

COST

Domain Committee " MPNS "

COST Action MP1201

Start Date 19-10-2012

Nanoscale Superconductivity (NanoSC)
Novel Functionalities through Optimized Confinement of Condensate and Fields

MONITORING PROGRESS REPORT

Reporting Period:

from 19-10-2012 to 01-08-2013

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report*** prepared by the COST Office/Grant Holder
- II. Scientific Report*** prepared by the Chair of the Management Committee of the Action
- III. Previous versions of the Scientific Report; i.e., part II of past reporting periods***

The report is a "cumulative" report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.D. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year's budget allocation.

Executive summary (max.250 words): COST Action MP1201 – NanoSC at present includes 19 signatory COST countries and 4 non-COST members, which all together involve about 150 researchers from physics, chemistry and engineering disciplines. In the first (incomplete) year, we had the kick-off meeting in Brussels (19/10/2012), followed by a Start-up meeting in Leuven (10-12/04/2013). At this moment, a first training school is to be held in Rhodes (about 120 participants, 21-26/09/2013). During the start-up meeting in Leuven, we organized and streamlined the Action's activities (training school), work package activities (future workshops), methods for collaboration, the web page with the European Virtual Institute (EVI), the STSM application method and the gender and young scientist's issues. For all mentioned topics, well defined conclusions and bench marks were put forward. A lot of effort has been devoted to the organization of the future VORTEX VIII conference in Rhodes, Greece. A first version of the EVI – Web page has been developed, and will be launched during the VORTEX VIII conference, forming an instrument for collaboration. The STSM's are starting up slowly, but after VORTEX VIII, we expect here a substantial boost for this activity.

I. Management Report prepared by the COST Office/Grant Holder



I.A. COST Action Fact Sheet

- **COST Action MP1201 - Nanoscale Superconductivity: Novel Functionalities through Optimized Confinement of Condensate and Fields (NanoSC -COST)**
- **Domain Materials, Physical and Nanosciences (MPNS)**

- **Action details:**

CSO Approval: (07/06/2012)

End date: (18/10/2016)

Entry into force: (04/07/2012)

Extension: (day/month/year)

- **Objectives** (from DB as in About COST)

The world has just celebrated the 100 years of discovery of superconductivity by Kamerlingh Onnes. Superconducting materials are of special interest in the XXI century since they provide new energy saving solutions for electricity grids, transport, metrology, information / communication technologies, and healthcare. This COST Action will coordinate and strengthen scientific and technological collaboration in the field of superconductivity in Europe through a variety of organizational tools, assuring leadership in this field. It will cover fundamental issues as well as explore possible novel applications important for European industries. This Action will also contribute to innovation-based growth in the field of superconductivity aimed at overcoming the existing bottlenecks for widespread industrial applications of nanostructured superconducting materials. The key novel approach here is to exploit recent spectacular progress in design and fabrication of nanostructured superconductors, in order to develop and implement such flux and condensate confinement patterns, which not only substantially improve the superconducting critical parameters, but also lead to novel functionalities of these nanopatterned materials. Due to the advanced dedicated modern technologies needed to produce nanostructured superconductors, international and interdisciplinary collaboration is essential for a successful implementation of the objectives for the NanoSC-COST Action.

- **Parties:** list of countries and date of acceptance

Austria (20/08/2012)	Germany (12/07/2012)	Slovakia (27/08/2012)
Belgium (13/06/2012)	Greece (27/11/2012)	Slovenia (27/06/2013)
Czech Rep. (18/09/2012)	Italy (02/08/2012)	Spain (21/06/2012)
Denmark (04/07/2012)	Netherlands (27/08/2012)	Sweden (in process)
Estonia (20/06/2012)	Norway (30/08/2012)	Switzerland (16/07/2012)
Finland (15/08/2012)	Poland (12/10/2012)	United Kingdom (13/06/2012)
France (27/07/2012)		

- **Intentions to accept:** Sweden / Israel

- **Other participants:**

(Institution Name, Country, Town)

Institute for Superconducting and Electronic Materials - University of Wollongong, **Australia**, Wollongong - Prof. Alexey V PAN

Unfortunately, we received 27/06/2013 from the Australian Academy of Science the following message: "The funding for this financial year was fully expended at the end of March.

Currently, we do not have any funding for next financial year. We may not know until late-June/early-July if we receive any funds from the Government to offer this grant in FY2013-14."

Departamento de Física, Universidade Federal de Pernambuco, **Brasil**, Pernambuco, Prof. Jose Albino AGUIAR

Institute of Physics Chinese Academy of Sciences - Physics faculty, **China**, Beijing, Prof. Xianggang QIU (*confirmation pending*)

Institute of Materials Science - University of Tsukuba, **Japan**, Tsukuba, Prof. Kazuo KADOWAKI

Graduate School of Engineering, Osaka Prefecture University, **Japan**, Osaka, Prof Takekazu ISHIDA (*confirmation pending*)

Chair:

Prof Victor MOSHCHALCOV

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DC Rapporteur: (*name, institution, address, phone, e-mail*)

DC Rapporteur will be appointed/confirmed only at the next DC meeting in September (10-12/09) in Iceland

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<http://www.kuleuven.be/inpac/cost/EVI.php>

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• **Working Groups** (list of WGs and names and affiliations of participants)

For a full list of participants see: http://www.kuleuven.be/inpac/cost/host_institutes.php
 From the practical point of view, during the start-up meeting in Leuven, all MC members emphasized the importance for a strong collaboration between WG1-3.

Working Group 1: Design and fabrication of new SC nanostructures
 Coordination by H. Suderow

Participants:

Names	Affiliations
H. Suderow (thin films of low T _c superconductors)	Universidad Autonoma de Madrid
W. Lang (thin film of high T _c superconductors)	University of Vienna
K. Arutynov (nanofabrication)	University of Jyväskylä
D. Roditchev (UHV island growth)	Universite Pierre et Marie Curie 6, Paris
T. Puig (chemical routes)	ICMAB, CSIC, Barcelona
J. Karpinski (single crystals)	EPFL, Lausanne
V.V. Moshchalkov (nanopatterned LTSC)	KU Leuven

Working Group 2: Characterisation
 Coordination by S. Bending

Participants:

Names	Affiliations
S. Bending (Coordinator)	University of Bath, UK
V.V. Moshchalkov (STM, SHPM, SNOM)	KU Leuven, Belgium
PF Samuely (STM, HPM, PCS, ac microcalorimetry)	Kosice, Slovakia
Suderow (STM, PPMS)	UAM, Spain
Woerdenweber (HCCSF, HFSC)	FZ Juelich, Germany
Tafari (I-V, dI/dV-V, TROPSS)	(Naples, Italy)
Roditchev (STM)	(Paris, France)

Working Group 3: Modeling tools
 Coordination by A. Buzdin

Participants

Names	Affiliations
A. Buzdin (Coordination, superconductor/ferromagnet systems)	University of Bordeaux, France
F. Taddei (Theory of quantum transport in hybrid systems)	(NEST, NANO-CNR) Pisa, Italy
Y. Galperin (Vortex matter in superconductors, hybrid mesoscopic devices)	University of Oslo, Norway
J. Tempère (Quantum simulators on the basis of cold gases)	University of Antwerp, Belgium

Working Group 4: SME's/Industry relations - demonstrator devices
 Coordination by F. Tafuri

Participants

Names	Affiliations
F. Tafuri (Coordination)	Second University of Napoli
R. Sobolewski (detectors)	Institute of Electron Technology
N.F. Pedersen (general applications)	Norwegian University of Science and Technology
T. Puig (HTSC coatings/films)	Institut Ciencia de Materials de Barcelona

Working Group 5: Coordination, dissemination & teaching-actions
Coordination by J. Vanacken

All MC members will be strongly involved with this WG5. Below are only some keystone scientists mentioned with their specific functions

Participants

Names	Affiliations
J. Vanacken (General management WP5 + website)	KU Leuven
T. Puig (Gender balance issues)	ICMAB-CSIC
P. Samuely (STSM management)	Slovak Academy of Sciences
R. Wördenweber (Dissemination activities)	FZ Jülich



I.B. Management Committee member list

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Dr I. MAGGIO-APRILE	Switzerland	ivan.maggio-aprile@unige.ch
Prof S. BENDING	United Kingdom	pyssb@bath.ac.uk
Prof. P.A.J. DE GROOT	United Kingdom	pajdeg@phys.soton.ac.uk



I.C. Overview activities and expenditure

Total Action Budget 2013: 118.030 €
Eligible costs till 12.07.2013: 21.898,04 €

Meetings 2012

Meeting Type	Date	Place	Participants	Cost	Total
Kick-off Meeting	19.10.2012	Brussels, Belgium	16	9.395,73	
				Total	9.395,73

Meetings 2013

Meeting Type	Date	Place	Participants	Cost	Total
Work group Meeting	11.04.- 12.04.13	Leuven, Belgium	17/19	12.502,31	
				Total	12.502,31

Total: 21.898,04 €

Note that the biggest activity, Vortex VIII is planned in September 2013, with an estimated budget of €60.000 (as agreed by the MC and described in the minutes of the Brussels kick-off and Leuven Start-up meetings).

Furthermore, we are also expecting additional invoices for the web site design, and the planned (still year 2013) STSM's.

II. Scientific Report

II.A. Innovative networking

- *Innovative knowledge resulting from COST networking through the Action. (Specific examples of Results vs. Objectives)*

The innovative research within COST-Action MP1201 has been focussed around the following objectives:

Objective 1: Individual superconducting nanostructures and in particular the relation between their quantized states and T_c 's:

Example/Result: Zero-bias anomaly in a single layer have been observed by STM in superconducting 2H-TaSe₂ (Galvis et al.)

Example/Result: Superconductivity near transition to insulating state in MoC ultrathin films have been studied by subkelvin STM (Szabó et al.)

Objective 2: Application of nanomodulated templates originally developed for fluxon confinement in superconductors for making new photonic metamaterials

Example/Result: Magnetic near-field distributions have been mapped in the vicinity of plasmonic nanoantennas (Denkova et al.)

Example/Result: Collaboration with national networking program "consolider ingenio 2010". The group of Madrid has found peculiar zero bias anomaly in single layers of TaSe₂ (PRB 87 094502 (2013)). This is also a result of a close national collaboration within the networking program "consolider ingenio 2010", headed by E. Coronado, and on which F. Guinea is also involved. The expertise from COST members in superconductivity will lead to new advances in interface superconductivity in future.

Objective 3: Fluxonics devices based on vortex manipulation, Josephson junctions and arrays

Example/Result: Vortex ratchet devices based on controlled edge roughness have been investigated (Cerbu et al.)

Example /Result: Current lines crowding effects in superconducting corner-shaped Al microstrips have been studied (Adami et al.)

Objective 4: Nanopatterned superconductors (SC) and superconductor-based hybrids (triplet superconductivity and proximity effects, SC/ferro, SC/insulator, SC/metal hybrids)

Example/Result: Band structure of magnetic excitations in the vortex phase of a ferromagnetic superconductor has been investigated (Buzdin et al.)

Example /Result: Nanofabrication approaches to YBCO film model systems (S/F hybrid systems (YBCO/Co) have been applied (Puig et al.)

Objective 5: Power application of nanostructured superconductors and new fabrication techniques

Example/Result: 50 nm YBCO thin films with extreme high critical current densities have been grown by chemical solution deposition in order to nanopattern them in form of nanowires in collaboration between ICMAB-CSIC (Spain) and U. Napoli (Italy)

Example /Result: Chemical approaches to nanostructured YBCO films and coated conductors have been developed followed by e-beam and FIB patterning (Puig et al.)

Objective 6: Enhancing Direct Visualization Techniques

Example/Result: The group of Madrid will make a collaborative effort to improve visualization techniques at high magnetic fields. A CIG FP7 proposal regarding STM measurements in topical superconductors has been granted.

Example /Result: A new technique for local mapping of dissipative vortex motion has been developed (Raes et al.)

- *Significant scientific breakthroughs as part of the COST Action. (Specific examples)*

Example/Result: A significant modulation of the critical current in YBCO thin films with pronounced maxima at vortex matching fields has been demonstrated. The films were patterned with an antidot array by masked ion beam structuring. (Lang et al., to be presented at VORTEX VIII)

Example/Result: Strain-driven broken twin boundary coherence in YBa₂Cu₃O_{7- δ} nanocomposite thin films have been demonstrated by correlating high resolution scanning electron microscopy and transport currents directed in different crystallographic directions (Puig et al., submitted to publication)

Example/Result: Guided vortex motion in $\text{YBa}_2\text{Cu}_3\text{O}_7$ thin films with collective ratchet pinning potentials has been fully evaluated by nanopatterning the films with e-beam and FIB with different geometrical configurations (Puig et al., submitted to publication)

Example/Result: Pinning investigations of solution-derived $\text{YBa}_2\text{Cu}_3\text{O}_7$ nanocomposite films with Ba_2YTaO_6 secondary phases demonstrate the relevance of nanosize nanoparticles for improved superconducting properties (Puig et al., submitted to publication)

Example/Result: High T_c nanostructures, nanowires and nano-junctions; studies on phase diffusion and macroscopic quantum effects in NbN and YBCO Josephson junctions; increase of J_c and photoresponse in HTS nanowires; phase slip events; unconventional junctions, topological insulators and Majorana fermions (Tafari et al.)

- *Tangible medium term socio-economic impacts achieved or expected. (Specific examples)*
 - It has been demonstrated that the effect of quantum phase slips in superconducting nanowires can be used for building the quantum standard of electric current. Such a standard will dramatically affect the metrology improving the accuracy of a large class of electronic devices.
 - Superconducting nanocomposites grown by chemical solutions represent a low-cost high-performance material for coated conductors production. This is a key material for the EUROTAPES project, NMP3-LA-2012-280432, where most of European CC companies participate
 - HTS nanowires may be of some impact as photo-detectors
 - production schemes towards long length coated conductors grown from chemical solutions in collaboration with the ICMAB spin-off company OXOLUTIA.
- *Spin off of new EC RTD Framework Programme proposals/projects. (List)*
 - Proposal: MARIE CURIE ACTIONS [Not Granted]
Marie Curie Initial Training Networks (ITN), Call: FP7-PEOPLE-2013-ITN, "VORTEXMATTERS"
Nanoscale imaging to understand the physics of vortex matter in superconductors
Multi-Partner ITN
 - ExtremeFieldImaging, Direct Imaging of the limiting effects for high field superconductivity: flux line patterns in conventional and unconventional superconductors, FP7-PEOPLE-2013-CIG. PI: I. Guillamón
 - T. Klapwijk, ERC-AG, METIQUM: Mesoscopic THz imaging of Quantum Matter.
- *Spin off of new National Programme proposals/projects. (List)*
 - Polish National Science Center: Competition HARMONY 4 (2013): Research Projects Carried out in the Framework of International Cooperation, Proposal title: Superconductor/Ferromagnet Nanostructures: Physics and Photon Counting Applications, Proposal PI: Roman Sobolewski, Proposal duration: 3 years
 - Collaboration: Institute of Electron Technology, Warsaw, Poland and CNR-SPIN, Complesso Universitario di Monte Sant'Angelo, Napoli, Italy—both teams are members of COST Action MP1201.
 - Síntesis y caracterización de superconductores nanoestructurados, Project SANTANDER-UAM 2013. PI: H. Suderow
 - a research proposal on 'superspintronics' was granted by the Leiden-Delft 'Nanofront' consortium. This brings one new staff member and a new PhD student into the Action.
 - *French ANR projects:* "Ultra-sensitive nanoprobe for the exploration of electric charge distributions in superconductors" (COST participants: D. Roditchev and A. Buzdin).
 - "Majorana and Andreev States in Hybrid Circuits combining Spin-active and Superconducting Materials" (COST participants: J. Meyer and A. Buzdin).
 - Bilateral project between Comisión Nacional de Energía Atómica, Bariloche, Argentina and IEP SAS Košice, Slovakia, 2013 / 2014. Spectroscopic properties of strongly-correlated electronic systems with competing orders. Project coordinators Yanina Fasano/Z. Pribulová.

- Project of SAS grant agency, Superconductors with nonconventional pairing. Coordinated by J. Kacmarcik, 2013-15
- Project of the Slovak R&D Agency Progressive materials with competing order parameters 2012-2014. Coordinated by P. Samuely
- Project Centre for Advanced Materials and Technologies of the EU Structural Funds, funded by 20 MEuro to build up an infrastructure incl. that of our Centre of Low Temperature Physics 2013-2015. Samuely responsible for research
- The N. Cabrera Institute (<http://www.nicolascabrera.es/index.php/es/investigacion/coloquios>) has started innovative local colloquium, following the high energy physics community of Madrid, with a significant involvement of experts in superconductivity, also from members of COST action.

II.B. Inter-disciplinary networking

- *Additional knowledge obtained from working with other disciplines within the COST framework. (Specific examples)*
 - MP1006 FPQP – Fundamental Problems in Quantum Physics
Contacts with Prof. W. T. Coffey (Ireland)/ Y. Kalmykov (France)
 - Collaboration between some COST partners and the existing EU project EUROTAPES generate interdisciplinarity knowledge in the more applied field of long length production of artificially nanostructured coated conductors and its benefits to power applications.
- *Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide scientific impacts. (Specific examples)*
 - Due to the advanced dedicated modern technologies needed to produce nanostructured superconductors, international and interdisciplinary collaboration is essential for a successful implementation of the objectives for the NanoSC-COST Action (Tafari et al.)
 - Development of well-defined novel superconducting materials and nanostructured superconductors. The only way to ensure that the parameters and nanostructuring of these novel superconducting structures can fulfil the requirements of practical applications is to exploit interdisciplinary boundaries and generate ideas and results covering the full chain of materials development, from design to fabrication, to analysis, testing, and device integration.
- *Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide socio-economic impacts. (Specific examples)*
 - At this moment (1th year) it is rather early stage of the collaboration between the partners in this COST Action to do this evaluation concisely.

II.C. New networking

- *Additional new members joining the Action during its life.*

Greece (27/11/2012), Slovenia (27/06/2013), Sweden (in progress), Israel (intentions by prof. Tsindlekht)
 Within the COST-Action countries, several **nodes have been added** : Units of Napoli, Salerno, Roma and Pisa, A. Pautrat (Caen), Maniv (Israel), E Coronado (Valencia) F. Guinea and JJ Palacios (Spain), JP Brison and D Aoki (Grenoble), prof. Grajcar (Comenius university in Bratislava), Thierry Klein and C. Marcenat (Inst. Neel CNRS Grenoble), Prof. Jose M. Colino García (Facultad de Ciencias Ambientales y Bioquímica, Universidad de Castilla-La Mancha, Spain)

- *Total number of individual participants involved in the Action work. (Number of participants. Give % of female and of Early Stage Researcher participants)*

Status Gender balance MC teams (survey provided by T. Puig – Gender balance coordinator):

- We have evaluated the gender balance at the beginning of the Project and at this 1 year period. Global numbers suggest that NANOSC-Cost is progressing with respect to gender balance. At the beginning of the project, the Consortium total female percentage was 14% and this has increased up to 17% in one year. These numbers are still low but in good agreement with the particular field

of solid-state physics.

- If one evaluates the different positions, we obtain that for all cases (staff, postdocs, PhD students and technicians), the global Consortium numbers have increase in 1 year. Staff female percentage has raised from 9 to 13%, postdocs from 21 to 26 %, PhD students from 14 to 17 % and technicians from 22 to 23 %.

Status Gender balance: (survey provided by J. Vanacken – VORTEX VIII organizer)

- 105 male and 27 female participants

Status ESR involvement: Vortex VIII – school:

- 33 ESR's on a total of 132 participants

- *Involvement of Early Stage Researchers in the Action, in particular with respect to STSMs, networking activities, and Training Schools. In addition, justification should be provided if less than 4 STSMs were carried out during the year.*

The following STSM's are still planned in the year 2013, but are not included in the expenditure sheet:

1. Dr. Ramon Iglesias, post-doc at the University of Santiago de Compostela

wants to visit KU Leuven, Moshchalkov's lab

2. Dr. Tomas Samuely, postdoc from Kosice will visit KU Leuven, Moshchalkov's lab

project approved by STSM panel

3. Dr. Prasanna Kulkarni, post doc from Universidad Autonoma de Madrid/Hermann Suderow will visit Kosice for 1 week sfg
4. Dr. Zuzana Pribulova, postdoc from Kosice wants to visit Institut Neel Grenoble(Olivier BOURGEOIS)/Thierry Klein for 1 week
5. Michal Žemlička, PhD student from Comenius University Bratislava/prof. Grajcar wants to go to Institut Neel Grenoble(Olivier BOURGEOIS)/Olivier Buisson for 2 weeks
6. Mr. Juan Carlos González, PhD student from ICMAB-CSIC (Spain) will visit the group of Maggio-Aprile in Geneva for 1 week. Project: STM spectroscopic measurements of ultrathin complex oxides films of LSMO and YBCO in the high/low resistive states of the metal-insulator transition.

- *Involvement of researchers from outside of COST Countries. (Number of participants from non-COST Countries approved by the CSO. Give % of such participants from countries with reciprocal agreements. Specify their contribution)*

Status outside COST Countries involvement: Vortex VIII – school: Australia: 2 ; Brazil: 16 ; China: 2 ; Israel: 3 ; Japan: 6 ; Russia: 1 ; Sweden: 1 ; Tunisia: 2 ; Ukraine: 2 ; USA: 12.

- *Advancement and promotion of scientific knowledge through publications and other outreach activities. (Number of publications and other outreach activities that resulted from COST networking through the Action. Complete list should be given in an annex)*

Annex 1: List of publications

Number of invited talks given by members of the MC: 41 (a list can be provided on request)

Diploma theses: Lukas Prochaska ; Georg Zechner, Igor Lyakhov, Bart Raes, Gufei Zhang,

COST Action MP1201 poster at EUCAS

- *Activities and projects with COST network colleagues.*

- a start was made with a collaboration between research groups in Leiden and Salerno on the specific problem of Long Range Proximity effects using the stripe phase of thick Permalloy films.
- Visit of Dr. John Durrell (Univ. Cambridge, UK) to University of Vienna 24.-25.6.2013
- The Group from Bordeaux (A. Buzdin) together with a Group from Madrid (H. Suderow) plan to investigate the role of the current on the spectra of the vortex core.
- Collaboration with node Jülich (Roger Wördenweber). Microwaves measurements on YBCO nanowires
- Collaboration with node CSIC (Teresa Puig). Patterning of YBCO films by chemical route
- Collaboration with node Chalmers (Floriana Lombardi, Sweden joining COST). Josephson junction employing barriers of topological insulators
- There is an ongoing research project with COST network by Linder with colleague Prof. Sudbø about controllable 0- π transitions in antiferromagnetic Josephson junctions.

- Joint experiments on measurements of noise in ultranarrow superconducting nanowires, governed by quantum fluctuations, between University of Jyväskylä (K. Arutyunov) and Aalto University (P. Hakkonen).

- *The capacity of the Action members to raise research funds.*

See above:

Spin off of new EC RTD Framework Programme proposals/projects. (List)

Spin off of new National Programme proposals/projects. (List)

III. Previous scientific report(s)

Part II of past periods' reports are to be found here.

None

1. Regular papers with explicit COST Action MP1201 acknowledgement

Vortex ratchet induced by controlled edge roughness

Cerbu, D.; Gladilin, V. N.; Cuppens, J.; et al.

NEW JOURNAL OF PHYSICS 15 (2013) 063022

Scanning tunneling microscopy in the superconductor LaSb₂

Galvis, J. A.; Suderow, H.; Vieira, S.; et al.

PHYSICAL REVIEW B 87 (2013) 214504

Resolving the effects of frequency-dependent damping and quantum phase diffusion in YBa₂Cu₃O_{7-x} Josephson junctions

Stornaiuolo, D.; Rotoli, G.; Massarotti, D.; et al.

PHYSICAL REVIEW B 87 (2013) 134517

Time-resolved optical response of all-oxide YBa₂Cu₃O₇/La_{0.7}Sr_{0.3}MnO₃ proximitized bilayers

Parlato, L.; Arpaia, R.; De Lisio, C.; et al.

PHYSICAL REVIEW B 87 (2013) 134514 [PI-It]

Scanning tunneling measurements of layers of superconducting 2H-TaSe₂: Evidence for a zero-bias anomaly in single layers

Galvis, J. A.; Rodiere, P.; Guillamon, I.; et al.

PHYSICAL REVIEW B 87 (2013) 094502

Proximitized NbN/NiCu nanostripes as new promising superconducting single-photon detectors

G. P. Pepe, L. Parlato, C. Bonavolontà, M. Valentino, C. De Lisio, R. Cristiano, M. Ejrnaes, H. Myoren, and R. Sobolewski, in Photon Counting Applications IV; and Quantum Optics and Quantum Information Transfer and Processing, ed. by I. Prochazka, J. Flurasek and R. Sobolewski,

Proc. of SPIE, 8773, 87730G-1-8 (2013) [PI-It]

Time-dependent Ginzburg-Landau equations for rotating and accelerating superconductors

Pavel Lipavský, J. Bok, Jan Kolářček

Physica C 492 (2013) 144-151

Specific heat study of superconductivity in Cu_{0.061}TiSe₂

J. Kačmarčík, Z. Pribulová, V. Soltészová, P. Husaníková, G. Karapetrov, V. Komanický, and P. Samuely

Acta Physica Polonica A 2014

Local magnetometry of Cu_{0.064}TiSe₂

Z. Pribulova, Z. Medvecká, J. Kačmarčík, V. Komanický, T. Klein, P. Husaníková,

V. Cambel, J. Šoltýs, G. Karapetrov, and P. Samuely

Acta Physica Polonica A 2014

Superconductivity near transition to insulating state in MoC ultrathin films studied by subkelvin STM

P. Szabó, P. Neilinger, M. Trgala, M. Grajcar, and P. Samuely,

Acta Physica Polonica A 2014

Influence of pressure on superconductivity in YB₆

S. Gabania, G. Pristas, I. Takacova, K. Flachbart, E. Gazo, T. Morib, D. Braithwaite, P. Samuely

Acta Physica Polonica A 2014

Heat capacity of single-crystal Cu_xTiSe_2 superconductors

J. Kacmarcik, Z. Pribulov, V. Paluchova, P. Szabo, P. Husanikova, G. Karapetrov, and P. Samuely
Phys. Rev. B, accepted

M. Sindler, R. Tesar, J. Kolacek, P. Szabo, P. Samuely, V. Haskova, C. Kadlec, F. Kadlec and P. Kuzel,
Infrared electrodynamics of thin superconducting NbN in magnetic field, to be published

2. Other Publications in regular journals [collaboration ID]:

Quantum phase slip phenomenon in ultra-narrow superconducting nanorings

K. Yu. Arutyunov, T. T. Hongisto, J. S. Lehtinen, L. I. Leino, and A. L. Vasiliev
Nature: Sci. Rep. 2 (2012) 293

Flux exclusion superconducting quantum metamaterial: towards quantum-level switching,

V. Savinov, A. Tsiatmas, A. R. Buckingham, V. A. Fedotov, P. A. J. de Groot & N. I. Zheludev,
Nature Sci. Rep. 2, 450 (2012).

Coherent quantum phase slip

O. V. Astafiev, L. B. Ioffe, S. Kafanov, Yu. A. Pashkin, K. Yu. Arutyunov, D. Shahar, O. Cohen, & J. S. Tsai
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Magnetic field-induced dissipation-free state in superconducting nanostructures,

R. Córdoba, T. I. Baturina, J. Sesé, A. Yu Mironov, J. M. De Teresa, M. R. Ibarra, D. A. Nasimov, A. K. Gutakovskii, A. V. Latyshev, I. Guillamón, H. Suderow, S. Vieira, M. R. Baklanov, J. J. Palacios, V. M. Vinokur,
Nat Comm 4, 1437 (2013)

Evidence of multiband behavior in the superconducting alloy $Zr_{0.96}V_{0.04}B_2$

Renosto, S. T.; Consoline, H.; dos Santos, C. A. M.; et al.
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Separation of the contributions to the magnetization of $Tm_{1-x}Y_xB_{12}$ solid solutions in steady and pulsed magnetic fields

Bogach, A. V.; Sluchanko, N. E.; Glushkov, V. V.; et al.
JOURNAL OF EXPERIMENTAL AND THEORETICAL PHYSICS 116 (2013) 838-842 [Be-Sk]

The Renewed KU Leuven Pulsed Field Facility

Vanacken, J.; Peng, T.; Perenboom, J. A. A. J.; et al.
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Metal-Bosonic Insulator-Superconductor Transition in Boron-Doped Granular Diamond

Zhang, Gufei; Zeleznik, Monika; Vanacken, Johan; et al.
PHYSICAL REVIEW LETTERS 110 (2013) 077001 [Be-Uk]

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Flux avalanches triggered by AC magnetic fields in superconducting thin films

Motta, M.; Colauto, F.; Johansen, T. H.; et al.
PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS 479 (2012) 134-136 [Be-Dk -Br]

Influence of artificial pinning on vortex lattice instability in superconducting films

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Denkova, Denitza; Verellen, Niels; Silhanek, Alejandro V.; et al.

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Pereira, Paulo J.; Moshchalkov, Victor V.; Chibotaru, Liviu F.

PHYSICAL REVIEW E 86 (2012) 056709

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$\text{La}_{1.89}\text{Ce}_{0.11}(\text{Cu}_{0.99}\text{Co}_{0.01})\text{O}_{-4}$ thin films

Jin, K.; Wu, B. X.; Zhu, B. Y.; et al.

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Raes, B.; Van de Vondel, J.; Silhanek, A. V.; et al.

PHYSICAL REVIEW B 86 (2012) 064522

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Two energy gaps in superconducting $\text{Lu}_2\text{Fe}_3\text{Si}_5$ single crystal derived from the temperature dependence of lower critical field $H_{c1}(T)$

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Evidence of quantum phase slip effect in titanium nanowires

J. S. Lehtinen, T. Sajavaara, K. Yu. Arutyunov, M. Yu. Presnjakov and A. Vasiliev,

Phys. Rev. B 85 (2012) 094508-1 -- 094508-7

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J. S. Lehtinen, K. Zakharov, and K. Arutyunov

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Nucleation and mesostrain influence on percolating critical currents of solution derived YBa₂Cu₃O₇ superconducting thin films,

X. Obradors, F. Martínez-Julián, K. Zalamova, R. Vlad, A. Pomar Barbeito, A. Palau Masoliver, A Llordés, H. Chen, M. Coll Bau, S. Ricart, N. Mestres Andreu, X. Granados, T. Puig Molina and M. Rikel,

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D. Stornaiuolo, G. Rotoli, D. Massarotti, F. Carillo, L. Longobardi, F. Beltram, and F. Tafuri
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Superconducting/magnetic hybrid rectifier based on Fe single-crystal nanocenters: Role of magnetic and geometric asymmetries
A. Gomez, E M Gonzalez, M Iglesias, N Sanchez, F J Palomares, F Cebollada, J M Gonzalez and J L Vicent
Journal of Physics D: Applied Physics 46, 095302 (2013)

Radiation-harvesting resonant superconducting sub-THz metamaterial bolometer,
V Savinov, V A Fedotov, P A J de Groot and N I Zheludev, Supercond.
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A. Sposito, T.C. May-Smith, G.B.G Stenning, P.A.J. de Groot, R.W. Eason,
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Optics Express. 21, 1456 (2013).

Substrate decoration for improvement of current-carrying capabilities of YBa₂Cu₃O_x thin Films,
A. Khoryushin, P. B. Mozhaev, J.E. Mozhaeva, I.K. Bdikin, Y. Zhao, N.H. Andersen, C.S. Jacobsen and J.O.B. Hansen,
PHYSICA C: Superconductivity and its Applications — 2013, Volume 486, pp. 1-8.

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A. Khoryushin, P.B. Mozhaev, J. Mozhaeva, N.H. Andersen, J.-C.Grivel, J.O.B. Hansen and C.S. Jacobsen,
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3. Other Publications as conference proceedings:

Proximitized NbN/NiCu nanostripes as new promising superconducting single-photon detectors, (INVITED)
G. P. Pepe, L. Parlato, C. Bonavolontà, M. Valentino, C. De Lisio, R. Cristiano, M. Ejrnaes, H. Myoren, and R.
Sobolewski, presented at the SPIE Europe: Optics + Optoelectronics; Symposium on Photon Counting
Applications, Prague, The Czech Rep., April 2013.

Photoresponse studies of proximitized superconductor/ferromagnet nanostructures for photon detection,
L. Parlato, G. P. Pepe, C. De Lisio, V. Pagliarulo, C. Bonavolontà, R. Arpaia, F. Miletto Granozio, U. Scotti di
Uccio, R. Cristiano, M. Ejrnaes, W. Słysz, Y. Wang, Y. Akbas, and R. Sobolewski, presented at the SPIE
Europe: Optics + Optoelectronics; Symposium on Photon Counting Applications, Prague, The Czech Rep.,
April 2013. [PI-It]

Solution of linearized Ginzburg-Landau problem for mesoscopic superconductors by conformal mapping
Pereira, Paulo J.; Moshchalkov, Victor V.; Chibotaru, Liviu F.

Book Group Author(s): IOP

Conference: 1st International Conference on Mathematical Modelling in Physical Sciences (IC-MSQUARE)

Location: Budapest, HUNGARY Date: SEP 03-07, 2012

Source: IC-MSQUARE 2012: INT

Dedicated MoM basis function scheme for plasmonic applications at the nano-scale

Vandenbosch, G. A. E.; Zheng, X.; Verellen, N.; et al.

Book Group Author(s): IEEE

Conference: International Conference on Electromagnetics in Advanced Applications (ICEAA) / IEEE-APS

Topical Conference on Antennas and Propagation in Wireless Communications (IEEE APWC) / URSI

Electromagnetic Environment and Interference Symposium (EEIS) Location: Cape Town, SOUTH AFRICA

Date: SEP 02-07, 2012

Sponsor(s): Univ Stellenbosch, Politecnico Torino; IEEE Antennas & Propagat Soc (AP-S); URSI, Int Union
Radio Sci; Ist Superiore Mario Boella Technologie Informazione & Telecomunicazioni; Torino Wireless Fdn;
COREP; FEKO; CST; Square Kilometre Array (SKA); Reutech Radar Syst

2012 INTERNATIONAL CONFERENCE ON ELECTROMAGNETICS IN ADVANCED APPLICATIONS (ICEAA) Pages:
910-913 Published: 2012

Second harmonic hotspots at the edges of the unit cells in G-shaped gold nanostructures

Valev, Ventsislav K.; Osley, Edward J.; De Clercq, Ben; et al.

Book Editor(s): Boardman, AD; Johnson, NP; Ziolkowski, RW

Conference: Conference on Metamaterials VII Location: Brussels, BELGIUM Date: APR 16-19, 2012

Sponsor(s): SPIE; Brussels Photon Team (B-PHOT); Brussels-Capital Reg; Fonds Wetenschappelijk Onderzoek
(FWO); Int Commiss Opt (ICO); Ville Bruxelles

METAMATERIALS VII Book Series: Proceedings of SPIE Volume: 8423 Article Number: 842311 DOI:
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Quantum phase slip junction, K. Yu. Arutyunov and J. S. Lehtinen, abstract book of the International
Workshop "Superconducting NanoHybrids" SNh-2012, September 3-7, San Sebastian, Spain, p13. Donostia
International Physics Center, 2012.

Quantum fluctuations in superconducting nanostructures: physics and applications. K. Yu. Arutyunov , oral talk, 13th International workshop on NanoScience and Nanotechnology, 01-04.10.2012, INFN Frascati, Italy. Abstract booklet, p. 36.

Duality between physics of Josephson junction and superconducting ultra-narrow nanowire, J. Lehtinen and K. Arutyunov, poster, proceedings of the NanoScience Days 2012, University of Jyväskylä, Finland, abstract booklet. P-33.

Super-fine Ion Beam Surface Treatment. L. Leino, P. Jalkanen and K. Arutyunov, poster, proceedings of the NanoScience Days 2012, University of Jyväskylä, Finland, abstract booklet. P-35.

Superconducting nanowire as a quantum standard of electric current. J. Lehtinen and K. Yu. Arutyunov, , invited oral talk, EURAMET meeting, May 21-22, 2013, Madrid / Tres Cantos.

Quantum fluctuations in nanoscale superconductors. K. Yu. Arutyunov, invited talk, International Conference SUPERSTRIPES 2013, Ischia, Italy, May 27-June 1, 2013.

Quantum fluctuations: physics and applications, K. Yu. Arutyunov, Proceedings of the 2nd International Conference "Mesoscopic structures: fundamentals and applications", Novosibirsk, Russia, 23-29 June 2013, p. 38.

Calculation of AC losses in HTS stacks and coils for large scale applications, V. M.R. Zermeno, A. B. Abrahamsen , N. Mijatovic, B. B. Jensen and M.P. Sørensen, Conference program book - 2012 Applied Superconductivity Conference (ASC 2012).

Model and Simulation of a HTS Generator under transient response, V. M.R. Zermeno, A. B. Abrahamsen , N. Mijatovic, B. B. Jensen and M.P. Sørensen, Conference program book - 2012 Applied Superconductivity Conference (ASC 2012).