

## HL 24: Invited Talk Neumaier

Time: Tuesday 14:45–15:30

Location: HSZ 01

## Invited Talk

HL 24.1 Tue 14:45 HSZ 01

**Phase coherent transport in (Ga,Mn)As** — •D. NEUMAIER<sup>1</sup>, K. WAGNER<sup>1</sup>, U. WURSTBAUER<sup>1,2</sup>, M. REINWALD<sup>1</sup>, W. WEGSCHEIDER<sup>1</sup>, and D. WEISS<sup>1</sup> — <sup>1</sup>Universität Regensburg — <sup>2</sup>Universität Hamburg

The low temperature conductance of mesoscopic samples is altered by quantum interference effects, caused by the electron's wave nature. Information on the relevant quantum mechanical transport properties is needed to understand charge transport in general and to design more sophisticated structures in particular. In this talk I will review our investigations on universal conductance fluctuations [1,2], Aharonov-Bohm oscillations [2] and weak localization [2,3] in the diluted magnetic semiconductor (Ga,Mn)As. Analyzing universal conductance fluctuations in (Ga,Mn)As nanowires results in a phase co-

herence length of  $\approx 100$  nm at 20 mK with a  $1/\sqrt{T}$  temperature dependency. This agrees well with values extracted from the amplitude of periodic Aharonov-Bohm oscillations observed in (Ga,Mn)As nanorings. To investigate weak localization in (Ga,Mn)As, arrays of wires were fabricated to suppress universal conductance fluctuations by ensemble averaging. The magnetoconductance of the (Ga,Mn)As wire arrays displays a pronounced low temperature anomaly ascribed to weak localization. A comparison of phase coherent transport in (Ga,Mn)As with nonmagnetic materials and conventional ferromagnets will be given.

[1] K. Wagner *et al* PRL 97, 056803 (2006).

[2] D. Neumaier *et al*. NJP 10 055016 (2008).

[3] D. Neumaier *et al* PRL 99, 116803 (2007).