EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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COST Action no. MP1201 2012 | 2016

Nanoscale Superconductivity (NanoSC)

Novel Functionalities through Optimized Confinement of Condensate and Fields

Objectives

- Superconducting nanostructures and the relation between their quantized state & T_c
- Interface superconductivity and electrical field effects
- Application of nanomodulated templates, originally developed for fluxon confinement, for making new photonic metamaterials
- Fluxonics devices based on vortex manipulation, Josephson junctions and arrays
- Nanopatterned superconductors and superconductor-based hybrids
- New superconducting devices
- Nanostructured multiband superconductors
- Novel nanoscale mechanisms for superconductivity (theory)
- Enhancing direct visualization techniques
- Power applications of nanostructured superconductors and new fabrication techniques

Working Groups

- WG 1: Design and fabrication of NanoSC
- WG 2: Characterization of NanoSC
- WG 3: Modeling of NanoSC
- WG 4: SME & Industry relations
- WG 5: Action management

Main Achievements

Organizational:

- European Virtual Institute –EVI
- 33 Publications with explicit acknowledgements to the MP1201 COST Action (2014)
- Organization of 1 training school (Vortex VIII), 1 workshop & 1 conference

Scientific :

- Experimental confirmation of duality between a Josephson junction and a superconducting nanowire governed by quantum fluctuations
- Reducing vortex creep in YBCO nanocomposite by local strain effects
- Materials challenges for coated conductors for power applications have been revised
- Effects of pressure up to 30 GPa on superconducting properties of YB6, the superconductor with Einstein lattice
- New unexpected effect of the vortex attraction in hybrid superconductor / ferromagnet system has been predicted
- Relation discovered between unconventional junctions, topological insulators and Majorana fermions

Gender Balance and Early Stage Researcher

- The total % female gender balance: 21% (start), 27% (2013), 25% (2014)
- Good progress regarding female percentage contribution to the project during year 2, indicating that the actions taken within the consortium are starting to be fruitful.
- Status ESR: 7 STSM's (2013) ; 7 STSM's (2014 – incomplete) / 11 new PhD theses
- 33 ESR's @ Vortex VIII, 13 ESR's @ Workshop 2014, 22 ESR's @ Conference 2014

Dissemination

- Dedicated web site with EVI
- Superconductivity News Forum (SNF) - article
- The European Researcher's Night and the Week of Science (Kosice)
- Superconductivity - the waltz of the electrons [Excerpts on Austrian TV].
- Abstract books, Vortex VIII proceedings & USB stick with presentations (training school)

Materials, Physics & Nanosciences (MPNS)

Participating countries: 22

AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, GR, HR, IL, IT, NL, NO, PL, PT, SI, SK, TR, UK

Internat. Collaboration:

AU, BR, CN, JP

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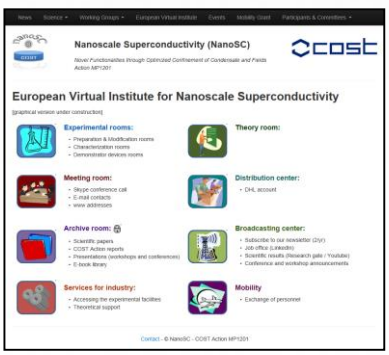

Fig. European Virtual Institute (EVI)

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