

Final Report for Conference 'Transport in Nanoscopic Systems'

Summary

The conference was held in the Historisches Kaufhaus in Freiburg im Breisgau, Germany, from 1 November to 3 November 2007. It hosted 53 participants, and was partially funded by INSTANS. The organizing board consisted of R. Egger (Düsseldorf), A. Komnik (Freiburg), J. Ankerhold (Ulm) and G. Ingold (Augsburg). The conference brought together the leading experts in the field of nanoscopic transport and reviewed the latest trends. Topics included were current statistics and noise, interaction effects, Josephson current and superconductivity in nanoscale systems, theory of graphene, and field theories of disordered interacting metals. The program consisted of 30 lectures (typically 20 to 30 minutes). In addition, there was ample time for informal discussions at the coffee breaks.

Scientific content

We believe that several highly exciting research topics have come up in the past year that now have reached peak activity. For that reason, we have chosen to organize this conference. The list of topics discussed at the meeting included

- Full counting statistics and quantum noise in interacting systems
- Transport in graphene and carbon nanotubes
- Superconductivity and Josephson transport in nanoscale systems
- Molecular transport
- Field theories of interacting weakly disordered metals

Speaker list

The following speakers gave presentations:

- Markus Büttiker (Geneva): The two particle Aharonov Bohm effect
- Christian Schönberger (Basel): The Mach Zehnder interferometer with edge states
- Rosario Fazio (Pisa/Trieste): Geometric phases and quantum pumping

- Leonid Glazman (Yale, USA): Dynamics of excitations in the 1D Bose liquid
- Helene Bouchiat (Orsay): Magnetic field asymmetry of nonlinear mesoscopic transport
- Alfredo Levy Yeyati (Madrid): Interaction signatures in nanoscale superconducting transport
- Silvano De Franceschi (Grenoble): Control of supercurrent in semiconductor nanowires
- Fabrizio Dolcini (Pisa): Switching the sign of the Josephson current with Aharonov Bohm interferometry
- Ilias Perakis (Heraklion, Greece): Quantum transport in superconducting quantum dots
- Franco Carillo (Pisa): Josephson effect in submicron InGaAs nanostructures
- Alessandro De Martino (Cologne): Magnetic confinement in graphene
- Ines Safi (Orsay): Emission and absorption spectrum in 1D interacting systems
- Peter Talkner (Augsburg): Quantum fluctuation theorems
- Björn Trauzettel (Basel): Momentum detector for nano-electromechanical systems
- Jan van Ruitenbeek (Leiden): From point contact spectroscopy to inelastic electron tunneling spectroscopy
- Abe Nitzan (Tel Aviv): Optical response and heat conduction in molecular junctions
- Charles Stafford (Tucson, USA): Transistors and wires. Quantum transport and stability at the bottom.
- Peter Hanggi (Augsburg): Quantum Brownian Motion and the 3rd law of thermodynamics

- Eli Pollak (Rehovot, Israel): Semiclassics, a route to mesoscopic dynamics?
- Ulrich Weiss (Stuttgart): FCS of charge and Cooper pair tunneling
- Hugues Pothier (Saclay, France): Detection of non-Gaussian noise in Josephson junctions
- Eugene Sukhorukov (Geneva): Stochastic dynamics of a Josephson junction threshold detector
- Jukka Pekola (Helsinki): Observation of shot noise and third moment in Josephson threshold detector
- Sasha Gogolin (Imperial College, London): FCS of Kondo and Anderson impurities
- Sushanta Dattagupta (Bangalore, India): Dissipative diamagnetism
- Hubert Saleur (Paris): Exact results for the interacting resonant level model out of equilibrium
- Gerd Schön (Karlsruhe): Single qubit lasing and cooling at the Rabi frequency
- Yuli Nazarov (Delft): Realistic measurement of non-commuting variables
- Michael Thorwart (Düsseldorf): Current induced domain wall motion
- Herbert Schoeller (Aachen): Renormalization group out of equilibrium