

THU2A: Semiconductor Physics - Quantum Effects

Chaired by Mario Capizzi, Sapienza Università di Roma, Rome, Italy

Time: Thursday 11:30–12:50

Location: Aula Amaldi

THU2A.1 11:30 Aula Amaldi

Self-sustained magnetoelectric oscillations in magnetic double barrier structures — ●CHRISTIAN ERTLER and JAROSLAV FABIAN — Institute for Theoretical Physics, University of Regensburg, Universitätsstraße 31, 93040 Regensburg, Germany

We theoretically investigate the highly nonlinear dynamics of a ferromagnetic semiconductor double barrier structure, in which the transport and magnetic properties are strongly coupled. The occurrence of intrinsic self-sustained current and magnetization oscillations is predicted.

THU2A.2 11:50 Aula Amaldi

Magnetic-field dependent tunnel coupling of stacked one-dimensional electron systems — ●SASKIA F. FISCHER¹, PATRIC S. ZAPP¹, SVEN S. BUCHHOLZ¹, GABRIELA APETRII¹, ULRICH KUNZE¹, DIETER SCHUH², and GERHARD ABSTREITER³ — ¹Werkstoffe und Nanoelektronik, Ruhr-Universität Bochum, D-44780 Bochum, Germany — ²Experimentelle und Angewandte Physik, Universität Regensburg, D-93040 Regensburg, Germany — ³Walter Schottky Institut, Technische Universität München, D-85748 Garching, Germany

Tunnel-coupled quantum wire states and Landau levels in the quantum Hall regime are investigated by magnetotransport. The magnetic-field induced oscillation of the tunnelling gap in the single-mode limit allows control of hybridization in quantum transport.

THU2A.3 12:10 Aula Amaldi

Quantum transport in magnetic fields: Real-space-real-time approach — ●ESA RÄSÄNEN^{1,2}, HEIKO APPEL^{1,2}, ALBERTO CASTRO^{1,2}, and E.K.U. GROSS^{1,2} — ¹Institut für Theoretische Physik, Freie Universität Berlin, Arnimallee 14, D-14195 Berlin, Germany — ²European Theoretical Spectroscopy Facility (ETSF)

We apply time-dependent density-functional theory to investigate electron transport in various two-dimensional nanostructures. As the first applications we consider (i) the Aharonov-Bohm flow through quantum rings in magnetic fields and (ii) electron pumping.

THU2A.4 12:30 Aula Amaldi

Spin Coulomb Drag — ●SAMVEL BADALYAN^{1,2}, CHANG SUB KIM³, and GIOVANNI VIGNALE⁴ — ¹Department of Radiophysics, Yerevan State University, 1 A. Manoukian St., Yerevan, 375025, Armenia — ²Department of Physics, Institute for Theoretical Physics, 93040 Regensburg, Germany — ³Department of Physics, Chonnam National University, Gwangju 500-757, Korea — ⁴Department of Physics and Astronomy, University of Missouri - Columbia, Missouri 65211, USA

We investigate the spin Coulomb drag (SCD) in a quasi-two-dimensional electron gas beyond the random phase approximation. Our results are in a very good agreement with the experimental findings and verify the observation of SCD.