10 Years

Capri Spring School

THE CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

VILLA ORLANDI, ANACAPRI, 2005-2014

FRIAS
FREIBURG INSTITUTE FOR ADVANCED STUDIES
ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG

http://tfp1.physik.uni-freiburg.de/Capri14/

THE CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Taking as the occasion the tenth edition of the Capri Spring School on Transport in Nanostructures (2014), this flyer collects the names of the lecturers and of the students that have contributed to the Schools in the decade 2005-2014 with their presentations of topics at the forefront of the research in nanophysics and nanodevices. The aim of the series was twofold. On the one hand, it was intended to bring together scientists from the areas of semiconductor physics, low temperature metal physics, and chemical physics, working on various types of conducting nanostructures, to discuss advanced experimental techniques and recent theoretical insights. On the other hand, young researchers would have an opportunity to learn about the exciting new developments related to these novel nanoscale electronic and molecular devices and to obtain training in basic theoretical and experimental methods employed in the field. The School is primarily intended to instruct PhD students and young postdocs. In the course of a week, several five hour lectures are delivered by leading experts on transport in nanostructures, supplemented by a few shorter seminars by the partecipants. The speakers are asked to give graduate level presentations introducing to state-of-the-art methods and techniques applied to quantum systems which are technologically particularly relevant in nanoelectronics. Novel discoveries and technological advances in recent years allow the growth or fabrication of nanostructures, such as carbon nanotubes, atomic size contacts, nanoscale Josephson junction circuits, or few electron quantum dots, as well as hybrid devices and newly prepared materials such as graphene or topological insulators. In these systems, not only familiar properties of electrical transport, like Ohm's law, are violated, but new transport effects arise due to the interplay of strong electron–electron interactions, disorder, reduced dimensionality, and quantum mechanical coherence. While fabrication and measurement techniques are often quite different, e.g. for chemically synthesized single molecule bridges, on–chip Josephson junction noise detectors, or quantum wires grown in semiconductor heterostructures, the new quantum phenomena arising from electronic correlations, quantum coherence, disorder, and the influence of the electromagnetic environment are closely related in all nanostructures. In a nutshell, the special focus of each School has been:

2005 Impurities, disorder and correlations in low dimensional systems and Quantum Hall Effect

2006 Quantum noise in nanostructures and counting statistics

2007 Atomic size conductors and break junctions

2008 Graphene and electronic correlations in 1D and 2D materials.

2009 Non equilibrium in quantum transport: theory and experiment

2010 Quantum information and qubits: entanglement and coherence

2011 Topological insulators in various dimensions and topological protection

2012 Superconductive proximity and possible Majorana fermionic excitations

2013 Spin and spin-orbit effects in nanostructures

2014 Celebration conference on the occasion of the tenth Capri Spring School

Outlook

The Capri Spring School has by now been firmly established as a leading teaching event on the condensed matter physics landscape. Originally conceived as teaching event within an EU network (ironically, this network had the title DIENOW) coordinated by Hermann Grabert, we have continued to organize this school for the past ten years. This success story reflects the overwhelming response and the need for such a regular event providing up-to-date teaching on the most recent progress to young doctoral and post-doctoral researchers. Matching "hot topics" with enthusiastic speakers and leading scientists has been among our primary goals. The success of the past ten years keeps us going, and we are looking forward to a fruitful continuation of the CAPRI SPRING SCHOOL during the years to come.

Organizers

HERMANN GRABERT Albert-Ludwig University Freiburg, Freiburg Institute for Advanced Studies

DARIO BERCIOUX Albert-Ludwig University Freiburg & Freiburg Institute for Advanced Studies

DANIEL URBAN Albert-Ludwig University Freiburg & Fraunhofer-IWM

ALESSANDRO DE MARTINO
City University College London

REINHOLD EGGER
Heinrich-Heine-Universität Düsseldorf

ARTURO TAGLIACOZZO
University of Napoli "Federico II" Naples

with the invaluable help of Helga Müller, Helen Pert, Silke Trötschel and Salvatore Verdoliva, famiglia Arcucci.

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Albert-Ludwig University of Freiburg FRIAS, Freiburg Institute for Advanced Studies

University of Napoli, "Federico II"

Heinrich-Heine-Universität Düsseldorf

ESF EuroScience Foundation network "Fundamental of Nanoelectronics" (SpiCo, Spincurrent, SPINTRA) (4th and 5th School)

ESF EuroScience Foundation network INSTANS "Interdisciplinary Statistical and Field Theory Approaches to Nanophysics and Low Dimensional Systems" (4th and 5th School)

ICAM "Institute for complex adaptive matter" (6th school)

Istituto Italiano di Studi Filosofici, Napoli (3rd School)

The venue has been Villa Orlandi in Anacapri, a Conference Center of the University of Napoli "Federico II". This is a house on top of the Capri island, in local architectural style, originally founded in the '700 and subsequently expanded in the '800. It is surrounded by a small garden with a porch and doric columns, hosting lemon and orange trees, agaves and mediterranean scrub, with a view on the gulf of Napoli.

1ST CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 3 - 10, 2005

Carlo Beenakker (Leiden): Shot noise and full counting statistics

Gerrit Bauer (Delft): Spintronics

Carlo Di Castro (Rome): Low dimensional disordered conductors

Karsten Flensberg (Copenhagen): Molecular electronics

Andrei Komnik (Heidelberg): Quantum impurity problems in one-dimensional metals

Allan MacDonald (Austin): Quantum Hall effect

Francesco Petruccione (Durban): Quantum information processing with nanostructures

Hugues Pothier (Saclay): Dephasing and relaxation in disordered nanowires

Arturo Tagliacozzo (Naples): Kondo and Fano resonances

Amir Yacoby (Harvard): Experimental study of electrons confined to one dimension

Participants

Babak Abdollahi, Institute for Advanced Studies in Basic Sciences, Ministry of Science, Research & Technology, Lionel Angers, Laboratoire de Physique des Solides, CNRS, Matthias Baenninger, Cavendish Laboratory, University of Cambridge, COLLECT,Jens H Bardarson, Instituut Lorentz ,University Leiden, Gerrit Bauer, Kavli Institute of Nanoscience Delft, Delft University of Technology, Carlo Beenakker, Instituut-Lorentz for Theoretical Physics, University of Leiden, Devis Bellucci, INFM - S3 and Dipartimento di Fisica, Universitá di Modena e Reggio Emilia, Colin Benjamin, Universitá degli Studi di Salerno,Dipartimento di Fisica E. R. Caianiello, Erasmus Bieri, Institute of Physics, University of Basel, Pierre Billangeon, Laboratoire de Physique des Solides - U. Paris-Sud ,CNRS, Matthias Braun, Institut für Theoretische Physik III ,Ruhr-Universität Bochum, Roberta Citro, Dipartimento di Fisica, Universitá di Salerno, Massimiliano Colarieti Tosti, IFM - Theoretical Physics, Linköping University, Lukong Cornelius Fai, University of Dschang, Cameroon, Faculty of Sciences, University of Dschang, Jean-Francois Dayen, Ecole Polytechnique LSI, CNRS, CEA, Alessandro De Martino, Imperial College, London, Department of Mathematics, Carlo Di Castro, Dipartimento di Fisica, Universita di Roma, Fabrizio Dolcini, Freiburg, Univ. Freiburg, Reinhold Egger, Institut für Theoretische Physik IV, HHU Düsseldorf, Karsten Flensberg, Niels Bohr Institute, University of Copenhagen, Jean-Noël Fuchs, Laboratoire de Physique des Solides, University Paris-Sud, F-91405 Orsay, Alexander Gogolin, Imperial College, London, Hermann Grabert, Freiburg ,Univ. Freiburg, Alexander Grishin, School of Physics and Astronomy, University of Birmingham, Vladimir Gritse, Department of Physics, University of Fribourg, Frank Grossmann, Institute for Theoretical Physics, TU Dresden, Gunnar Gunnarsson, Institut für Physik, Uni Basel, NCCR, Max Hofheinz, DRFMC/SPSMS/LCP, CEA Grenoble, Benjamin Huard, Groupe Quantronique, SPEC, CEA Saclay, Ning Kang, Fachbereich Physik ,Universität Konstanz, Andrei Komnik, Freiburg ,Univ. Freiburg, Wolfgang Körner, Physikalisches Institut, Univ. Freiburg, Jasper Llewelyn Seisa Loverio, Department of Physics, National University of Singapore, Procolo Lucignano, Dipartimento di scienze fisiche, Universitá Federico II Napoli, Anders Mathias Lunde, Niels Bohr Institute, Ørsted Laboratory, Allan MacDonald, Department of Physics ,University of Texas at Austin, Santanu K., Maiti, Saha Institute of Nuclear Physics, Mohammad Ali Maleki, Institute for Advanced Studies in Basic Sciences, Ministry of Science, Research and Technology, Leonhard Mayrhofer, Institute of Theoretical Physics, Universität Regensburg, Ghadir Mohammadkhani, Institute for Advanced Studies in Basic Sciences, Ministry of Sciences, Research and Technology, Christophe Mora ,Institut für Theoretische Physik IV, Heinrich-Heine-Universität, Tommi Nieminen, Low Temperature Laboratory, Helsinki University of Technology, Stefan Oberholzer, Institute of Physics, University of Basel, Vittorio Peano, Theoretische Physik IV, Heinrich Heine Universität Düsseldorf, Francesco Petruccione, School of Pure and Applied Physics, University of KwaZulu-Natal, Durban, Hugues Pothier, Groupe Quantronique, SPEC , CEA Saclay, Marcelo Rozenberg, Laboratoire de Physique des Solides, CNRS, Thomas Schmidt, Freiburg,Univ. Freiburg, Francesco Siano, Imperial College, London, Department of Mathematics, Izak Snyman, Instituut Lorentz, University Leiden, Hadar Steinberg, Weizmann Institute of Science, Deparment of Condensed Matter Physics, Arturo Tagliacozzo, Dipartimento di scienze fisiche, Universitá Federico II Napoli, Michael Thorwart, Theoretische Physik IV, Heinrich Heine Universität Düsseldorf, Mihajlo Vanevic, Department of Physics and Astronomy, University of Basel, Pauli Virtanen, Low Temperature Laboratory, Helsinki University of Technology, Stephan Weiss, Theoretische Physik IV, Heinrich-Heine Universität Düsseldorf, Amir Yacoby, Weizmann Institute of Science, Deparment of Condensed Matter Physics, Iryna Yakymenko, Department of Physics and Measurement Technology, Linkoping University, Oleg Zaitsev, Institute for Theoretical Physics, University of Regensburg, Oren Zarchin , Weizmann Institute of Science

2ND CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 2 - 9, 2006

Joachim Ankerhold (Freiburg): Josephson Junctions as Detectors of Electrical Noise

Markus Büttiker (Geneva): Scattering Matrix Approach to Charge Fluctuations

Richard Deblock (Orsay): Emission/Absorption asymmetry in the quantum noise of a Josephson junction

Toshimasa Fujisawa (NTT): Counting statistics of single-electron transport through a double quantum dot

Christian Glattli (Paris): Shot Noise as a Probe of Conduction Mechanisms

Leonid Levitov (MIT): Electrical Noise in Nanostructures

Yuli Nazarov (Delft): Circuit Theory and Quantum Transport

Stefan Oberholzer (Basel): Shot noise and Hanbury-Brown and Twiss-type experiments in electronic devices

Hugues Pothier (Saclay): Measuring noise with a Josephson junction

Patrik Recher (Stanford): Signatures of Tomonaga-Luttinger liquid behavior in shot noise of a carbon nanotube

Bertrand Reulet (Orsay): Measurements of third moment of current or voltage fluctuations

Gerd Schön (Karlsruhe): Noise and Decoherence

Christian Schönenberger (Basel): Quantum Noise in Low-Dimensional Conductors

Ulrich Weiss (Stuttgart): Counting statistics of open point-contact tunneling

Participants

Dario Bercioux, Institut für Theoretische Physik, Universität Regensburg, Erasmus Bieri, Institute of Physics, University of Basel,Pierre Billangeon, Laboratoire de Physique des Solides, University Paris-Sud, Valentina Brosco, Physics Department, NEST-INFM, University of Pisa, Jonas Bylander, MC2, Chalmers University of Technology, Olivier Coupiac, SPSMS, CEA, Alessandro De Martino, Institut für Theoretische Physik IV, Heinrich-Heine-Universität Düsseldorf, Richard Deblock, Laboratoire de Physique des Solides, C.N.R.S., Luca Dell 'Anna, Max-Planck-Institut für FKF, Stuttgart, Max-Planck-Gesellschaft, Charles Doiron, Institut für Physik, Universität Basel, Toshimasa Fujisawa, NTT Basic Research Laboratories, NTT Corporation, Thomas Geiger, Institute for Experimental and Applied Physics, University of Regensburg, Benjamin Huard, Groupe Quantronique / SPEC, CEA Saclay, Tammy Humphrey, Department of Theoretical Physics, University of Geneva, Kyryl Kazymyrenko, SPEC, CEA Saclay, Wolfgang Körner, Universität Freiburg, Michael Krieger, Kamerlingh Onnes Lab., Institute of Physics, Universiteit Leiden, Leonid Litvin, Institut für Experimentelle und Angewandte Physik, Universität Regensburg, David Marcos, Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Ciencia fisicas, Jens Michelsen, Institute of micro-technology and nano-science, Chalmers Univeristy of Technology, Tomas Novotny, Nano-Science Center, University of Copenhagen, Teemu Ojanen, Low Temperature Laboratory, Helsinki University of Technology, Andreas Osterloh, Institut für Theoretische Physik, Universität Hannover, Hugues Pothier, Quantronics group, SPEC, CEA-Saclay, Bertrand Reulet, Laboratoire de Physique des Solides, University Paris-Sud, Javier Sabio, Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas, Thomas Schmidt, Department of Mathematics, Imperial College, London, Cesar Seoanez, ICMM (Materials Science Institute of Madrid), CSIC, Francesco Siano, Mathematics Department, Imperial College London, Izak Snyman, Instituut Lorentz, Universiteit Leiden, Andrey Timofeev, Helsinki University of Technology, Low Temperature Laboratory, Lars Tornberg, Chalmers, microtechnology and nanoscience, Daniel Urban, Phys. Institut, Univ. Freiburg, Ulrich Weiss, 2. Institute of Theoretical Physics, University of Stuttgart, Markus Weiss, Institute of Physics, University of Basel, David Humphrey, Oxford, Fabrizio Dolcini, Universität Freiburg, Joachim Ankerhold, Michele Büttiker, Markus Büttiker, Christian Glattli, Leonid Levitov, Yuli Nazarov, Stefan Oberholzer, Gerd Schön, Christian Schönenberger, Hermann Grabert, Arturo Tagliacozzo, Szabolcs Csonka, Department of Physics , Budapest University, Patrik Recher, Ines Safi, Procolo Lucignano, Domenico Giuliano, Maria Luisa Della Rocca, Alvise Verso

3RD CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, March 25 - March 31, 2007

Alexander Altland (Cologne): Disordered Conductors and Chaotic Scattering

Piet Brouwer (Cornell): Quantum Transport and its Classical Limit

Andras Halbritter (Budapest): Investigating nanojunctions with break junction technique and Andreev spectroscopy

Chris Van Haesendonck (Leuven): Scanning probe microscopy for measuring local electrical and magnetic properties

Alfredo Levi Yeyati (Madrid): Modelling of Atomic Size Conductors

Elke Scheer (Konstanz): Spin-Dependent Transport in Metallic Point Contacts

Charles Stafford (Tucson): Stability and Symmetry Breaking in Metal Nanowires

Alexei Tsvelik (Brookhaven): Quantum Transport in Integrable Models

Jan van Ruitenbeek (Leiden): Atomic sized conductors: atoms, chains of atoms, and molecole

Cristian Urbina (Saclay): Andreev States in Atomic Size Contacts

Dinner Seminar by **Antonio Barone (Naples):** Josephson effect in Naples ("Theoretically I am an experimentalist")

Participants

Alexander Altland, Yaroslaw Bazaliy, Instituut Lorentz, Leiden University, Dario Bercioux, Physikalisches Institut, Albert-Ludwigs-Universität, Freiburg, Tobias Böhler, Universität Konstanz, Physik AG Scheer, Oksana Boyko, Peter Bozsoki, Physics Department, Lancaster University, Piet Brouwer, Vittorio Cataudella,University of Naples, Alexander Croy, Max-Planck-Institut für Physik komplexer Systeme, MPG, Szabolcs Csonka, Nanocenter Basel and Institute of Physics, University of Basel, Magdalena Czapkiewicz, Institute of Physics Polish Academy of Sciences, Cardinal S. Wyszynski University, Jeroen Danon, Kavli Institute of Nanoscience, TU Delft, Anna Dari, University of Perugia, Alessandro De Martino, Institut für Theoretische Physik IV, Heinrich-Heine-Universität Düsseldorf, Alexandre Faribault, Institute for Theoretical Physics, University of Amsterdam, Axel Freyn, DSM / DRECAM / SPEC,CEA Saclay, Hans Fritz, Institut für Physik, Universität Freiburg, Attila Geresdi, Department of Physics, Budapest University of Technology and Economics, Domenico Giuliano, University of Cosenza, Hermann Grabert, Institut für Physik, Universität Freiburg, Andras Halbritter, Moosa Hatami, Delft University of Technology, Kavli Institute of Nanoscience Delft, Peter Henseler, Physikalisches Institut, Universität Bonn, Krzysztof Kolwas, Institute of Physics Polish Academy of Sciences, Cardinal S. Wyszynski University, Marten Kopp, Dept. of Physics, Lancaster University, Joern Kupferschmidt, Laboratory of Atomic and Solid State Physics, Cornell University, Andreas Lassl, Institut für Theoretische Physik, Universität Regensburg, Quentin Le Masne, Quantronics Group / CEA Saclay, CEA, Alfredo Levi Yeyati, Maria Longobardi, Geneva, Procolo Lucignano, University of Naples, Peter Makk, Budapest University of Technology and Economics, Department of Physics, Dmytro Makogon, Theoretical Physics Department, Utrecht university, Vincenzo Marigliano Ramaglia, University of Naples, Christian Martin, Leiden Institute of Physics, Leiden University, Geraldine Morin, Université de Toulouse, Paolo Papari, University of Naples, Stefano Pugnetti, Scuola Normale Superiore di Pisa, Olivier Schecker, Fachbereich Physik / IMEP, Universität Konstanz(D) / MINATEC Grenoble(F), Thomas Schmidt, Institut für Physik, Universität Freiburg, Charles Stafford, Arturo Tagliacozzo, Oren Tal, Leiden University, Leiden Institute of Physics, Daniel Urban, Physikalisches Institut, Univ. Freiburg, Annika Urban, Cristian Urbina, Chris van Haesendonck, Jan van Ruitenbeek, Carsten von Zobeltitz, Institut für Theoretische Physik Leibniz Universität Hannover, Michael Wolz, Fachbereich Physik, Universität Konstanz, Zheng Ming Wu, Department of Physics, University of Basel, Oleksandr Zozulya, Institute for theoretical physics, University of Amsterdam

4TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, March 30 - April 6, 2008

Adrian Bachtold (Barcelona): Experiments on electron transport and electromechanics in nanotubes

Carlo Beenakker (Leiden): Mesoscopic physics of graphene

Klaus Ensslin (Zürich): Experiments with graphene: fabrication, characterization and electronic properties

Leonid Glazman (Yale): One-Dimensional Fermions and Bosons Outside the Luttinger Liquid Picture

Takis Kontos (Paris): Quantum transport in hybrid structures based on carbon nanotubes

Thierry Martin (Marseille): Transport and noise in chiral and non-chiral Luttinger liquids

Cristiane de Morais Smith (Utrecht): Zooming-in on the Quantum Hall Effect

Alexei Tsvelik (Brookhaven): Electron fractionalization in 1D and 2D strongly correlated materials

Participants

Christopher Allen, University of Leeds, Adrian Bachtold, University of Barcelona, Fabio Baruffa, Univ. Napoli / Regensburg, Institut Theoretische Physik Universität Regensburg, Carlo Beenakker, University of Leiden, Michal Bek, Institute of Molecular Physics, PAS, Intsitute of Molecular Physics, Polish Academy of Sciences, Dario Bercioux, Univ. Napoli / Freiburg, Physikalisches Institut Albert-Ludwigs-Universität, Barbara Broda, Poznan Univ. of Technology, Institute of Physics Faculty of Technical Physics, Claudio Cacciapuoti, Napoli / Czech Technical Univ., Prague, Czech Republic, Graham Creeth, University of Leeds, School of Physics and Astronomy, Franz Czeschka, Walther-Meissner-Institut, Bayerische Akademie der Wissenschaften TU München, Pino D'Amico, Institut for Theoretical Physics ,Institut I, Universität Regensburg, Cristiane de Morais Smith, University of Utrecht, Thomas Delattre, LPA, ENS Paris, Laboratoire Pierre Aigrain Departement de Physique, Antonella Di Trapani, ESF, Susanne Dröscher, ETH Zürich, Laboratory for Solid State Physics Nanophysics group, Reinhold Egger, HHU Düsseldorf, Mark Elkin, University of Leeds, Department of Physics and Astronomy, Klaus Ensslin, ETH Zürich, Cheryl Feuillet-Palma, LPA, ENS Paris, Petra Fries, Universität Würzburg, Physikalisches Institut, Lehrstuhl für Experimentelle Physik III, George Giavaras, Lancaster University, UK, Leonid Glazman,Yale University, Hermann Grabert, University of Freiburg, Sophie Gueron, Universite Paris Sud, Orsay, Johannes Güttinger, ETH Zürich, Laboratory for Solid State Physics Nanophysics group, Jan C. Hammer, University of Konstanz, Department of Physics, Kostyantyn Kechedzhi, Lancaster University, Physics Department, Sonja Koller, Universität Regensburg, Takis Kontos, LPA, ENS Paris, Ze'ev Lindenfeld, Tel-Aviv University, Jerusalem, Israel, Procolo Lucignano, University of Naples, CNR-INFM Coherentia and Dipartimento di Scienze Fisiche Universitá Federico II Napoli, Magdalena Marganska, University of Regensburg, Vincenzo Marigliano Ramaglia, University of Naples, Dipartimento di Scienze Fisiche Universitá di Napoli "Federico II", Thierry Martin, University of Marseille, Gabriel Niebler, University Prague / TU Dresden, Department of Condensed Matter Physics, Charles University, Claudia Ojeda, Univ. Paris-Sud, Orsay, Laboratoire de Physique des Solides, Carmine Antonio Perroni, University of Naples, Universita' "Federico II" Napoli and Coherentia CNR-INFM, Fabio Santandrea, University of Goteborg, Department of Physics, Andreas Schulz, HHU Düsseldorf, Gustav Sonne, Gothenburg University, Eleonora Storace, MPI Stuttgart,Max-Panck-Institute for Solid State Research, Arturo Tagliacozzo, University of Naples, Yury Tarakanov, Chalmers Univ. of Technology, Department of Applied Physics, Alexei Tsvelik, Brookhaven National Lab., Daniel Urban, University of Freiburg, Physikalisches Institut, Albert-Ludwigs-Universität, Peter Waechter, University of Göttingen, Marnix Wakker, Delft University, Michael Wimmer, University of Regensburg, Institut für Theoretische Physik, Bernhard Wunsch, Univ. Complutense de Madrid, Departamento de Fisica de Materiales Spain, Alex Zazunov, HHU Institut für Theoretische Physik IV

5TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, March 29 - April 5, 2009

Alexander Altland (Köln): Classical nonequilibrium

Natan Andrei (Rutgers): Nonperturbative methods I

Michel Devoret (Yale): Experiments out of equilibrium I

Benjamin Doyon (London): Nonperturbative methods II

Alex Kamenev (Minnesota): Keldysh technique

Elke Scheer (Konstanz): Experiments out of equilibrium II

Michael Thorwart (Freiburg): Numerical methods out of equilibrium

Participants

Alexander Altland, Universität Köln, Natan Andrei, Rutgers University, New Jersey, Remi Avriller, Universidad Autonoma de Madrid, Departamento de Fisica Teorica de la materia condensada, Julien Basset, Universite Paris Sud, Laboratoire de Physique des solides, Daniel Becker, University of Hamburg, Institute for Theoretical Physics, Andrei Ciprian Berceanu, Universiteit Leiden, Dario Bercioux, Freiburg Institute for Advanced Studied, Physikalisches Institut, Albert-Ludwigs-Universität, Alexander Branschädel, Universität Karlsruhe, Hamilton Carrillo, Universiteit Antwerpen, Department of Physics, Sung Chao, Rutgers University, Alessandro De Martino, University of Cologne, Department of Theoretical Physics, Michel Devoret, Yale University, New Haven, Benjamin Doyon, Durham University, Reinhold Egger, HHU Düsseldorf, Institut für Theoretische Physik IV, Amir Erez, Ben Gurion University, Regine Frank, Universität Bonn, Physikalisches Institut Bonn, Ion Garate, University of Texas at Austin, Hermann Grabert, Universität Freiburg, Emanuel Gull, ETH Zürich - Columbia University, Federica Haupt, Konstanz University, Department of Physics, Jens Honer, Universität Stuttgart, II Institut für Theoretische Physik, Bertalan Horvath, Budapest Univ. of Technology, Department of Theoretical Physics, Alina Hriscu, TU Delft, Alex Kamenev, University of Minnesota, Matti Laakso, Low Temperature Laboratory, TKK, Procolo Lucignano, University of Napoli, Sarah Macleod, Helsinki University of Technology, Low Temperature Laboratory, PICO-Group, Stefan Maier, Heidelberg University, Institut für Theoretische Physik, Stephan Mandt, University of Cologne, Department of Physics, Vincenzo Marigliano Ramaglia, Universitá di Napoli, Dipartimento di Scienze Fisiche, Monica Morales, University of Leiden, Kamerlingh Onnes Laboratory, Peter Nalbach, Universität Freiburg, Freiburg Institute for Advanced Studies – FRIAS, Thanh Nguyen, The Adbus Salam ICTP, Condensed Matter, Emiliano Pallecchi, Ecole Normale Superieure Paris, Vincenzo Parente, Universitá di Napoli Federico II, Korbinian Paul, LMU München, Chair for Theoretical Condensed Matter Physics, Vittorio Peano, HHU Düsseldorf, Institut für Theoretische Physik IV, Milton E. Pena Aza, University of Gothenburg ,Department of Physics, Francesco Romeo, Universitá di Salerno, Dipartimento di Fisica, Elke Scheer, Universität Konstanz, Jörg Schelter, University of Würzburg, Mesoskopische Physik, Institut für Theoretische Physik, Walter Schirmacher, TU München, Physik-Department E13, Marco Schirom, International School for Advanced Studies, SISSA, Andreas Schulz, HHU Düsseldorf, Institut für Theoretische Physik IV, Sergey Smirnov, Universität Regensburg, Spyros Sotiriadis, University of Oxford, Rudolf Peierls Centre for Theoretical Physics, Arturo Tagliacozzo, University of Naples, Tomohiro Taniguchi, University of Tsukuba and NRI-AIST, National Institute of Advanced Industrial science and technology, Michael Thorwart, FRIAS, Universität Freiburg, Andrea Tomadin, Scuola Normale Superiore Pisa, Anna Toth, Budapest University of Technology and Economics, Department of Theoretical Physics, Daniel Urban, University of Freiburg, Physikalisches Institut, Albert-Ludwigs-Universität, Kevin van Hoogdalem, University of Basel, Department of Physics, Raphael Van Roermund, CEA Grenoble - INAC,CEA Grenoble - INAC/SPSMS/GT, Nina Winkler, Universität Duisburg-Essen, Theoretische Physik

6TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 11 - April 18, 2010

Rainer Blatt (Innsbruck): Quantum Information Science with Trapped Ions

Ignacio Cirac (Munich): A Quantum Information Perspective of Quantum Many-Body Systems

Daniel Esteve (Saclay): Readout of quantum information in Josephson qubits: readout fidelity, backaction, QND character and entanglement

Fabrizio Illuminati (Salerno): Entanglement, quantum information and collective phenomena in quantum spin systems

Daniel Loss (Basel): Spin Qubits in Nanostructures

John Martinis (Santa Barbara): Superconducting Phase Qubits: Qudits, Arbitrary Photon States, and Bell's Inequality

Thierry Martin (Marseille): Entanglement and noise in nanoscale devices with propagating electrons

Robert Silbey (MIT): Energy and Charge Transport in Molecular Aggregates: the effects of coherence and static and dynamic disorder with applications to photosynthetic light harvesting complexes

Participants

Ferdinand Albrecht, Universität Freiburg, Stephan Andre Universität Karlsruhe ,Institut für Theoretische Festkörperphysik Universität Karlsruhe, Dario Bercioux, Universität Freiburg, Freiburg Institute for Advanced Studies – FRIAS, School of Soft Matter Research, Rainer Blatt, Innsbruck University, Antoni Borras, Delft University of Technology, Kavli Institute of Nanoscience, Gregory Bulnes Cuetara, Université Libre de Bruxelles, Pablo Burset, Universidad Autonoma de Madrid, Departamento de Fisica Teorica de la Materia Condensada C-V, Facultad de Ciencias, Ignacio Cirac, MPQ Garching, Andreas Dewes, CEA Saclay, Nicolas Didier, Scuola Normale Superiore Pisa, Reinhold Egger, Institut für Theoretische Physik, Heinrich Heine Universität Düsseldorf, Erik Eriksson, University of Gothenburg, Department of Physics, Daniel Esteve, CEA Saclay, Tobias Frey, ETH Zurich, Solid State Physics Laboratory, Alexander Glätzle, Universität Innsbruck, Christoph-Marian Goletz, Technische Universität Dresden, Institut für Theoretische Physik, Hermann Grabert, Universität Freiburg, Vera Gramich, Universität Ulm, Institut für Theoretische Physik, Roland Hützen, Heinrich-Heine-Universität Düsseldorf, Institut für Theoretische Physik IV, Sarah Heizmann, Universität Basel, Departement Physik, Lukas Hofstetter, Universität Basel, Fabrizio Illuminati, Universitá di Salerno, Werner Koch, Technische Universität Dresden, Institut für Theoretische Physik, Arijit Kundu, Heinrich-Heine University Düsseldorf, Institute for Theoretical Physics IV, Martin Leib, TU München, Daniel Loss, Universität Basel, Thierry Martin, Université Marseille, John Martinis, Univ. of California, Santa Barbara, Tomi Paananen, Heinrich-Heine University Düsseldorf, Institut für Theoretische Physik IV, Carmine Antonio Perroni, Universitá Federico II Napoli, Stefano Pugnetti, Scuola Normale Superiore, Pisa, Andres Alejandro Reynoso, Niels Bohr Academy, Copenhagen, Jan Roden, MPIPKS Dresden, Simeon Sauer, Universität Freiburg, Physikalisches Institut, AG Buchleitner, Benedikt Scharf, Universität Regensburg, Institut I - Theoretische Physik, Maximilian Schultz, Universität Basel, Departement Physik, Sebastian Smerat, LMU München, Department für Physik, Henning Soller, Universität Heidelberg, Institut für Theoretische Physik, Arturo Tagliacozzo, University of Naples, Malte Tichy, Universität Freiburg, Physikalisches Institut, Daniel Urban, Universität Freiburg, Juha Voutilainen, Helsinki University of Technology, Stephan Weiss, Niels-Bohr Institute, Copenhagen, Nano-Science Center, Dmitry Yudin, MPQ Garching, Robert Zielke, Universität Basel, Departement Physik

7TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 10 - April 17, 2011

Piet Brouwer (Berlin): Topological quantum pumps & Signatures of topological superconducting states on transport

Marcel Franz (Vancouver): Surface phenomena in topological insulators

Laurens Molenkamp (Würzburg): Quantum spin-Hall effect in HgTe quantum wells

Joel Moore (Berkeley): Introduction to topological phases of electrons in solids

Shoucheng Zhang (Stanford): Overview of topological insulators and superconductors

M. Zahid Hasan (Princeton): Experimental discoveries: Topological Surface States

Participants

Inanc Adagideli, Sabanci University, FENS, Turkey, Mireia Alos Palop, Kavli Inst. of Nanoscience Delft, Delft University of Technology, Dario Bercioux, FRIAS, Univ. Freiburg, Landry Bretheau, CEA – Saclay, Piet Brouwer, FU Berlin, Jan Budich, Universität Würzburg, Fabian Craes, University of Cologne, II. Physikalisches Institut, Fabrizio Dolcini, Politecnico di Torino, Dipartimento di Fisica, Kasper Duivenvoorden, Universität Köln, Institute of Theoretical Physics, Anna Dyrdal, Adam Mickiewicz University, Poznan, Department of Physics, Mesoscopic Physics Division, Reinhold Egger, Universität Düsseldorf, Vitaly Emets, Aalto University, Marcel Franz, Univ. of British Columbia, Vancouver , Sebastien Giraud,Universität Düsseldorf, Hermann Grabert, FRIAS, Univ. Freiburg, Christoph Groth, CEA Grenoble, SPSMS-INAC-CEA, Wolf-Rüdiger Hannes, Heriot-Watt University, Edinburgh, School of Engineering and Physical Sciences, Zahid Hasan, Princeton University, Federica Haupt, RWTH Aachen, Institut fÜr Theoretische Physik A, Jelena Klinovaja, University of Basel, Department of Physics, Viktor Krückl, Universität Regensburg,Institut für Theoretische Physik, Arijit Kundu, Institut für Theoretische Physik IV, Heinrich-Heine-Universität, Lucia Lenz, Universität Freiburg, Physikalisches Institut, Procolo Lucignano, CNR-SPIN Napoli, Dipartimento di Scienze Fisiche Universita Federico II Napoli, Luis Maier, University of Würzburg ,Experimentelle Physik 3, Physikalisches Institut, Stefan Maier, Heidelberg University, Institute for Theoretical Physics, Antonio Mezzacapo, Universitá di Napoli, Mario Michan, Univ. of British Columbia, Paolo Michetti, University of Würzburg, Institut für Theoretische Physik und Astrophysik, Laurens Molenkamp, Universität Würzburg, Joel Moore, Univ. of California, Berkeley, Vincenzo Parente, Universitá Federico II, Napoli, Dipartimento di Scienze Fisiche, Alessandro Puri, INFN, Bolsena, Laboratori Nazionali di Frascati, Marek Rataj, Adam Mickiewicz University, Poznan, Department of Physics, Mesoscopic Physics Division, Benedikt Scharf, Universität Regensburg, Institut I - Theoretische Physik, Martin Schneider, FU Berlin, Institut für Theoretische Physik, Sebastian Schramm, Universiteit Leiden, Edouard Sonin, Hebrew Univ. of Jerusalem, Racah Institute of Physics, Israel, Doru Sticlet, LPS, Universite Paris Sud, Laboratoire de Physique des Solides, Anders Ström, University of Gothenburg, Francesco Tafuri, SUN Napoli, Arturo Tagliacozzo, Universitá di Napoli, Daniel Urban, Physikalisches Institut, Albert-Ludwigs-Universität Freiburg, Pauli Virtanen, University of Würzburg, Institute for Theoretical Physics and Astrophysics, Michael Wimmer, Universiteit Leiden,Instituut Lorentz, Alex Zazunov, Universität Düsseldorf,Institut für Theoretische Physik IV, Shoucheng Zhang, Stanford University

8TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 15 - April 22, 2012

Rosario Fazio (Pisa): Geometric phases and quantum pumping

David Goldhaber-Gordon (Stanford): Unconventional Josephson Effect in Hybrid Superconductor-Topological Insulator Devices

Francisco Guinea (Madrid): General overview of graphene physics

Philippe Joyez (Saclay): Probing the DOS in proximity systems

Charles Marcus (Harvard): Proximity effect in InAs nanowires

Ady Stern (Weizmann): Majorana fermions in super-conductors and quantum Hall systems

Participants

Simon Abay, Chalmers University of Technology, Göteborg, Quantum Device Physics Laboratory Microtechnology and Nanoscience, Dario Bercioux, Freiburg Institute of Advanced Studies, FRIAS, Andrew Bestwick, Stanford University, Vincent Bouchiat, Neel Institute, CNRS, Grenoble, Aldo Brunetti, Heinrich Heine Universität- Düsseldorf, Institut für Theoretische Physik IV, Sophie Charpentier, Chalmers University of Technology, Göteborg, Department of Microtechnology and Nanoscience, Roberta Citro, Dep. of Physics, Universitá di Salerno, Bastien Dassonneville, Univ. Paris Sud, Orsay,Laboratoire de Physique des Solides, Samuel d'Hollosy, Departement Physik, Universität Basel, Reinhold Egger, Heinrich-Heine-Universität, Omar El Araby, Université de Fribourg, Christopher Espy, Universität Konstanz, Fachbereich Physik, Rosario,Fazio,Scuola Normale Superiore, Pisa, Ion Cosma Fulga, Lorentz Institute, Leiden University, Gergo Fulop, Budapest University of Technology and Economics, Department of Physics, Luca Galletti, Universitá degli Studi di Napoli Federico II, Dip. Scienze Fisiche, Simone Gasparinetti, Low Temperature Laboratory Aalto University, Espoo, Finland, David Goldhaber-Gordon, Stanford University, Diego Gonzalez Olivares, Universidad Autonoma de Madrid, Hermann Grabert, Freiburg Institute of Advanced Studies, Marine Guigou, Institut für Theoretische Physik, Universität Würzburg, Francisco Guinea, Instituto de Ciencia de Materiales de Madrid, Andreas Heimes, TFP, Karlsruhe Institute of Technology, Institut für Theoretische Festkörperphysik, Cecilia Holmqvist, Universität Konstanz, Fachbereich Physik, Anders Jellinggaard, University of Copenhagen, Philippe Joyez, CEA-Saclay, Carolin Küppersbusch, Institut für Theoretische Physik, Universität Köln, Iryna Kulagina, Norwegian Univ. of Science and Technology, Trondheim, Department of Physics, NTNU, Martin Leijnse, Niels Bohr Institute, University of Copenhagen, Peter Makk, Budapest University of Technology and Economics, Charles Marcus, Harvard University, William Armando Munoz, Universiteit Antwerpen, Peter O` Malley, University of California, Santa Barbara, Physics Department, Christoph Ohm, Institute for Quantum Information, RWTH Aachen, Physikzentrum, Mika Oksanen, Low Temperature Laboratory, Aalto, Sebastian Pfaller, Universität Regensburg, Falko Pientka, Freie Universität Berlin, Fachbereich Physik, Dmitry Pikulin, Instituut-Lorentz, Universiteit Leiden, Rolf Reinthaler , Institut für Theoretische Physik, Universität Würzburg, Maria-Theresa Rieder, Freie Universität Berlin, Fachbereich Physik, Pedram Roushan, University of California, Santa Barbara, Department of Physics, Henning Soller, Universität Heidelberg, Ady Stern, Weizmann Institute of Science, Arturo Tagliacozzo, Universitá degli Studi di Napoli Federico II, Daniel Urban, Universität Freiburg ,AG Grabert, Physikalisches Institut, Luzie Weithofer, Mathematische Physik, TU Braunschweig

9TH CAPRI SPRING SCHOOL ON TRANSPORT IN NANOSTRUCTURES

Capri, April 07 - April 14, 2013

Tomasz Dietl (Warsaw): Spin-related transport phenomena in low dimensional magnetic semiconductors

Karsten Flensberg (Copenhagen): Spins and spin-orbit coupling in carbon nanotubes

Tomas Jungwirth (Prague): Spin Hall and spin-torque phenomena

Jansaku Nitta (Sendai): Spin transport affected by spin-orbit interaction

Felix von Oppen (Berlin): Majorana fermions in spin-orbit coupled quantum wires

Klaus Richter (Regensburg): Spin-dependent transport in mesoscopic systems

Participants

Sahib Babaee Tooski, Institute of Molecular Physics Polish Academy of Sciences, Dario Bercioux, FRIAS, Daniel Bucheli, Universitá di Roma, La Sapienza, Dipartimento di Fisica, Daniel Cox, Low Temperature Lab, Aalto University, Alessandro De Martino, Department of Mathematical Science, City University London, Dhananjay Dhokarh, Laboratoire de Physique des solides University of Paris, Sud Orsay, Tomasz Dietl, Polish Academy of Sciences, Reinhold Egger, Theoretische Physik IV, Uni Düsseldorf, Sven Essert, University of Regensburg, Institut für Theoretische Physik, Luke Fleet, Imperial College London, Department of Materials, Karsten Flensberg, The Niels Bohr Institute, Florian Geissler, University of Würzburg, Hermann Grabert, Freiburg Institute for Advanced Studies, Jörg Gramich, University of Basel, Department of Physics, Thomas Hasler, University of Basel, Andreas Inhofer, FRIAS Freiburg Institute for Advanced Studies, Stefan Jürgens, Universität Würzburg, Tomas Jungwirth, Academy of Sciences of the Czech Republic, Lukasz Karwacki, Adam Mickiewicz University, Department of Physics, Thomas Keevers, University of Sydney, School of Physics, Denis Klöpfer, Institut für Theoretische Physik IV, Heinrich Heine Univ. Düsseldorf, Maria Longobardi, University of Geneve, Procolo Lucignano, CNR Spin Napoli, Shlomi Matityahu, Ben-Gurion University of the Negev, Amin Naseri Jorshari, Institut für Theoretische Physik IV, Heinrich-Heine-Universität Düsseldorf Jansaku Nitta, Tohoku University, Baris Pekerten, Sabanci University, Istanbul, Helen Pert, FRIAS, Sebastian Putz, University of Regensburg, Institut I - Theoretische Physik, Alireza Qaiumzadeh, Norwegian University of Science and Technology (NTNU), Department of Physics, Klaus Richter, University of Regensburg, Saber Rostamzadeh, Sabanci University, Orta Mahalle, -Istanbul, Bjoern Sbierski, FU Berlin, Fachbereich Physik, Linnea Schätzle, FRIAS Freiburg Institute for Advanced Studies, Zoltán Scherübl, Budapest, Andrew See, University of New South Wales, Australia, Quantum Electronic Devices Group, School of Physics, Ruben Seoane Souto, Universidad Autonoma de Madrid, Pasquale Sodano, International Institute of Physics_UFRN, Natal, Brasil, Philipp Stegmann, University Duisburg-Essen, Richard Steinacher, ETH Zürich, Nanophysics group, ETH Zurich, Solid State Physics Laboratory, Martin Stier, I. Institut für Theoretische Physik, Universität Hamburg, Arturo Tagliacozzo, University of Naples, Juan Enrique Vazquez Lozano, Universidad de Sevilla, Departamento de Fisica Aplicada II, Felix von Oppen, Freie Universität, Krzysztof Wojcik, Adam Mickiewicz University in Poznan, Department of Physics, Fei Xu, University of Konstanz, Fachbereich Physik, Jakub Zelezny, Faculty of Mathematics and Physics, Charles University in Prague

10 Years

ANNIVERSARY WORKSHOP ON TRANSPORT IN NANOSTRUCTURES

10TH CAPRI SPRING SCHOOL 2014

Capri, April 28 – May 03, 2014

ALEXANDER ALTLAND (Cologne)

CARLO BEENAKKER (Leiden)

PIET BROUWER (Berlin)

CHRISTIAN GLATTLI (Saclay)

PHILIPPE JOYEZ (Saclay)

ALFREDO LEVY YEYATI (Madrid)

ALLAN MACDONALD (Austin)

CHARLES MARCUS (Kopenhagen)

THIERRY MARTIN (Marseille)

JOHN MARTINIS (Santa Barbara)

YULI NAZAROV (Delft)

JOHN QUINN (Knoxville)

HUBERT SALEUR (Saclay/Los Angeles)

CHRISTIAN SCHÖNENBERGER (Basel)

PASQUALE SODANO (Natal)

MICHAEL THORWART (Hamburg)

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