

International workshop on:

Bound states in superconductors and interfaces (BOSSA)

Date and place:

8-10 April 2019, Max Planck Institute, Dresden (Germany)

Scientific coordinators:

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Aim of the event:

Recent tunneling studies for quantum impurities/dots coupled to superconducting bulk materials have revealed such phenomena as: (i) tunable quantum phase transition between the BCS-like and singly occupied states [responsible for the $0-\pi$ transition in Josephson junctions], (ii) unusual relationship between the subgap Kondo effect and electron pairing, (iii) non-local processes due to the crossed Andreev reflections (or Cooper pair splitting), (iv) dynamical transitions driven by a.c. fields, quantum quench effects, and many other. Main purpose of this workshop is to bring together experts of the Andreev and/or Josephson spectroscopies to exchange information about the state-of-art techniques and reliable computational methods for analysis of the bound states in various heterostructures, which are important for fundamental science and future technological applications. The workshop will give an opportunity for younger scientists to become acquainted with fundamental properties of the bound states and their exotic mutations, e.g. in topological materials.

List of the confirmed invited speakers (in alphabetic order):

- S. Andergassen (Universität Tübingen, Germany)
„Magneto-electric spectroscopy of Andreev bound states in Josephson quantum dots”
- A.V. Balatsky (Los Alamos National Lab, USA)
„Universal bound states in Dirac materials”
- A. Baumgartner (University of Basel, Switzerland)
„Electron spectroscopy of Andreev type bound states in carbon nanotubes and semiconducting nanowires”
- W. Belzig (University of Konstanz, Germany)
„Manipulating superconductivity by spin-active interfaces”
- A.Black-Schaffer (Uppsala University, Sweden)
„Majorana fermions using magnetic impurities in spin-orbit coupled superconductors”
- M.S. Choi (Korea University, Seoul, Korea)
„New quantum phase transition from triad interplay of Kondo effect, magnetism, and superconductivity”

- R. Egger (Heinrich-Heine-Universität, Düsseldorf, Germany)
„Topological Kondo effect from Majorana bound states”
- R. Deblock (Université Paris Sud, France)
„Josephson effect in a carbon nanotube: $0-\pi$ transitions and high frequency emission”
- S. de Franceschi (CEA Grenoble, France)
„Magnetic properties of Andreev states in hybrid superconductor-semiconductor nanowire”
- J. König (Universität Duisburg-Essen, Germany)
„Unconventional superconductivity in quantum-dot systems”
- E. Lee (Universidad Autónoma de Madrid, Spain)
„Andreev states in hybrid superconductor-semiconductor quantum dots”
- A. Levy Yeyati (Universidad Autónoma de Madrid, Spain)
„Andreev bound states formation and quench dynamics revealed by time-dependent counting statistics”
- R. Lutchyn (University of California, USA)
„Coulomb blockade effect in proximitized nanowires”
- V. Meden (Aachen University, Germany)
„Josephson current through the Anderson quantum dot with superconducting leads”
- R. Mélin (Institut Néel, Grenoble, France)
„Floquet-Wannier-Stark-Andreev viewpoint for three-terminal Josephson junctions”
- T. Meng (Technische Universität Dresden, Germany)
„Yu-Shiba-Rusinov bound states: topological dynamics”
- Y.V. Nazarov (Delft University of Technology, Netherlands)
„Novel topologies in superconducting junctions and nanostructures”
- T. Novotný (Charles University, Prague, Czech Republic)
„Perturbation theory for a correlated quantum dot attached to superconducting leads”
- J. Nygård (Niels Bohr Institute, University of Copenhagen, Denmark)
„Spectroscopy of subgap states in coupled hybrid quantum dots”
- J. Paaske (Niels Bohr Institute, University of Copenhagen, Denmark)
„Yu-Shiba-Rusinov states in quantum dots”
- H. Pothier (CEA Saclay, France)
„Andreev bound states in superconducting weak links”
- Ch. Strunk (Universität Regensburg, Germany)
„Andreev bound states and spin-orbit interaction in InAs-based Josephson junctions”
- C.B. Winkelmann (Institut Néel, Grenoble, France)
„Bound states in superconductors: density of states and Josephson coupling”
- A. Zaikin (Karlsruhe Institute of Technology, Germany)
„Andreev levels as a quantum dissipating environment”