

HL 17: Invited Talk Thomas Ihn

Time: Monday 15:00–15:30

Location: POT 081

Invited Talk

HL 17.1 Mon 15:00 POT 081

Low-temperature scanning probe investigations of nanostructures at high and low magnetic fields — NIKOLA PASCHER, ●THOMAS IHN, ALEKSEY KOZIKOV, RICHARD STEINACHER, CLEMENS RÖSSLER, KLAUS ENSSLIN, CHRISTIAN REICHL, and WERNER WEGSCHEIDER — ETH Zurich, Department of Physics, Otto-Stern Weg 1, CH-8093 Zurich

In our investigations we use the conducting tip of a scanning force microscope operated at cryogenic temperatures down to 40 mK for spatially resolved studies of the conductance in semiconductor nanostructures. The spatial resolution of the technique, which is comparable to the Fermi wavelength, gives insights into the *local* peculiarities of integer and fractional edge channel formation on spatial scales of many

micrometers. It turns out that particular fractional edge channels are observed in certain regions along the edge but often fade out on a micrometer scale [1]. The macroscopic quantization of the Hall resistance still survives in the presence of these inhomogeneities.

It is an adventure to also apply this scanning gate technique to the *local* investigation the *non-local* transport in fully coherent nanostructures such as ballistic stadii [2]. What sounds like a contradiction at a first glance leads to beautiful images exhibiting the whole zoo of coherent mesoscopic phenomena ranging from irregular conductance fluctuations to regular standing wave patterns and even to the paradigmatic Aharonov-Bohm effect.

[1] N. Pascher *et al*, arXiv:1309.4918, accepted in PRX [2] A. A. Kozikov *et al*, New J. Phys. **15**, 083005 (2013).