a suppression of the visibility of the Aharonov-Bohm oscillations at a large source-drain bias $\Delta\mu \gg \hbar v_F/L$, where L is the length of the arms and v_F is the electron drift speed. Our numerical simulations indicate that the visibility of the Aharonov-Bohm oscillations is a non-analytic function of the mutual capacitance strength, in the limit $\Delta\mu \to \infty$.

TT 35.10 Thu 16:30 H 3010

Effect of Magnetic field on edge channel interference in an electronic Mach-Zehnder interferometer — •Leonid Litvin, Andreas Helzel, Peter Tranitz, Werner Wegscheider, and Christoph Strunk — Institute of experimental and applied physics, University of Regensburg, D-93040 Regensburg, Germany

We study an electronic Mach-Zehnder Interferometer (MZI) employing the edge channels of a two-dimensional electron gas in the quantum Hall regime and quantum point contacts as tuneable beam splitters. In this system interference contrast up to 80% can be achieved at low temperatures. Two interferometers with the arm length of 14 and 9 μm were investigated. We found that the interference contrast depends strongly on interferometer size and filling factor. High visibility is restricted to a rather small interval of magnetic field, which approximately ranges from filling factor 2 to 1, with maximum near 1.5. The temperature dependences of visibility taken at fixed magnetic field show exponential damping above ≈45 mK. Below this value the visibility has much weaker T-dependence. This implies that two energy scales are responsible for the decay of visibility.

TT 35.11 Thu 16:45 H 3010

Bulk-edge coupling in the non-abelian $\nu = 5/2$ quantum Hall interferometer — •Bernd Rosenow[1], Bertrand I. Halperin[1], Steven H. Simon[2], and Ady Stern[3] — [1]Physics Department, Harvard University, Cambridge, MA 02138 — [2]Lucent-Alcatel Bell Laboratories, Murray Hill NJ, 07974 — [3]Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot 76100, Israel

Recent schemes for probing non-abelian statistics in the $\nu = 5/2$ quantum Hall effect are based on geometries where current-carrying quasiparticles flow along edges that encircle N_{qp} bulk quasiparticles, which are localized. Here we consider one such scheme, the Fabry-Perot interferometer. In the limit of weak back-scattering, when N_{qp} is even the two back-scattering amplitudes interfere coherently, while when N_{qp} is odd they are incoherent, and thus do not interfere. In the former case, the back-scattered current oscillates with the area of the cell, while in the latter case it does not. This difference reflects the non-abelian nature of the quasiparticles.

In a real system, some degree of coupling between the edge and quasiparticles localized in the bulk is unavoidable. One may suspect that such a coupling would blur the distinction between bulk and edge quasiparticles and endanger the possibility of observing the even-odd effect. We find that at weak coupling the interference signal is indeed degraded, while for strong enough coupling the bulk quasiparticle becomes essentially absorbed by the edge and the even-odd effect survives. Furthermore, we find that the strength of the coupling can be tuned by the source-drain voltage.

15 min. break

TT 35.12 Thu 17:15 H 3010

Critical conductance of a one-dimensional doped Mott insulator — •Markus Garst[1], Dmitry Novikov[2], Ady Stern[3], and Leonid Glazman[2] — [1]Institut für Theoretische Physik, Universität zu Köln, 50938 Köln — [2]Department of Physics, Yale University, New Haven, Connecticut 06520, USA — [3]Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot 76100, Israel

We consider the two-terminal conductance of a one-dimensional Mott insulator close to the commensurate-incommensurate quantum phase transition to a conducting state (arXiv:0708.0545). We treat the leads as Luttinger liquids. At a specific value of compressibility in the leads, corresponding to the Luther-Emery point, the conductance can be computed in terms of a scattering problem of non-interacting fermions with charge $e/\sqrt{2}$. The Mott insulator can be approximated as an effective point scatterer with a strongly energy dependent scattering matrix. At the Luther-Emery point, the temperature dependence of the conductance across the quantum phase transition is then described by a Fermi function. The deviation from the Luther-Emery point in the leads results in an interaction among the fermionic scattering states and changes the temperature dependence qualitatively. In the metallic state, the low-temperature conductance is determined by the properties of the leads, and is described by the conventional Luttinger liquid theory. In the insulating state, conductance still occurs via activation of $e/\sqrt{2}$ charges, and is independent of the Luttinger liquid compressibility.

TT 35.13 Thu 17:30 H 3010

Conductivity of a disordered fermion-gaugefield system — •Thomas Ludwig[1], Igor V. Gornyi[2], Alexander D. Mirlin[2,3], and Peter Woelfle[3] — [1]Instituut-Lorentz, Universiteit Leiden, The Netherlands — [2]Institut fuer Nanotechnologie, Forschungszentrum Karlsruhe, Germany — [3]Institut fuer Theorie der kondensierten Materie, Universitaet Karlsruhe, Germany

We present a discussion of the interaction correction to conductivity in a disordered system of fermions interacting via a Chern-Simons gauge field. To first order in the interaction, we find a large positive Hartree correction to the conductivity. To account for higher orders in the interaction, we discuss effects of dephasing (at high temperatures) and screening (at low temperatures) on the Hartree correction. At sufficiently high temperatures, the Hartree correction is strongly suppressed by dephasing. At very low temperatures, the correction changes its sign to negative due to screening.

TT 35.14 Thu 17:45 H 3010

Quantum Transport in a Multi Particle Triple Quantum Dot — •Pöltl Christina, Emary Clive, and Brandes Tobias — Institut für Theoretische Physik, Hardenbergstr. 36, D-10623 TU Berlin, Germany

It is known that in the transport through triple quantum dot systems so-called dark states can occur [1, 2]. An electron entering such a state is trapped in the quantum dot system due to destructive interference and this leads to a blockade in current. Such states have previously been discussed only in the strong Coulomb blockade regime, where at most one excess electron is present in the system at any one time.

In this contribution, we discuss the effects of relaxing this condition, and permit multiple dot-occupancies. We use an number-resolved master equation approach to calculate the current, noise and counting statistics of the system, and show how the experimentally relevant quantities show a combination of dark-state and multiple-occupancy effects. We also consider signatures of electronic entanglement in the system.

[1] B. Michaelis, C. Emary and C. W. J. Beenakker, Europhys. Lett., 73 (5), pp. 677-683 (2006)

[2] C. W. Groth, B. Michaelis, and C. W. J. Beenakker, Phys. Rev B 74, 125315 (2006)

TT 35.15 Thu 18:00 H 3010

Electron Bunching in Stacks of Coupled Quantum Dots — •Sigmund Kohler[1], Rafael Sánchez[2], Peter Hänggi[1], and Gloria Platero[2] — [1]Institut für Physik, Universität Augsburg — [2]Instituto de Ciencia de Materiales, CSIC, Madrid, Spain

In recent measurements of the electrical current through transport channels that are formed by self-assembled double quantum dots, super-Poissonian noise has been observed [1]. In this system, two physical ingredients seems to play a crucial role, namely Coulomb interaction between electrons in neighbouring transport channels and, as well, the coupling of the electrons to substrate phonons. In a corresponding theoretical analysis [2], we study the transport properties of two double quantum dots in a parallel arrangement, in which the transport channels can block each other. Our results show that phonon emission and absorption, however, can suspend this blocking, which leads to "phonon-induced channel opening". This also affects the shot noise: For asymmetric coupling between the dots and the respective lead, the current noise is sub-Poissonian for resonant tunnelling, but super-Poissonian in the vicinity of the resonances. The both experimentally and theoretically observed asymmetry of the peaks at low temperatures stems from spontaneous emission.

[1] P. Barthold, F. Hols, N. Maire, K. Pierz, and R. J. Haug, Phys. Rev. Lett. **96**, 246804 (2006).

[2] R. Sánchez, S. Kohler, P. Hänggi, and G. Platero, arXiv:0706.2950 [cond-mat].

TT 35.16 Thu 18:15 H 3010

Violation of Wiedemann-Franz Law in a Single-Electron Transistor — •Björn Kubala[1,2], Jürgen König[1], and Jukka Pekola[3] — [1]TP III, Ruhr-Universität Bochum, 44780 Bochum, Germany — [2]Physics Department, ASC, and CeNS, Ludwig-Maximilians-Universität, 80333 Munich, Germany — [3]Low Temperature Labora-