH CLAESSEN, Experimentelle Physik 4, Universitaet Wuerzburg — Magnetite ($Fe_3O_4$) is ranked among the most promising materials to use as a spin injector into a semiconducting host. We demonstrate epitaxial growth of $Fe_3O_4$ films on ZnO which presents a further step towards incorporation of magnetic materials into semiconductor technology. X-ray spectroscopy results evidence that the iron-oxide is phase-pure and nearly stoichiometric magnetite. Diffraction measurements indicate highly oriented epitaxy and almost complete structural relaxation. The microstructure consists of domains separated by anti-phase boundaries or twin boundaries as a result of island-like growth. The magnetic behavior shows a rather slow approach to saturation at high fields in comparison with bulk crystals, which is likely due to antiferromagnetic coupling at the anti-phase boundaries.

Andreas Mueller
Experimentelle Physik 4, Universitaet Wuerzburg

Date submitted: 19 Nov 2010 Electronic form version 1.4