
HL 17: Invited Talk Limmer

Time: Tuesday 10:00–10:45

Location: H15

Invited Talk

HL 17.1 Tue 10:00 H15

Magnetic anisotropy and magnetization switching in ferromagnetic GaMnAs — ●WOLFGANG LIMMER — Institut für Halbleiterphysik, Universität Ulm, 89069 Ulm, Germany

Characteristic features of semiconductor spintronics such as the anisotropic magnetoresistance or the spin-polarization of charge carriers are intimately connected with the macroscopic magnetization in a ferromagnetic semiconductor. The orientation of the magnetization is controlled by magnetic anisotropy which predominantly arises from crystal symmetry, sample geometry, and strain. A detailed knowledge of this anisotropy is indispensable for the design of novel spintronic devices.

In this talk, angle-dependent magnetotransport is demonstrated to be an excellent tool for probing magnetic anisotropy as an alternative to the standard ferromagnetic-resonance method. Moreover, its ability to trace the movement of the magnetization vector in a variable external magnetic field makes it ideally suitable for studying magnetization switching, a potential basic effect in future logical devices. Experimental data recorded from a variety of different GaMnAs samples are analyzed by means of model calculations which are based on a series expansion of the resistivity tensor, a numerical minimization of the free enthalpy with respect to the magnetization orientation, and the assumption that the GaMnAs layers under study consist of single ferromagnetic domains.