The Abdus Salam
International Centre for Theoretical Physics

United Nations
Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

SMR. 2035

Conference on Superconductor-Insulator Transitions

18 - 23 May 2009, ICTP, Trieste, Italy

Programme

List of Participants

Speaker's Abstracts

http://cdsagenda5.ictp.it/full_display.php?ida=a08158

Strada Costiera 11, 34014 Trieste, Italy - Tel. +39 040 2240 111; Fax +39 040 224 163 - sci_info@ictp.it, www.ictp.it

printed on:11th May 2009

The Abdus Salam
International Centre for Theoretical Physics

Conference on Superconductor-Insulator Transitions

Organizer(s): Directors: M. Feigelman, M. Muller, Z. Ovadyahu, M. Sanquer. Local Organizer: V. Kravtsov
Trieste - Italy, 18 - 23 May 2009

Venue: Adriatico Guest House Kastler Lecture Hall

Preliminary Programme

Monday, 18 May (Room:Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))

18 May 2009

08:30 - 09:30 (Room: Adriatico Guest House (Lower Level 1))
Registration and Administrative Formalities

09:30 - 09:45 (Room: Adriatico Guest House Kastler Lecture Hall)
Welcome and Opening Remarks

09:45 - 10:30 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Kapitulnik / *Stanford University, USA*
Critical behavior near the superconductor-insulator transitions in two-dimensions

10:30 - 11:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

11:00 - 11:45 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Goldman / *University of Minnesota, USA*
Scaling Analyses of Direct Superconductor-Insulator Transitions in Disordered

11:45 - 12:30 (Room: Adriatico Guest House Kastler Lecture Hall)
V. Gantmakher / *Inst. of Solid State Physics, Moscow, Russian Federation*
Comparsion of superconductor-insulator transitions in different materials

12:30 - 14:30 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:30 - 15:15 (Room: Adriatico Guest House Kastler Lecture Hall)
D. Shahar / *The weizmann Inst. of Science, Rehovot, Israel*
The insulator in the superconductor-insulator transition

15:15 - 16:00 (Room: Adriatico Guest House Kastler Lecture Hall)
S. Ganapathy / *University of Buffalo, USA*
Inhomogeneous conduction near the quantum critical point in InO films

16:00 - 16:30 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

16:30 - 17:15 (Room: Adriatico Guest House Kastler Lecture Hall)
C. Strunk / *Universitaet Regensburg, Germany*
The Superconductor-Insulator transition in thin TiN films

19:00 - 21:00 (Room: Adriatico Guest House Cafeteria)
--- RECEPTION ---

Tuesday, 19 May (Room:Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))

19 May 2009

08:45 - 09:30 (Room: Adriatico Guest House Kastler Lecture Hall)
B. Sacepe / *University of Geneva, Switzerland*
Tunneling spectroscopy on amorphous indium oxide: spectral signature of incoherent Cooper-pairs

09:30 - 10:15 (Room: Adriatico Guest House Kastler Lecture Hall)
C. Chapelier / *C.E.A. Grenoble, France*
Fluctuations in thin superconducting TiN films

10:15 - 10:45 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

10:45 - 11:30 (Room: Adriatico Guest House Kastler Lecture Hall)
P. Raychaudhuri / *Tata Inst. of Fundamental Res. Mumbai, India*
Tunneling studies in a disordered s-wave superconductor close to the Fermi glass regime

11:30 - 12:15 (Room: Adriatico Guest House Kastler Lecture Hall)
N. P. Armitage / *John Hopkins University, Baltimore, USA*
From classsical to quantum: Broadband microwave studies of superconducting fluctuations in 2D InO thin Films

12:15 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 14:45 (Room: Adriatico Guest House Kastler Lecture Hall)
P. Adams / *Louisiana State University, Baton Rouge, USA*
Spin effects near the superconductor-insulator transition in ultra-thin Al and Be films

14:45 - 15:30 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Frydman / *Bar-Ilan University, Ramat Gan, Israel*
Inverse proximity effect in thin superconducting and ferromagnetic layers

15:30 - 16:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

16:00 - 16:45 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Gershenson / *Rutgers State University, Piscataway, USA*
Towards Realization of Topological Order in Josephson Arrays

20:00 - 21:30 (Room: Adriatico Guest House Kastler Lecture Hall)
Round Table 1: News and views, and open questions on the Sl-transition

Wednesday, 20 May (Room:Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))

20 May 2009

08:45 - 09:30 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Cieplak / *Inst. of Physics, PAS, Warsaw, Poland*
Superconductor-Insulstor Transition in High-Tc and Conventional Superconducting Films

09:30 - 10:15 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Yazdani / *Princeton University, USA*
Nodal Quasi-Particles & the Suppression of Superconductivity with Doping & Temperature in Cuprates

10:15 - 10:45 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

10:45 - 11:30 (Room: Adriatico Guest House Kastler Lecture Hall)
N. Trivedi / *The Ohio State University, Columbus, USA*
Nature of Superconducting and Insulating States in a Disordered System

11:30 - 12:15 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Mueller / *ICTP, Trieste, Italy*
Compensation driven superconductor-insulator transition

12:15 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 14:45 (Room: Adriatico Guest House Kastler Lecture Hall)
S. Gariglio / *Universite de Geneve, Switzerland*
Electric Field Tuning of Superconductivity at the LaAlO3/SrTiO3 Interface

14:45 - 15:30 (Room: Adriatico Guest House Kastler Lecture Hall)
T. Schneider / *University of Zurich, Switzerland*
Finite size effects in 2D superconductors

15:30 - 16:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

16:00 - 16:45 (Room: Adriatico Guest House Kastler Lecture Hall)
B. Kessler / *Univ. of California at Berkeley, USA*
Tunable Superconducting Transition in Doped Graphene Sheets

17:00 - 19:00 (Room: Adriatico Guest House (Lower Level 1))
Poster Session

Thursday, 21 May (Room:Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))

21 May 2009

08:45 - 09:30 (Room: Adriatico Guest House Kastler Lecture Hall)
T. Grenet / *LEPES - CNR, Grenoble, France*
Glassiness in insulating granular aluminum thin films

09:30 - 10:15 (Room: Adriatico Guest House Kastler Lecture Hall)
O. Entin-Wohlman / *Tel Aviv University, Israel*
The conductance of superconducting-normal hybrid structures

10:15 - 10:45 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

10:45 - 11:30 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Ioselevich / *Landau Inst. for Theoretical Physics, Moscow, Russian Federation*
Coulomb effects in a mixed granular system near the percolation threshold

11:30 - 12:15 (Room: Adriatico Guest House Kastler Lecture Hall)
V. Kravtsov / *ICTP, Trieste, Italy*
Giant jumps in nonlinear resistance: bistability caused by overheating of an electron system

12:15 - 14:00 (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---

14:00 - 14:45 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Feigelman / *L.D. Landau Inst. for Theoretical Physics, Moscow, Russian Federation*
Pseudogaped superconductivity of localized electrons

14:45 - 15:30 (Room: Adriatico Guest House Kastler Lecture Hall)
L. Ioffe / *Rutgers, the State Univ. of New Jersey, USA*
Phase transitions in strongly disordered magnets and superconductors on Bethe lattice

15:30 - 16:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

16:00 - 16:45 **K. Efetov** / *Ruhr-Universitat Bochum, Germany*
Transport in a network of Josephson junctions in the insulating state

16:45 - 17:30 (Room: Adriatico Guest House Kastler Lecture Hall)
B. Altshuler / *Columbia University, New York, USA*
Many-Body Localization and Transport Properties of Insulation Josephson Arrays

20:00 - 21:30 (Room: Adriatico Guest House Kastler Lecture Hall)
Round Table 2: 2d superconductivity:Superconducting films, high Tc's, interfacial superconductivity - Similarities and differences

Friday, 22 May (Room:Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))

22 May 2009

08:45 - 09:30 (Room: Adriatico Guest House Kastler Lecture Hall)
K. Prassides / *University of Durham, UK*
Fulleride superconductivity at hyperexpanded separations

09:30 - 10:15 (Room: Adriatico Guest House Kastler Lecture Hall)
E. Tosatti / *S.I.S.S.A., Trieste, Italy*
Strongly Correlated Superconductor-Mott insulator Transition in Fullerides

10:15 - 10:45 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

10:45 - 11:30 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Fabrizio / *S.I.S.S.A., Trieste, Italy*
s-Wave superconductivity near a Mott transition: the puzzling case of fullerenes

11:30 - 12:15 (Room: Adriatico Guest House Kastler Lecture Hall)
A. Ardavan / *University of Oxford, UK*
Fluctuating and unconventional superconductivity in organic molecular metals

12:15 - 14:00 (Room: Adriatico Guest House (Terrace))
--- Lunch Break ---

14:00 - 14:45 (Room: Adriatico Guest House Kastler Lecture Hall)
H. Aubin / *Ecole Sup. de Physique et Chimie Industrielle, Paris, France*
Nernst effect and superconducting glasses

14:45 - 15:30 (Room: Adriatico Guest House Kastler Lecture Hall)
M. Skvortsov / *L.D. Landau Inst. for Theoretical Physics, Moscow, Russian Federation*
Giant Nernst Effect due to Fluctuating Cooper Pairs in Superconductors

15:30 - 16:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

16:00 - 16:45 (Room: Adriatico Guest House Kastler Lecture Hall)
K. Michaeli / *The Weizmann Inst. of Science, Rehovot, Israel*
Fluctuations of the superconducting order parameter as an origin of the Nernst effect

17:00 - 19:00 (Room: Adriatico Guest House (Lower Level 1))
Poster Session

Saturday, 23 May (Room:Adriatico Guest House Kastler Lecture Hall) (**Saturday**)

23 May 2009

09:00 - 10:30 **Informal Discussions**

10:30 - 11:00 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---

11:00 - 11:45 **Informal Discussions**

11:45 - 12:00 **Concluding Remarks**

The Abdus Salam
International Centre for Theoretical Physics

United Nations
Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

Activity SMR: **2035**

Conference on Superconductor-Insulator Transitions

18 May 2009 - 23 May 2009
Trieste - ITALY

Total Number of Visitors: 85

Preliminary List of Participants

Strada Costiera 11, 34014 Trieste, Italy - Tel. +39 040 2240 111; Fax +39 040 224 163 - sci_info@ictp.it, www.ictp.it

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function

DIRECTOR — Total number in this function: 4

1. **FEIGELMAN MIKHAIL** — 11/06/1954 — M — RUSSIAN FEDERATION — **DIRECTOR**

Research Field :

Research Topic :

Permanent address:

Russian Academy of Sciences
L.D. Landau Institute for Theoretical Physics
Kosygin St. 2
GSP-1.
119334 Moscow
RUSSIAN FEDERATION
Permanent Institute e mail feigel@landau.ac.ru

2. **MUELLER MARKUS** — 11/02/1976 — M — SWITZERLAND — **DIRECTOR**

Research Field :

Research Topic :

Permanent address:

The Abdus Salam International Centre for Theoretical Physics
Condensed Matter Section
Strada Costiera 11
34014 Trieste
ITALY
Permanent Institute e mail markusm@ictp.it

3. **OVADYAHU ZVI** — 13/03/1946 — M — ISRAEL — **DIRECTOR**

Research Field :

Research Topic :

Permanent address:

The Hebrew University of Jerusalem
Racah Institute of Physics
Edmond Safra campus
Givat Ram
91904 Jerusalem
ISRAEL
Permanent Institute e mail zvi@vms.huji.ac.il

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
4.	**SANQUER MARC**	02/08/1959	M	FRANCE	**DIRECTOR**

Research Field :

Research Topic :

Permanent address:

LaTEQS
Quantum Electronic Transort & Superconductivity Lab.
CEA Grenoble
17 rue des Martyrs
38504 Grenoble Cedex 9
FRANCE
Permanent Institute e mail marc.sanquer@cea.fr

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function

CONFERENCE SPEAKER Total number in this function: 31

5. **ADAMS PHIL** 28/07/1958 M UNITED STATES OF AMERICA **CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Louisiana State University
Department of Physics & Astronomy
202 Nicholson Hall
70803-4001 LA Baton Rouge
UNITED STATES OF AMERICA
Permanent Institute e mail adams@phys.lsu.edu

6. **ALTSHULER BORIS L.** 27/01/1955 M UNITED STATES OF AMERICA **CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Columbia University
Department of Physics
538 West 120th Street
New York NY 10027
UNITED STATES OF AMERICA
Permanent Institute e mail bla@phys.columbia.edu, bla@altshuler.net

N.E.C. Research Institute Inc.
4 Independence Way
NJ 08540 Princeton
UNITED STATES OF AMERICA

7. **ARDAVAN ARZHANG** 30/04/1973 M UNITED KINGDOM **CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University of Oxford
Clarendon Laboratory
Department of Physics
Parks Road
OX1 3PU Oxford
UNITED KINGDOM
Permanent Institute e mail arzhang.ardavan@physics.ox.ac.uk

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
8.	**ARMITAGE N. PETER**	23/12/1971	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Johns Hopkins University
Dept. of Physics & Astronomy
3400 North Charles Street
MD 21218-2695 Baltimore
UNITED STATES OF AMERICA
Permanent Institute e mail npa@pha.jhu.edu

9.	**AUBIN HERVE**	08/11/1970	M	FRANCE	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Ecole Superieur de Physique Et Chimie Industrielle
Laboratoire de Physique Quantique
10 Rue Vauquelin
75231 CEDEX 05 Paris
FRANCE
Permanent Institute e mail herve.aubin@espci.fr

10.	**CHAPELIER CLAUDE**	07/08/1960	M	FRANCE	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

C.E.A. Grenoble
SPSMS, INAC
Bat.C1
17 Rue Des Martyrs
38054 Grenoble
FRANCE
Permanent Institute e mail claude.chapelier@cea.fr

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
11.	**EFETOV KONSTANTIN**	29/04/1950	M	GERMANY	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Ruhr-Universitat Bochum
Theoretische Physik III
Universitatsstrasse 150
D-44780 Bochum
GERMANY
Permanent Institute e mail efetov@tp3.rub.de

12.	**ENTIN-WOLMANN ORA**	21/12/1943	F	ISRAEL	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Tel Aviv University
School of Physics
Tel Aviv 69978
ISRAEL
Permanent Institute e mail oraentin@bgu.ac.il

13.	**FABRIZIO MICHELE**	22/06/1964	M	ITALY	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

S.I.S.S.A. - International School for Advanced Studies
Via Beirut 2-4
34014 Trieste
ITALY
Permanent Institute e mail fabrizio@sissa.it

14.	**FRYDMAN AVIAD**	09/02/1964	M	ISRAEL	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Bar-Ilan University
Department of Physics
52900 Ramat Gan
ISRAEL
Permanent Institute e mail aviad.frydman@gmail.com

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
15.	**GANAPATHY SAMBANDAMURTHY**	01/06/1972	M	INDIA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University at Buffalo
State University of New York
Department of Physics
Amherst Campus
239 Fronczak Hall
NY 14260-1500 Buffalo
UNITED STATES OF AMERICA
Permanent Institute e mail sg82@buffalo.edu

16.	**GANTMAKHER VSEVOLOD FELIKSOVICH**	08/10/1935	M	RUSSIAN FEDERATION	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Russian Academy of Sciences
Institute of Solid State Physics
Chernogolovka
Distr.
142432 Moscow
RUSSIAN FEDERATION
Permanent Institute e mail GANTM@ISSP.AC.RU

17.	**GARIGLIO STEFANO**	08/09/1973	M	ITALY	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Universite' de Geneve
Ecole de Physique/Dpnc
24 Quai E.Ansermet
CH-1211 Geneva
SWITZERLAND
Permanent Institute e mail stefano.gariglio@unige.ch

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
18.	**GERSHENSON (GUERCHENZON) MICHAEL (MIKHAIL)**	22/08/1953	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Rutgers State University
Dept.of Physics and Astronomy
136 Frelinghuysen Road
NJ 08854-8019 Piscataway
UNITED STATES OF AMERICA
Permanent Institute e mail GERSH@PHYSICS.RUTGERS.EDU

19.	**GOLDMAN ALLEN M.**	18/10/1937	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University of Minnesota
School of Physics and Astronomy
116 Church Street S.E.
MN 55455 Minneapolis
UNITED STATES OF AMERICA
Permanent Institute e mail goldman@physics.umn.edu

20.	**GRENET THIERRY**	14/05/1966	M	FRANCE	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

LEPES - CNR
25 Avenue des Martyrs
BP 166
38042 Grenoble
FRANCE
Permanent Institute e mail grenet@grenoble.cnrs.fr

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
21.	**IOFFE LEV B.**	04/06/1958	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Rutgers, the State University of New Jersey
Department of Physics and Astronomy
136 Frelinghuysen Road
Piscataway NJ 08854-8019
UNITED STATES OF AMERICA
Permanent Institute e mail ioffe@physics.rutgers.edu

22.	**IOSELEVICH ALEXEY**	10/01/1954	M	RUSSIAN FEDERATION	**CONFERENCE SPEAKER**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **DISORDERED SYSTEMS, QUANTUM MESOSCOPICS**

Permanent address:

Russian Academy of Sciences
L.D. Landau Institute for Theoretical Physics
Kosygin St. 2
GSP-1.
119334 Moscow
RUSSIAN FEDERATION
Permanent Institute e mail iossel@comintern.ru

23.	**KAPITULNIK AHARON**	29/07/1953	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Stanford University
Department of Applied Physics
CA 94305-4090 Stanford
UNITED STATES OF AMERICA
Permanent Institute e mail aharonk@stanford.edu

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
24.	**KESSLER BRIAN MAXWELL**	21/02/1982	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University of California at Berkeley
Zetti Research Group
105 Birge Hall
Berkeley 94709
CA
UNITED STATES OF AMERICA
Permanent Institute e mail bkessler@berkeley.edu

25.	**KRAVTSOV VLADIMIR E.**	17/10/1952	M	RUSSIAN FEDERATION	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

The Abdus Salam International Centre for Theoretical Physics
Condensed Matter Section
Strada Costiera 11
34014 Trieste
ITALY
Permanent Institute e mail kravtsov@ictp.it

26.	**MICHAELI KAREN**	31/12/1900	F	ISRAEL	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

The Weizmann Institute of Science
Department of Condensed Matter Physics
76100 Rehovot
ISRAEL
Permanent Institute e mail karen.michaeli@weizmann.ac.il

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
27.	**PRASSIDES KOSMAS**	30/04/1957	M	GREECE	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University of Durham
Department of Chemistry
Science Site
South Road
Durham DH1 3LE
UNITED KINGDOM
Permanent Institute e mail k.prassides@durham.ac.uk

28.	**RAYCHAUDHURI PRATAP**	13/12/1971	M	INDIA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Tata Institute of Fundamental Research
Department of Condensed Matter Physics and Materials Science
Homi Bhabha Road
Colaba
Mumbai 400005
INDIA
Permanent Institute e mail pratap@tifr.res.in

29.	**SACEPE BENJAMIN**	22/04/1980	M	FRANCE	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

University of Geneva
D.P.M.C. - Departement de Physique de la Matiere Condensee
24 Quai Ernest-Ansermet
CH-1211 Geneva 4
SWITZERLAND
Permanent Institute e mail benjamin.sacepe@unige.ch

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
30.	**SHAHAR DAN**	16/10/1962	M	ISRAEL	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

The Weizmann Institute of Science
Department of Condensed Matter Physics
76100 Rehovot
ISRAEL
Permanent Institute e mail dan.shahar@weizmann.ac.il

31.	**SKVORTSOV MIKHAIL**	06/07/1972	M	RUSSIAN FEDERATION	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

L.D. Landau Institute for Theoretical Physics
Prospekt akademika Semenova 1A
Moscow Region
142432 Chernogolovka
RUSSIAN FEDERATION
Permanent Institute e mail skvor@itp.ac.ru

32.	**STRUNK CHRISTOPH**	24/09/1961	M	GERMANY	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Universitaet Regensburg
Institut fuer Experimentelle und Angewandte Physik
Universitaetsstr. 31
Regensburg 93040
GERMANY
Permanent Institute e mail christoph.strunk@physik.uni-regensburg.de

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
33.	**TOSATTI ERIO**	09/11/1943	M	ITALY	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

S.I.S.S.A. International School For Advanced Studies
Settore di Materia Condensata
Via Beirut 9
34014 Trieste
ITALY
Permanent Institute e mail tosatti@sissa.it

34.	**TRIVEDI NANDINI**	24/10/1959	F	INDIA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

The Ohio State University
Department of Physics
191 W. Woodruff Ave.
OH 43210-1106 Columbus
UNITED STATES OF AMERICA
Permanent Institute e mail trivedi.15@osu.edu

35.	**YAZDANI ALI**	25/12/1947	M	UNITED STATES OF AMERICA	**CONFERENCE SPEAKER**

Research Field :

Research Topic :

Permanent address:

Princeton University
Department of Physics
Jadwin Hall
Princeton NJ 08544
UNITED STATES OF AMERICA
Permanent Institute e mail yazdani@princeton.edu

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function

PARTICIPANT — Total number in this function: 50

36. **AL KHAWWAM ANAS** — 15/01/1969 — M — SYRIAN ARAB REPUBLIC — **AFFILIATE**

Research Field : **NANOMATERIALS AND THIN FILMS**

Research Topic : **SYNTHESIS, CHARACTERIZATION OF THIN FILMS**

Permanent address:

Atomic Energy Commission of Syria
P.O. Box 6091
Damascus
SYRIAN ARAB REPUBLIC
Permanent Institute e mail aalkhawwam@aec.org.sy

37. **AN JIN** — 12/02/1975 — M — PEOPLE'S REPUBLIC OF CHINA — **AFFILIATE**

Research Field :

Research Topic :

Permanent address:

Nanjing University
National Laboratory of Solid State Microstructures
Department of Physics
22 Hankou Road
Gulou District
Jiangsu Province
210093 Nanjing
PEOPLE'S REPUBLIC OF CHINA
Permanent Institute e mail anjin@nju.edu.cn

38. **ASSAOUI FATNA** — 04/07/1968 — F — MOROCCO — **JUNIOR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Universite' Mohammed V
Laboratoire de Physiques Des Hautes Energies
Faculty of Sciences
Av. Ibn Battota
B.P. 1014
Agdal
Rabat
MOROCCO
Permanent Institute e mail FASSAOUI@FSR.AC.MA

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
39.	**BALOCH KAMAL HUSSAIN**	29/10/1979	M	PAKISTAN	**PARTICIPANT**

Research Field : **NANOPHYSICS**

Research Topic : **THERMAL & ELECTRONIC PROPERTIES OF NANOSTRU.**

Permanent address:

University of Maryland College Park
Institute of Physical and Technology
1314 Chemical and Nuclear Engineer Bldg.
College Park 20742
UNITED STATES OF AMERICA
Permanent Institute e mail kamalhussainbaloch@hotmail.com

40.	**BHASEEN MIRACULOUS JOSEPH**	10/07/1975	M	UNITED KINGDOM	**PARTICIPANT**

Research Field : **STRONGLY CORRELATED SYSTEMS**

Research Topic : **STRONGLY CORRELATED SYSTEMS**

Permanent address:

Cambridge University
Theory of Condensed Matter Group
Cavendish Laboratory
19, J.J. Thomson Avenue
Cambridge CB3 0HE
UNITED KINGDOM
Permanent Institute e mail mjb230@cam.ac.uk

41.	**BOSE SANGITA**	21/01/1977	F	INDIA	**PARTICIPANT**

Research Field : **EXPERIMENTAL SSP**

Research Topic : **NANOSCALE SUPERCONDUCTIVITY,TUNNELING**

Permanent address:

Max Planck Institute MPI
for Solid State Research
Heisenbergstrasse 1
D-70569 Stuttgart
GERMANY
Permanent Institute e mail sangita.bose@fkf.mpg.de

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
42.	**BOURGEOIS OLIVIER**	02/02/1971	M	FRANCE	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **NANOSCALE PHASE TRANSITION**

Permanent address:

Centre National de La Recherche Scientifique
Institut Neel
25. Avenue des Martyrs
B.P. 166X
38042 Grenoble Cedex 9
FRANCE
Permanent Institute e mail olivier.bourgeois@grenoble.cnrs.fr

43.	**BREZNAY NICHOLAS PHIBBS**	22/08/1980	M	UNITED STATES OF AMERICA	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **SUPERCONDUCTOR-INSULATOR TRANSITION**

Permanent address:

Stanford University
Geballe Laboratory For Advanced Materials
McCullough Building
Stanford CA 94305-4045
UNITED STATES OF AMERICA
Permanent Institute e mail nbreznay@stanford.edu

44.	**BUI DUC TINH**	10/09/1980	M	VIET NAM	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **TRANSPORT PROPERTIES OF TYPE LL SUPERCONDUCTORS**

Permanent address:

National Chiao Tung University
Electrophysics Department
1001 Ta Hsueh Road
300 Hsinchu
TAIWAN, CHINA
Permanent Institute e mail tinhdhsp@yahoo.com

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
45.	**CAVIGLIA ANDREA**	17/03/1981	M	ITALY	**PARTICIPANT**

Research Field :

Research Topic :

Permanent address:

Universite' de Geneve
Ecole de Physique/Dpnc
24 Quai E.Ansermet
CH-1211 Geneva
SWITZERLAND
Permanent Institute e mail andrea.caviglia@unige.ch

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
46.	**CHAND MADHAVI SIDDHARTHA**	25/02/1980	F	INDIA	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **EFFECT OF DISORDER ON SUPERCONDUCTING PROPERTIES**

Permanent address:

Tata Institute of Fundamental Research
Department of Condensed Matter Physics and Materials Science
Homi Bhabha Road
Colaba
Mumbai 400005
INDIA
Permanent Institute e mail chand@tifr.res.in

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
47.	**CHERIAN DONA**	06/10/1984	F	INDIA	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **IRON BASED SUPERCONDUCTORS**

Permanent address:

Indian Institute of Science
Crystal Growth Laboratory
Department of Physics
C.V. Raman Avenue
Bangalore 560012
Karnataka
INDIA
Permanent Institute e mail donnacherian@gmail.com

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
48.	**CIEPLAK MARTA ZOFIA**	27/03/1950	F	POLAND	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **SUPERCONDUCTIVITY**

Permanent address:

Polish Academy of Sciences
Institute of Physics
Al. Lotnikow 32/46
02-668 Warsaw
POLAND
Permanent Institute e mail marta@ifpan.edu.pl

49.	**COSLOVICH GIACOMO**	02/12/1982	M	ITALY	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **PUMP-PROBE EXPER.ON HIGH TC SUPERCOND.**

Permanent address:

Universita' degli Studi di Trieste
Dipartimento di Fisica
Via A. Valerio 2
34127 Trieste
ITALY
Permanent Institute e mail jack_coslovich@yahoo.it

50.	**DEL RIO AMADOR LENIN**	18/07/1984	M	CUBA	**AFFILIATE**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **TRANSPORT PROPERTIES ON SUPERCONDUCTORS**

Permanent address:

University of Havana
Faculty of Physics
Colina Universitaria
San Lazaro y L, Plaza
10400 Havana
CUBA
Permanent Institute e mail ldelrio@fisica.uh.cu

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
51.	**DELAHAYE JULIAN**	25/06/1974	M	FRANCE	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **ELECTRONIC PROPERTIES**

Permanent address:

Centre National de La Recherche Scientifique
Institut Neel
25. Avenue des Martyrs
B.P. 166X
38042 Grenoble Cedex 9
FRANCE
Permanent Institute e mail julien.delahaye@grenoble.cnrs.fr

52. **DIMITROVA OLGA VENTSISLAVOVNA** 02/07/1978 F BULGARIA **PARTICIPANT**

Research Field :

Research Topic :

Permanent address:

L. D. Landau Institute for Theoretical Physics
Acad. Semenova str.,
Chernogolovka
Moscow 119334
RUSSIAN FEDERATION
Permanent Institute e mail olgadim@itp.ac.ru

Present institute:

The Abdus Salam International Centre for Theoretical Physics
Condensed Matter Section
Strada Costiera 11
34014 Trieste
ITALY

Until: **29 October 2009**

53. **HERRERA VASCO EDWIN** 24/03/1981 M COLOMBIA **PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY & LOW TEMPERATURES**

Research Topic : **STUDY OF PG IN HTSC SYS. YBCO-CA**

Permanent address:

Universidad de Los Andes
Department of Physics
Superconductor and Low Temperatures Laboratory
Carrera 1 No. 18A- 10
Bogota 0000
Cundinamarca
COLOMBIA
Permanent Institute e mail e.herrera23@uniandes.edu.co

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
54.	**HU XIUKUN**	01/09/1980	F	PEOPLE'S REPUBLIC OF CHINA	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **MAGNETORESISTANCE, SUPERCONDUCTIVITY**

Permanent address:

China Jiliang University
College of Materials Science and Engineering
Xueyuan Street
Hangzhou 310018
Zhejiang Province
PEOPLE'S REPUBLIC OF CHINA
Permanent Institute e mail xiukunhu@hotmail.com

55.	**HUANG HUAI XIANG**	22/05/1972	F	PEOPLE'S REPUBLIC OF CHINA	**PARTICIPANT**

Research Field : **STRONG CORRELATED SYSTEM**

Research Topic : **HIGH TEMPERATURE SUPERCONDUCTIVITY**

Permanent address:

Shanghai University
Department of Physics
Shangda Road No. 99
2000436 Shanghai
PEOPLE'S REPUBLIC OF CHINA
Permanent Institute e mail hxhuang@shu.edu.cn,sxcao@shu.edu.cn

56.	**IAZZI MAURO**	28/12/1983	M	ITALY	**PARTICIPANT**

Research Field : **LOW TEMPERATURE PHYSICS**

Research Topic : **SUPERCONDUCTORS AND BOSE-EINSTEIN CONDENSATES**

Permanent address:

S.I.S.S.A. - International School for Advanced Studies
Via Beirut 2-4
34014 Trieste
ITALY
Permanent Institute e mail iazzi@sissa.it

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
57.	**KALE SANGEETA NARENDRA**	23/09/1967	F	INDIA	**REGULAR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Fergusson College
Dept. of Computer Science
411 004 Pune
INDIA
Permanent Institute e mail snkale@vsnl.com,fcp_comp@vsnl.com

58.	**KARMAKAR MADHUPARNA**	06/02/1980	F	INDIA	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **HIGH TEMP. SUPERCONDUCTIVITY**

Permanent address:

University of Pune
Department of Physics
Ganeshkhind
411 007 Pune
Maharashtra
INDIA
Permanent Institute e mail madhu@physics.unipune.ernet.in

59.	**KHVESHCHENKO DMITRY**	17/04/1962	M	RUSSIAN FEDERATION	**PARTICIPANT**

Research Field : **CONDENSED MATTER THEORY**

Research Topic : **STRONGLY CORRELATED SYSTEMS**

Permanent address:

University of North Carolina
College of Arts and Sciences
Dept. Physics and Astronomy
CB 3255 Phillips Hall
Chapel Hill NC 27599-3255
UNITED STATES OF AMERICA
Permanent Institute e mail khvesh@physics.unc.edu

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
60.	**KONCZYKOWSKI MARCIN**	26/02/1949	M	FRANCE	**PARTICIPANT**

Research Field : **SUPERCONDUCTORS**

Research Topic : **VORTEX MATTER**

Permanent address:

Ecole Polytechnique
Laboratoire des Solides Irradies
Route de Saclay
F-91128 Palaiseau Cedex
FRANCE
Permanent Institute e mail marcin.konczykowski@polytechnique.edu

61.	**LASAVE JORGE AUGUSTO**	17/02/1976	M	ARGENTINA	**JUNIOR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Instituto de Fisica Rosario
Universidad Nacional de Rosario
Av. 27 de Febrero 210 bis
2000 Rosario
ARGENTINA
Permanent Institute e mail lasave@ifir-conicet.gov.ar

62.	**LOBOS ALEJANDRO MARTIN**	26/04/1978	M	ARGENTINA	**PARTICIPANT**

Research Field : **STRONG CORRELATIONS IN CMS**

Research Topic : **FLUCTIONS IN LOW-DIMEN. SUPERCONDUCTORS**

Permanent address:

Universite' de Geneve
Departement de Physique de la Matiere Condensee D.P.M.C.
24 Quai Ernest Ansermet
CH-1211 Geneva
SWITZERLAND
Permanent Institute e mail alejandro.lobos@unige.ch

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
63.	**MANDAL SUDHANSU SEKHAR**	29/08/1965	M	INDIA	**PARTICIPANT**

Research Field : **FQHE, SUPERCONDUCTIVITY, SPINTRONICS**

Research Topic : **COMPOSITE FERMIONS, VORTICES, PSEUDO-GAPS**

Permanent address:

Indian Association for the Cultivation of Science
Dept. of Theoretical Physics
2A & 2B Raja S.C. Mullick Road
Jadavpur
700032 Kolkata
INDIA
Permanent Institute e mail tpsm@iacs.res.in

64.	**MARRACHE CLAIRE AKIKO**	14/06/1978	F	FRANCE	**PARTICIPANT**

Research Field : **SOLID STATE PHYSICS**

Research Topic : **SUPERCONDUCTOR INSULATOR TRANSITIONS**

Permanent address:

Centre de Spectrometrie Nucleaire Et de
Spectrometrie de Masse
Batiment 108
(91406)
Orsay
FRANCE
Permanent Institute e mail claire.marrache@csnsm.in2p3.fr

65.	**MEIDAN DGANIT**	14/01/1978	F	ISRAEL	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **FLUCTUATIONS IN LOW DIMENSIONAL SUPERCOND.**

Permanent address:

The Weizmann Institute of Science
Department of Condensed Matter Physics
76100 Rehovot
ISRAEL
Permanent Institute e mail dganit.meidan@weizmann.ac.il

66.	**MEIR YIGAL**	20/11/1957	M	ISRAEL	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYS.**

Research Topic : **MESOSCOPIC SYST. DISORDERED SUPERCOND**

Permanent address:

Ben-Gurion University of the Negev
Department of Physics
P.O.Box 653
84105 Beer Sheva
ISRAEL
Permanent Institute e mail ymeir@bgu.ac.il

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
67.	**MIRANDA MENA JOAQUIN GABRIEL**	09/05/1974	M	MEXICO	**PARTICIPANT**

Research Field : **STRONG CORRELATED SYSTEMS**

Research Topic : **HIGH TEMPERATURE SUPERCONDUCTORS**

Permanent address:

Jozef Stefan Institute
Jamova 39
1000 Ljubljana
SLOVENIA
Permanent Institute e mail joaquin.miranda@ijs.si, miranda.joaquin@gmail.com

68.	**NAQIB SALEH HASAN**	03/08/1970	M	BANGLADESH	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **HIGH-TC CUPRATES & STRONGLY CORRELATED SYSTEMS**

Permanent address:

University of Rajshahi
Department of Physics
6205 Rajshahi
BANGLADESH
Permanent Institute e mail salehnaqib@yahoo.com

69.	**OVADIA MAOZ**	09/10/1978	M	ISRAEL	**PARTICIPANT**

Research Field : **SUPERCONDUCTOR PHYSICS**

Research Topic : **SUPERCONDUCTOR INSULATOR TRANSITION**

Permanent address:

The Weizmann Institute of Science
Department of Condensed Matter Physics
76100 Rehovot
ISRAEL
Permanent Institute e mail maoz.ovadia@weizmann.ac.il

70.	**PHAM TIEN SON**	21/01/1964	M	VIET NAM	**REGULAR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Dalat University
Department of Mathematics
1 Phu Dong Thien Vuong
Dalat
VIET NAM
Permanent Institute e mail pham_ts@yahoo.co.uk

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
71.	**PROTOPOPOV IVAN VLADIMIROVICH**	22/05/1982	M	RUSSIAN FEDERATION	**PARTICIPANT**

Research Field : **SUPERCONDUCTIVITY**

Research Topic : **JOSEPHSON-UNCTION ARRAYS, SL TRANSITION**

Permanent address:

L.D. Landau Institute for Theoretical Physics
Prospekt akademika Semenova 1A
Moscow Region
142432 Chernogolovka
RUSSIAN FEDERATION
Permanent Institute e mail ipro@itp.ac.ru

72.	**RACHATARUANGSIT THANASIT**	09/03/1972	M	THAILAND	**JUNIOR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Physics Department
Faculty of Science
Burapha University
169 Long-Hard Bangsaen Road
Tambon Saensook
Amphur Munag
Chonburi 20131
THAILAND
Permanent Institute e mail boonlit@buu.ac.th,
thanasitha@yahoo.com

73.	**REFAEL GIL**	05/10/1976	M	ISRAEL	**PARTICIPANT**

Research Field : **DISORDERED & OUT OF EQUILIBRIUM QUAN.SYST.**

Research Topic : **SUPERCOND. INSULATOR TRANSITION IN FILMS**

Permanent address:

California Institute of Technology
1200 E. California Blvd.
MC 205-45
Pasadena CA 91125
UNITED STATES OF AMERICA
Permanent Institute e mail refael@caltech.edu

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
74.	**ROJO BRAVO ALVARO JUAN**	19/12/1980	M	CHILE	**PARTICIPANT**

Research Field : **CONDENSED MATTER**

Research Topic : **STRONGLY CORRELATED SYSTEMS**

Permanent address:

Universite XI Paris Sud
LPTMS
Laboratoire de Physique Theorique et Modeles Statistiques
Batiment 100
15, rue Georges Clemenceau
91405 Orsay Cedex 05
FRANCE
Permanent Institute e mail rojobravo@gmail.com

75.	**SCHNEIDER TONI**	04/08/1932	M	SWITZERLAND	**PARTICIPANT**

Research Field : **CONDENSED MATTER**

Research Topic : **PHASE TRANSITIONS**

Permanent address:

University of Zurich
Physics Department
Wintherthurerstr. 190
CH-8057 Zurich
SWITZERLAND
Permanent Institute e mail toni.schneider@swissonline.ch

76.	**SENOUCI KHALED**	02/05/1966	M	ALGERIA	**PARTICIPANT**

Research Field : **DISORDERED SYSTEMS, CONDUCTANCE STATISTICS**

Research Topic : **ELECTRONIC & STATISTICAL PROPERTIES**

Permanent address:

University of Mostaganem
Faculte Des Sciences
Departement de Physique
B.P. 227
Route Belhacel
27000 Mostaganem
ALGERIA
Permanent Institute e mail senouci_k@yahoo.com

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
77.	**SERBYN MAKSYM**	30/01/1986	M	UKRAINE	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **MESOSCOPICS, TRANSPORT PHENOMENA**

Permanent address:

L.D. Landau Institute for Theoretical Physics
Prospekt akademika Semenova 1A
Moscow Region
142432 Chernogolovka
RUSSIAN FEDERATION
Permanent Institute e mail serbin@itep.ru

78. **SHAH NAYANA PRAVIN** — 14/07/1973 — F — INDIA — **PARTICIPANT**

Research Field : **QUANTUM CMP**

Research Topic : **STRONGLY CORRELATED, MESOSCOPIC/NANOSCALE SYSTS.**

Permanent address:

University of Illinois at Urbana Champaign
Department of Physics
1110 West Green Street
Urbana IL 61801-3080
UNITED STATES OF AMERICA
Permanent Institute e mail nayana@illinois.edu

79. **SHUKLA PRAGYA** — 02/10/1965 — F — INDIA — **REGULAR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Indian Institute of Technology
Department of Physics
West Bengal
721302 Kharagpur
INDIA
Permanent Institute e mail shukla@phy.iitkgp.ernet.in

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
80.	**SINGH MANGEJ**	05/08/1965	M	INDIA	**REGULAR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

University of Rajasthan
Department of Physics
10 Vigyan Bhawan
302004 Jaipur
INDIA
Permanent Institute e mail mangej_singh@yahoo.com

81.	**SOMAN SWATI SUDHAKAR**	25/10/1973	F	INDIA	**PARTICIPANT**

Research Field : **EXPERIMENTAL CONDENSED MATTER PHYSICS**
Research Topic : **THIN FILM DISORDERED SUPERCONDUCTORS**

Permanent address:

Indian Institute of Technology Bombay IIT Bombay
Department of Metallurgical Engineering and Material Science
Powai
Mumbai 400076
INDIA
Permanent Institute e mail swatisoman@yahoo.com

The Weizmann Institute of Science
Department of Condensed Matter Physics
76100 Rehovot
ISRAEL
Present Institute e-mail: swatisoman@yahoo.com

82.	**TIKHONOV KONSTANTIN**	13/01/1987	M	RUSSIAN FEDERATION	**PARTICIPANT**

Research Field : **MESOSCOPIC PHYSICS**

Research Topic : **SUPERCONDUCTIVITY**

Permanent address:

L. D. Landau Institute for Theoretical Physics
Acad. Semenova str.,
Chernogolovka
Moscow 119334
RUSSIAN FEDERATION
Permanent Institute e mail tikhonov.konstantin@gmail.com

No.	NAME and INSTITUTE	DoB	Gender	Nationality	Function
83.	**WEHT RUBEN OSCAR**	06/09/1962	M	ARGENTINA	**REGULAR ASSOCIATE**

Research Field :

Research Topic :

Permanent address:

Cnea - National Commission of Atomic Energy
Tandar
Department of Physics
Avda. General Paz Y
Constituyentes
1650 San Martin
ARGENTINA
Permanent Institute e mail RUWEHT@CNEA.GOV.AR

84.	**XIE HONGYI**	29/01/1983	M	PEOPLE'S REPUBLIC OF CHINA	**PARTICIPANT**

Research Field : **CONDENSED MATTER PHYSICS**

Research Topic : **STRONGLY CORRELATED SYST.**

Permanent address:

S.I.S.S.A. International School For Advanced Studies
Settore di Materia Condensata
Via Beirut 9
34014 Trieste
ITALY
Permanent Institute e mail xie@sissa.it

85.	**ZAYTSEVA IRYNA**	04/02/1975	F	UKRAINE	**PARTICIPANT**

Research Field : **SOLID STATE PHYSICS**

Research Topic : **SUPERCONDUCTIVITY**

Permanent address:

Polish Academy of Sciences
Institute of Physics
Al. Lotnikow 32/46
02-668 Warsaw
POLAND
Permanent Institute e mail zaytseva@ifpan.edu.pl

SMR. 2035

Conference on Superconductor-Insulator Transitions

18 - 23 May 2009, ICTP, Trieste, Italy

Speaker's Abstracts

Author: P. Adams

Title:
Spin Effects near the Superconductor-Insulator Transition in Ultra-Thin Al and Be Films

I will present an overview of the Zeeman mediated superconductor-insulator (S-I) transition in ultra thin Al and Be films. Since these metals have a low spin-orbit scattering rate, spin is a good quantum number and we can use a parallel magnetic field to probe the spin states of the system through the S-I transition. I will show that in films with sheet resistance R < h/e^2, there is clear spectroscopic evidence of incoherent pairing in the Pauli-limited normal state of films, though the films are otherwise logarithmically insulating. On the insulating side of the zero-field S-I transition, in films with R > h/e^2, we show that the Zeeman field produces a multi-fold magnetoresistance that saturates near the quantum resistance. I will argue that this latter behavior is consistent with existence of localized Cooper pairs.

Author: B. Altshuler

Title:
Many-Body Localization and Transport Properties of Insulating Josephson Arrays

Recent experiments on charge transport in highly resistive films of superconducting materials revealed a quite unexpected behavior of these systems: Arrhenius law in temperature dependence of conductivity accompanied with low temperature anomalies, specific singularities in nonlinear transport, etc. It looks like this behavior can be explained at least qualitatively on the basis of the many-body localization concept. I will discuss these theoretical predictions, its relevance to experiments and open problems in this field.

Author: A. Ardavan

Title:
Fluctuating and unconventional superconductivity in organic molecular metals

The isostructural series of quasi-two-dimensional organic metals kappa-(BEDT-TTF)2X exhibit strong Coulomb correlations and a bandwidth that depends on the constituent X. This results in a ground state which may be tuned from an antiferromagnetic Mott insulator for the narrow-bandwidth X=Cu[N(CN)2]Cl compound through a superconducting state (X=Cu[N(CN)2]Br and and X=Cu(NCS)2) into a normal metal as the bandwidth increases. This series thus offers an experimental environment in which to study superconductivity in the proximity of a Mott insulating state.

We show that the superconductivity exhibits various unconventional features: measurements of the Nernst effect reveal fluctuating superconductivity substantially above Tc as the Mott state is approached [1]; and the dependence of Tc on quasiparticle scattering rate indicates that the pairing is almost certainly not simple s-wave [2]. While these results are analogous to observations made in the high-Tc cuprate superconductors, there are key differences between the organics and the cuprates which may reveal new insights into the physics of strongly correlated superconductors.

[1] MS Nam, A Ardavan, SJ Blundell, JA Schlueter, Nature 449, 584
[2] JG Analytis, A Ardavan, SJ Blundell, RL Owen, EF Garman, C Jeynes,
BJ Powell, Phys. Rev. Lett. 96, 177002

Author: N. P. Armitage

Title:
From classical to quantum:
Broadband microwave studies of superconducting fluctuations in 2D InO thin films

We apply a new broadband microwave `Corbino' technique to the study of 2D disordered superconducting InOx thin films across the superconductor insulator transition. Explicit frequency dependency of the superfluid stiffness and complex conductivity are obtained down to 290mK from 10MHz to 20GHz. AC measurements such as these ones are explicitly sensitive to the time scales of various superconducting fluctuation modes. We discuss various regimes of classical fluctuations and evidence for quantum superconducting fluctuations as the system is driven with increasing disorder across the 2D superconductor-insulator transition and into the unconventional insulating state.

Author: H. Aubin

Title:
Nernst effect and superconducting TiN glasses

In amorphous superconducting thin films of Nb0.15Si0.85 and InOx, a finite Nernst coefficient can be detected in a wide range of temperature and magnetic field. Due to the negligible contribution of normal quasi-particles, superconducting fluctuations easily dominate the Nernst response in the entire range of study. In the vicinity of the critical temperature and in the zero-field limit, the magnitude of the signal is in quantitative agreement with what is theoretically expected for the Gaussian fluctuations of the superconducting order parameter. Even at higher temperatures and finite magnetic field, the Nernst coefficient is set by the size of superconducting fluctuations. The Nernst coefficient emerges as a direct probe of the ghost critical field, the normal-state mirror of the upper critical field. Moreover, upon leaving the normal state with fluctuating Cooper pairs, we show that the temperature evolution of the Nernst coefficient is different whether the system enters a vortex solid, a vortex liquid or a phase-fluctuating superconducting regime.

Author: C. Chapelier

Title: **Fluctuations in thin superconducting TiN films**

Homogeneously disordered superconducting TiN thin films close to the superconductor-insulator transition (SIT) have been investigated by scanning tunneling spectroscopy [1]. At low temperature, we observed spatial fluctuations of the superconducting gap Δ in agreement with theoretical predictions [2,3]. When the sample gets closer to the critical disorder, its superconducting critical temperature Tc is significantly depressed towards zero while these inhomogeneities are reinforced with a local strong Δ/Tc ratio. This non vanishing spectral gap demonstrates the persistence of local superconducting pairing across the disorder-tuned SIT. At higher temperature, a pseudogap state has been revealed above Tc. The thermal evolution of the density of states at the Fermi level in this pseudogap regime, analysed in the framework of disorder-enhanced superconducting fluctuations, gives a clear signature of short-lived Cooper pairs well above Tc. The interplay of these superconducting fluctuations with the Coulomb interaction will be discussed.

[1] B. Sacépé, et al. Physical Review Letters **101**, 157006 (2008).
[2] A. Ghosal, M. Randeria, and N. Trivedi, Phys. Rev. Lett. **81**, 3940 (1998); Phys. Rev. B **65**, 014501 (2001).
[3] M. A. Skvortsov, and M. V. Feigel'man, Phys. Rev. Lett. **95**, 057002 (2005).

Author: M. Cieplak

Title:

Superconductor-Insulator Transition in High-T_c and Conventional Superconducting Films

One of the most interesting, still poorly understood problems in condensed matter physics is the nature of the evolution from the superconducting to the insulating state with the increasing disorder or the application of the magnetic field. The competing theories propose that the Cooper pairs are distroyed at the superconductor-insulator transition (SIT) in 2-dimensional systems (2D), or, that they survive in the insulating state; there are also suggestions of the percolation of the locally superconducting clusters. Recent experiments on the SIT induced by the magnetic field in conventional superconductors indicate the presence of the peak in the positive magnetoresistance (p-MR) in the immediate vicinity of the SI transition; it is believed that these effects may be attributed to the existance of superconducting islands immersed in the insulating matrix. It has been suggested that similar field-induced SI transition may occur in high-Tc superconductors in the underdoped regime, in which some experiments indicate the presence of microscopic superconducting areas immersed in more insulating background.

In this talk I will discuss first our experimental studies of the magnetoresistance (MR) in the insulating, spin-glass regime of $La_{2-x}Sr_xCuO_4$ [1]. We find large negative MR at low temperatures which we attribute to spin-related effects, and positive orbital MR, which we show is consistent with the the Maki-Thompson contribution to the interaction effects. This observation indicates the presence of superconducting fluctuations which exists deep inside the insulating phase. In this respect our observation confirms the picture of the local superconducting areas in the vicinity of the SI transition.

Next, I will describe our most recent results on the SI transition in the set of Si/Nb(*d*)/Si trilayers, in which the thickness of Si is fixed at 10 nm, and the nominal thickness of Nb, *d*, changes down to 1A. TEM and transport measurements indicate that for small *d* the alloy Nb-Si film is formed, in which the carrier concentration, *n*, decreases with the decrease of *d*. The behavior of the p-MR strongly depends on the thickness *d*, displaying oscillating behavior in the samples with small *d*.

[1] Marta Z. Cieplak, *et al.*, Phys. Rev. Lett. **92**, 187003 (2004).

Author: K. B. Efetov

Title:
Transport in a network of Josephson junctions in the insulating state

We consider motion of Cooper pairs in a system of Josephson junctions in the limit of a small coupling between the superconducting grains. In this limit the macroscopic superconductivity is destroyed due to Coulomb blockade. We show that in a sufficiently clean system the temperature dependence of the conductivity is described by an activation law with the gap equal to the energy of adding one Cooper pair to the grain. At stronger disorder or lower temperature one comes to the Anderson localization of the Cooper pairs and to a faster decay of the conductivity with temperature.

Author: O. Entin-Wohlman

Title:
The conductance of superconducting-normal hybrid structures

The dc conductance of normal-superconducting hybrid structures is discussed. It is shown that since the Bogoliubov-DeGennes (BDG) equation does not conserve charge, its application to create a Landauer-type approach for the conductance of the NSN system is problematic. We `mend' this de ciency by calculating the conductance from the Kubo formula for a ring con guration (for this geometry the solutions of the BDG equation conserve charge). We show that the presence of a superconductor segment within an otherwise normal metal may reduce the overall conductance of the composite structure. This reduction enhances the tendency of the NS composite to become
insulating.

PACS numbers: 74.45.+c,73.40.-c
Keywords: frequency-dependent mesoscopic conductance, superconducting-normal junctions

Author: F. Fabrizio

Title:
s-Wave superconductivity near a Nott transition: the puzzling case of fullerenes

There are convincing evidences that fullerene superconductors are as correlated as cuprates. However, while the latter efficiently avoid strong repulsion by condensing pairs into d-wave symmetry, fullerenes have a more conventional phonon-mediated s-wave superconductivity. How s-wave superconductivity can emerge at all near a Mott transition is a big puzzle posed by these compounds. Dynamical mean field (DMFT) studies [1,2] confirm that strong correlations in models for fullerenes are not detrimental for s-wave superconductivity, which is counter-intutively enhanced rather then depressed by proximity to a Mott transition, and ascribe this phenomenon to the specific nature of the phonons that mediate pairing, i.e. intra-molecular vibrations Jahn-Teller coupled to the conduction electrons.
Since DMFT reduces to solving a single impurity model self-consistently coupled to a conduction bath, one may wonder whether the single-impurity itself, even without self-consistency, already contains the seeds that produce the physical behavior observed in the bulk material. A thorough analysis of an Anderson impurity model for a single C60(n-) molecule [3] reveals a quite rich phase diagram that includes Kondo screened and unscreened phases separated by anomalous quantum critical points.
These results shed light on the DMFT results and suggest a general scenario for correlation-enhanced superconductivity that goes far beyond the specific example of fullerenes.

[1] M. Capone, M. Fabrizio, C. Castellani, and E. Tosatti,
"Strongly Correlated Superconductivity" Science 296, 2364 (2002);
"Strongly Correlated Superconductivity and Pseudogap Phase near a Multi-band Mott Insulator", Phys. Rev. Lett.93, 047001 (2004);
"Modeling the Unconventional Superconducting Properties of Expanded A3$C60 Fullerides", Rev. Mod. Phys. (May 2009); and arXiv:0809.0910.
[2] J. E. Han, O. Gunnarsson, and V. H. Crespi,
"Strong Superconductivity with Local Jahn-Teller Phonons in C60 Solids", Phys. Rev. Lett. 90, 167006 (2003).
[3] Lorenzo De Leo and Michele Fabrizio, "Surprises in the Phase Diagram of an Anderson Impurity Model for a
Single C60(n-) Molecule", Phys. Rev. Lett. 94, 236401 (2005).

Author: A. Frydman

Title:
Inverse proximity effect in thin superconducting and ferromagnetic layers

I present transport and magnetotransport measurements on ultrathin superconducting (Pb, Sn) and itinerant ferromagnetic (Ni, Fe, Co) films. As the thickness of the films is increased the superconducting films undergo an insulator-superconductor transition and the ferromagnetic films undergo a paramagnetic-ferromagnetic transition. Adding a normal metallic overlayer has a counter-intuitive effect on both types of films: it increases the critical temperature and energy gap in a superconducting film and enhances the magnetic order in a ferromagnetic film. These results are consistent with the understanding that lack of electronic screening is responsible for suppression of superconductivity or itinerant ferromagnetism in ultrathin films..

Author: V. F. Gantmakher

Title:
Comparison of superconductor-insulator transitions in different materials

The transitions in ultrathin films (Bi and Be films mainly), in materials with variable chemical content (amorphous InO, polycrystalline TiN), and in high-T_c superconductors are compared, together with transitions from superconductors to "bad" metals where significant contribution exists of quantum corrections to normal transport at the temperature T_c of the superconductive transition (for instance, amorphous Mo-Ge and Nb-Si, ultrathin Ta films). Specific scenario of the transition depends on several factors. In particular, it is important what happens first: degradation of T_c or carrier localization. Other two factors which contend when approaching the transition are decrease of the module of the order parameter (the superconducting gap) and growth of its phase fluctuations. If the transition is induced by phase fluctuations then localized pair and pseudogap appear at the insulating side accompanied by specific respond to the magnetic field.

Author: A. Caviglia

Title:
Electric Field Tuning of Superconductivity at the $LaAlO_3/SrTiO_3$ Interface

At interfaces between complex oxides, electronic systems with unusual properties can be generated[1]. A striking example is the interface between $LaAlO_3$ and $SrTiO_3$, two good *insulating* perovskite oxides, which was found in 2004 to be conducting with a high mobility [2]. We discovered that the ground state of this system is a superconducting condensate, with a critical temperature of about 200 mK[3]. The characteristics observed for the superconducting transitions are consistent with a two-dimensional superconducting sheet as thin as a few nanometers[4]. Recent field effect experiments revealed the sensitivity of the normal and superconducting states to the carrier density. In particular, the electric field allows the tuning of the critical temperature between 200 mK and 0 K and thus the on-off switching of superconductivity, revealing a complex phase diagram and a superconductor to insulator transition[5]. Recent results suggest that this phase diagram is linked to the large interfacially generated spin-orbit coupling.

[1] See for instance, "When oxides meet face to face".
E. Dagotto, Science **318**, 1076 (2007)
[2] "A high mobility electron gas at the $LaAlO_3/SrTiO_3$ heterointerface", A. Ohtomo, H. Y. Hwang, Nature **427**, 423 (2004).
[3] "Superconducting interfaces between insulating oxides", N. Reyren, S. Thiel, A. D. Caviglia, L. Fitting Kourkoutis, G. Hammerl, C. Richter, C. W. Schneider, T. Kopp, A.-S. Ruetschi, D. Jaccard, M. Gabay, D. A. Muller, J.-M. Triscone and J. Mannhart, Science **317**, 1196 (2007).
[4] "Anisotropy of the Superconducting Transport Properties of the $LaAlO_3/SrTiO_3$ Interface", N. Reyren, S. Gariglio, A. Caviglia, D. Jaccard, and J.-M. Triscone, Applied Physics Letters **94**, 112506 (2009).
[5] "Electric field control of the $LaAlO_3/SrTiO_3$ interface ground state", A. Caviglia, S. Gariglio, N. Reyren, D. Jaccard, T. Schneider, M. Gabay, S. Thiel, G. Hammerl, J. Mannhart, and J.-M. Triscone, Nature **456**, 624 (2008).

Author: **M. Gershenson**

Title:
Towards Realization of Topological Order in Josephson Arrays

Recently it was predicted (see, e.g., [1-3]) that the arrays of small Josephson junctions with nontrivial topology may exhibit a novel phase which is characterized by long-range order of ***pairs*** of Cooper pairs in the absence of long-range correlations in single-Cooper–pair condensate. Experimental realization of this novel phase can facilitate the fabrication of fault-tolerant superconducting qubits exponentially protected from local noises [1,3,4]. Our experiments [5] with small Josephson arrays show that, indeed, the condensate of ***pairs*** of Cooper pairs can be observed in the absence of coherence in the single-Cooper–pair condensate. The charge transport in this regime is due to coherent co-tunneling of pairs of Copper pairs, ***objects with charge 4e***. These experiments suggest that even a relatively small prototype device is well protected against magnetic flux variations. Novel experiments with larger Josephson arrays will be also discussed.

1. L.B. Ioffe and M.V. Feigel'man, Possible realization of an ideal quantum computer in Josephson junction array, *Phys. Rev. B* **66**, 224503 (2002).
2. B. Douçot and J. Vidal, Pairing of Cooper pairs in a fully frustrated Josephson-junction chain, *Phys. Rev. Lett*. **88**, 227005 (2002).
3. B. Douçot *et al*., Topological order in the insulating Josephson junction arrays, *Phys. Rev. Lett*. **90**, 107003 (2003).
4. B. Doucot *et al*., Protected qubits and Chern-Simons theories in Josephson junction arrays, *Phys. Rev*. B **71**, 024505 (2005).
5. S. Gladchenko, D. Olaya, E. Dupont-Ferrier, B. Douçot, L.B. Ioffe, and M.E. Gershenson, Superconducting Nanocircuits for Topologically Protected Qubits, *Nature Physics* **5**, 48 (2009).

Author: A. Goldman

Title:
Scaling Analyses of Direct Superconductor-Insulator Transitions in Disordered Ultrathin of Metals

Sufficiently disordered ultrathin films of metals exhibit direct transitions between insulating and superconducting ground states as a function of a control parameter which can be film disorder (thickness) perpendicular or parallel magnetic field, or electric charge, modified using the electric field effect. In sufficiently homogeneous systems finite size scaling has been successfully applied to identify the universality class of the quantum critical point associated with these transitions. Not all systems that have been studied exhibit direct transitions, and the success of scaling does not reveal the underlying microscopic physical nature of the quantum phase transition.
In this talk, the state of the subject will be reviewed.

Author: T. Grenet

Title:
Glassiness in insulating granular aluminum thin films

Disordered insulating materials like indium oxide and granular metals exhibit out of equilibrium phenomena at low temperature. After a quench cool or the application of a gate voltage, slow relaxations of the electrical conductance proceed, together with the appearance of specific field effect anomalies. These might be signatures of an electron glass state which was anticipated almost three decades ago.
We will review briefly the main experimental findings in the case of insulating granular aluminium thin films. In particular we will emphasize the observation and analysis of ageing phenomena, which were the subject of some confusion in previous studies, and clearly show that non trivial dynamics is at work in these systems.

Author: A. Ioselevich

Title:
Coulomb effects in a mixed granular system near the percolation threshold

We consider a granular system with two sorts of small grain (metallic
and insulating) slightly below the percolation threshold. Here the system is a collection of finite metallic clusters, characterized by wide spectrum of sizes, resistances, and charging energies. Clusters are imbedded in an insulating matrix, and electrons hop from cluster to clusters via single-grain insulating "links" of high resistance. At relatively high T the conduction process is possible to organize so, that small Coulomb-blocked clusters are completely avoided by the current; in this regime the dc-conductivity is suppressed by a factor, which is only a power of T. At lower T the current inevitably goes through Coulomb-blocked clusters, and the suppression of becomes exponential. At lowest T the leading transport mechanism is variable
range cotunneling via largest (critical) clusters, leading to the modified
Efros-Shklovsky law. If the dimensionless resistance of critical clusters is large, then there is an interesting intermediate-T regime, where the principal suppression of originates from the Coulomb zero bias anomaly occurring, when electron tunnels between adjacent critical clusters. In this regime the T-dependence of is also stretched exponential, but with a nontrivial index, expressed through the indices of percolation theory. Due to the fractal structure of critical clusters the anomaly is strongly enhanced: it arises not only in low dimensions, but also in d = 3 case.

Author: A. Kapitulnik

Title:
Critical behavior near the superconductor-insulator transitions in two-dimensions

Transport measurements in a perpendicular magnetic field show distinct regimes of strongly fluctuating order-parameter amplitude and phase, and reveal a wide range of insulator strength in samples with differing disorder, despite the similarity in behavior near the superconductor-insulator transition. An intervening metallic phase is also found in films with weak disorder. A detailed study of the superconductor-insulator transition in many films suggests that results for a variety of materials with different strength of disorder can be collapsed onto a single phase diagram. The data display two clear branches, one with weak disorder and an intervening metallic phase, the other with strong disorder.

Author: B. Kessler

Title:
Tunable Superconducting Transition in Doped Graphene Sheets

The superconducting transition in two dimensions is traditionally investigated by varying disorder or applied magnetic field. Ideally,one would also like an easy way to manipulate the concentration of charges mediating the supercurrent. Graphene is a recently realized two-dimensional crystal with many interesting properties including a band structure that allows the carrier concentration to be tuned continuously between electrons and holes. Though graphene is not superconducting by itself, superconductivity can be induced by doping
it with elemental superconductors via the proximity effect. Using a simple fabrication procedure we have recently produced doped superconducting graphene sheets. This new meta-material displays a
gate-tunable transition of the Berezinsky-Kosterlitz-Thouless type. The ease of fabrication and wide tunability of this system offer a unique experimental opportunity to explore the superconducting transition in two dimensions. We report the details of the transition and ground state properties of this system as a function of gate voltage, applied bias and magnetic field.

Author: V. Kravtsov

Title:
Giant jumps in nonlinear resistance: bistability caused by overheating of an electron system

We review recent experiments on nonlinear current-voltage characteristics in amorphous InO and TiN films which show giant jumps in the resistance at some critical voltage. We show that these experiments can be explained by an assumption of overheating of the electron system relative to the phonon bath. If there is a steep enough dependence of resistivity on the electronic temperature, such overheating may cause bistability and existence (below some critical bath temperature) of "cool" and "hot" phases. Although the difference in absolute temperature of these phases is not very large, the steep exponential dependence of resistance on temperature results in a resistance difference of several orders of magnitude similar to the one observed in experiments.

Author: K. Michaeli

Title:
Fluctuations of the superconducting order parameter as an origin of the Nernst effect

We show that the strong Nernst signal observed recently in amorphous superconducting films far above the critical temperature is caused by the fluctuations of the superconducting order parameter. We demonstrate a striking agreement between our theoretical calculations and the experimental data at various temperatures and magnetic fields. Besides, the Nernst effect is interesting not only in the context of superconductivity. We discuss some subtle issues in the theoretical study of thermal phenomena that we have encountered while calculating the Nernst coefficient. In particular, we explain how the Nernst theorem (the third law of thermodynamics) imposes a strict constraint on the magnitude of the Nernst effect.

Author: Markus Müller

Title:
Compensation driven superconductor-insulator transition.

We consider the superconductor-insulator transition in the presence of strong Coulomb disorder in the form of strong compensation of dopants. Such a situation was recently realized in La-doped YBCO and it may occur in many other compounds that can be doped with either type of carriers. The compensation of acceptors by donors makes it possible to change independently the concentration of holes n and the total concentration of charged impurities N. Here, we propose a scaling theory of the superconductor-insulator phase diagram in the (N,n) plane. The transition reflects the BEC-BCS crossover and exhibits interesting features in the case of strong coupling superconductivity, where Cooper pairs behave as compact nonoverlapping bosons. In that case the transition occurs at a significantly higher density n than for spatially overlapping pairs of the same density. We analyze the non-linear screening problem and the SI transition both in isotropic and layered superconductors and make predictions for transport and tunneling measurements, especially on the insulating side of the transition.

Author: K. Prassides

Title:
Fulleride superconductivity at hyperexpanded separations

C_{60}-based solids are archetypal examples of molecular superconductors with superconducting transition temperatures (T_c) as high as 33 K. T_c of the face-centred cubic (fcc) A_3C_{60} (A = alkali metal) fullerides increases monotonically with the interC_{60} separation, which is in turn controlled by the sizes of the A^+ cations – this physical picture has remained unaltered since 1992. Pressure-induced trace superconductivity (s/c fraction<<1%) at ~40 K was reported in 1995 in multiphase samples in the Cs_xC_{60} phase field. Despite numerous attempts by many groups worldwide, this remained unverified and the structure and composition of the material responsible for superconductivity unidentified. This has hindered any attempt to push T_c even higher and make contact with theory which predicts correlation-enhanced superconductivity for expanded fullerides near the metal-insulator transition. Here I will present our recent work in this field that led to the discovery of pressure-induced bulk superconductivity at the highest T_c currently known for any molecular material.

[1] A. Y. Ganin, Y. Takabayashi, Y. Z. Khimyak, S. Margadonna, A. Tamai, M. J. Rosseinsky, and K. Prassides, '*Bulk superconductivity at 38 K in a molecular system*', *Nature Mater*. **2008**, *7*, 367.
[2] Y. Takabayashi, A. Y. Ganin, P. Jeglič, D. Arčon, T. Takano, Y. Iwasa, Y. Ohishi, M. Takata, N. Takeshita, K. Prassides, and M. J. Rosseinsky, '*The disorder-free non-BCS superconductor Cs_3C_{60} emerges from an antiferromagnetic insulator parent state*', *Science* **2009**, *323*, 1585.

Author: P. Raychaudhuri

Title:
Tunneling studies in a disordered s-wave superconductor close to the Fermi glass regime

In this talk I will discuss the evolution of superconducting properties with increase in disorder in homogeneously disordered epitaxial NbN thin films grown on (100) MgO substrate using d.c. magnetron sputtering. Analysis of the temperature dependence of Hall effect and resistivity shows all these films are very close to Anderson metal-insulator transition, spanning the metal-insulator transition boundary. Tunneling measurements reveal that for films with large disorder the superconducting transition temperature is not associated with a vanishing of the superconducting energy gap but with a large broadening of the superconducting density of states. Our results provide strong evidence of the loss of superconductivity via phase fluctuations in a homogeneously disordered s-wave superconductor.

Ref:
Tunneling studies in a homogeneously disordered s-wave superconductor: NbN
S. P. Chockalingam, Madhavi Chand, Anand Kamlapure, John Jesudasan, Archana Mishra, Vikram Tripathi and Pratap Raychaudhuri
Phys. Rev. B **79,** 094509 (2009).

Superconducting properties and Hall effect in epitaxial NbN thin films
S. P. Chockalingam, Madhavi Chand, John Jesudasan, Vikram Tripathi and Pratap Raychaudhuri
Phys. Rev. B **77**, 214503 (2008)

Author: B. Sacépé

Title:
Tunneling spectroscopy on amorphous indium oxide: spectral signature of incoherent Cooper-pairs

The concept of localized Cooper pairs has intrigued scientists for several decades both theoretically and experimentally [1,2]. Until now, transport measurements in disordered superconducting films close to the Superconductor-Insulator Transition (SIT) were unable to provide a conclusive signature of the localized Cooper pairs. In this talk we address this issue of superconductivity and localization by means of local measurements of the Density of States (DOS) on a disordered superconductor with a Scanning Tunneling Microscope. Our samples are thin superconducting films of amorphous indium oxide close to the SIT. Scanning Tunneling Spectroscopy (STS) reveals strong spatial inhomogeneities of the superconducting gap Δ at a nanometer scale, as well as an anomalously large Δ/Tc ratio. Although these measurements have been performed at 50mK deep in the superconducting state (T<<Tc), we have observed unexpected spatial fluctuations of the BCS singularities height in the spectra at eV = $\pm$ Δ. A careful analysis of the temperature dependence of the DOS shows that these BCS singularities grow precisely at Tc, independently of the local gap value, and are the signature of the macroscopic superconducting phase coherence. Hence, in the extreme limit where BCS singularities are absent, the local gap probed by STS is due to the local pairing of electrons in a localization volume, without any phase correlation with the macroscopically coherent condensate. In addition, STS performed above Tc reveals a strong pseudogap state which persists up to 5×Tc. In this regime, we have observed an anomalous violation of the DOS conservation which is, in contrast, restored below Tc. All these observations are discussed regarding the available theories of superconductivity close to the mobility edge [3-5].

[1] M. P. A. Fisher, Phys. Rev. Lett. **65**, 923 (1990)
[2] A. M. Goldman, and N. Markovic, Physics Today, **51**, 39 (1998)
[3] M. Ma and P. A. Lee, Phys. Rev. B **32**, 5658 (2001)
[4] A. Ghosal, M. Randeria, and N. Trivedi, Phys. Rev. Lett. **81**, 3940 (1998); Phys. Rev. B **65**, 014501 (2001)
[5] M. Feigelman, et al, Phys. Rev. Lett. **98**, 027001 (2007)

Author: G. Sambandamurthy

Title:
Inhomogeneous conduction near the quantum critical point in InO films

Abstract: In this talk, recent experimental results from transport measurements on structurally homogeneous, amorphous, indium oxide thin films, that are driven across the superconductor-insulator transition, will be presented. In particular, we will present clear evidence that samples that display homogeneous transport at lower magnetic fields become "electronically inhomogeneous" as we approach the magnetic field tuned quantum critical point. On the higher field side of the transition, the inhomogeneous conduction persists, but the nature of inhomogeneity appears reversed. Current-voltage characteristics in this conduction region will also be presented.

Author: T. Schneider

Title:
Finite size effects in 2D superconductors

Finite size e°Ëects, driven by thermal or quantum áuctuations occur when- ever the growth of the diverging length at a Önite temperature or quantum phase transition is limited. Examples of such limiting lengths include the ex-tent of the homogeneous domains, the failure of cooling and an applied magnetic Öeld. In the latter case is the correlation length of the áuctuations which are transverse to the applied magnetic Öeld bounded by the magnetic length LH/(0=H)1=2. Here we concentrate on superconducting Ölms and interfaces and explore the evidence for the resulting Önite size e°Ëects and their relevance for the interpretation of experimental data.

Author: D. Shahar

Title:
The insulator in the superconductor-insulator transition

We will discuss recent experimental results that shed new light on the
insulating state terminating superconductivity in disordered films under the application of a strong magnetic field. We will focus on the non-linear current voltage characteristics observed in the insulating state and demonstrate how important information on electron-phonon
coupling can be obtained from them.

Author: M. Skvortsov

Title:
Giant Nernst Effect due to Fluctuating Cooper Pairs in Superconductors

A theory of the fluctuation-induced Nernst effect is developed for a two-dimensional superconductor in a perpendicular magnetic field. First, we derive a simple phenomenological formula for the Nernst coefficient, which naturally explains the giant Nernst signal due to fluctuating Cooper pairs. The latter signal is shown to be large even far from the transition and may exceed by orders of magnitude the Fermi liquid terms. We also present a complete microscopic calculation of the Nernst coefficient for arbitrary magnetic fields and temperatures, which is based on the Matsubara-Kubo formalism. It is shown that the magnitude and the behavior of the Nernst signal observed experimentally in disordered superconducting films can be well understood on the basis of superconducting fluctuation theory.

Author: C. Strunk

Title:
The Superconductor-Insulator transition in thin TiN films

We investigate low-temperature transport properties of thin TiN superconducting films, differing in the degree of disorder. At zero magnetic field, we find an extremely sharp separation between superconducting- and insulating phases, demonstrating a direct superconductor-insulator transition (SIT) without an intermediate metallic phase. As temperature decreases the conductivity of the insulating films in the critical region of the disorder-driven SIT undergoes a transition from thermally activated (Arrhenius) behavior to a state with even stronger, 'hyperactivated' temperature dependence.
The latter is destroyed by the magnetic field and voltage bias. We observe a sharp depinning transition at a threshold voltage. The threshold voltage and the activation energy controlling Arrhenius conductivity dependend in a non-monotonic way on magnetic field. These observations suggest formation of a distinct collective insulating
state with characteristic energies, which depend on the total size of the sample.

Author: E. Tosatti

Title:
Strongly Correlated Superconductor_Mott Insulator Transition in Fullerides

Superconductivity in A3C60 trivalent alkali fullerides (A=K, Rb, Cs) -- notoriously phonon-driven and s-wave as in conventional BCS systems -- also exhibits seriously unconventional features. As the cell volume is expanded by physical or chemical means, there is at first an increase of T_c, not inconsistent with BCS, but then a decrease, and finally a superconductor-Mott insulator transition, the latter signaling exceedingly strong electron-electron correlations. Experimental evidence of a low spin S=1/2 antiferromagnetic state [1] indicates that the insulating state is most likely a Mott-Jahn-Teller insulator [2]. The low spin in fact signifies the prevailing intramolecular dynamical Jahn Teller over Hund's rule exchange, since the latter would have favored spin 3/2. Superconductivity in these expanded compounds is thus adjacent, and possibly related, to the Mott insulator state.

Using Dynamical Mean Field Theory (DMFT), Capone et al.[3] solved a
3-band Hubbard model, each molecular site endowed with a threefold
degenerate t1u-like level, and with three electrons hopping between sites with a bandwidth W. Interactions are entirely on-site, including the Hubbard on-site coulomb repulsion U, the intra-molecular Hund's rule exchange J, and the Jahn Teller electron-phonon coupling Ejt -- the latter treated, near the Mott transition, in the unretarded approximation. One crucial assumption of the model, supported by NMR data and by molecular calculations, is that J is strong enough to nearly cancel, but not to overwhelm, the electron-phonon coupling energy Ejt. Introducing the main effect of lattice expansion as a continuous increase of U and a decrease of W -- whence a net rise of U/W but no change of J and of Ejt -- the T = 0 ground state of the Hubbard model is found to evolve from a superconductor with increasing gap, to a sort of pseudogap superconductor with decreasing gap, and finally through a first order transition to a S=1/2 antiferromagnetic Mott insulator.

This theoretical phase diagram is in striking agreement with the experimental behavior of fullerides under volume expansion, most particularly of the recently discovered expanded A15-structured fulleride Cs3C60 as a function of decreasing pressure.[4] The dome-shaped superconducting temperature, the pseudogap phase, and the subsequent Mott insulator state also assimilate the expanded

fulleride superconductors to the behavior of high Tc cuprates as a function of decreasing hole doping, systems which we view as members at large of the same extended family.[5] The strongly correlated superconductivity picture makes additional experimental predictions, including a kinetic energy gain and a Drude weight increase in the superconducting state relative to the normal state, contrary to BCS, but similar to cuprates.

[1] K. Prassides, this Conference; K.Prassides, S.Margadonna, D.Arcon, A.Lappas,H.Shimoda, and Y.Iwasa, ``Magnetic ordering in the ammoniated fulleride (ND3)K3C60'' J. Am. Chem. Soc. 121, 11227 (1999), and references therein.

[2] M. Fabrizio and E. Tosatti, ``Non-magnetic molecular Jahn-Teller Mott insulators'' Phys. Rev. B 55, 13465 (1997).

[3] M. Capone, M. Fabrizio, C. Castellani, and E. Tosatti, "Strongly Correlated Superconductivity" Science 296, 2364 (2002);
"Strongly Correlated Superconductivity and Pseudogap Phase near a Multi-band Mott Insulator", Phys. Rev. Lett.93, 047001 (2004);
"Modeling the Unconventional Superconducting Properties of Expanded A3$C60 Fullerides", Rev. Mod. Phys. (May 2009); and arXiv:0809.0910

[4] A. Y. Ganin, Y. Takabayashi, Y. Z. Khimyak, S. Margadonna, A. Tamai, M. J. Rosseinsky, and K. Prassides, 'Bulk superconductivity at 38 K in a molecular system', Nature Mater. 2008, 7, 367; Y. Takabayashi, A. Y. Ganin, P. Jeglic, D. Arcon, T. Takano, Y. Iwasa, Y. Ohishi, M. Takata, N. Takeshita, K. Prassides, and M. J. Rosseinsky, 'The disorder-free non-BCS superconductor Cs3C60 emerges from an antiferromagnetic insulator parent state', Science Science 323, 1585 (2009)

[5] E. Tosatti, " Fullerides in a Squeeze", Science 323, 1570 (2009).

Author: N. Trivedi

Title:
Nature of Superconducting and Insulating States in a Disordered System

What is the nature of the insulating state? Are there Cooper pairs on the insulating side, if so on what scale? What is the nature of the disordered superconducting state? Are there vortices near the finite temperature transition? And near the zero- temperature disorder-tuned quantum phase transition? I will discuss insights gained into these questions based on inhomogeneous mean field theories and quantum Monte Carlo calculations of the tunneling density of states, frequency-dependent conductivity and superfluid density. I will also discuss the ubiquity of such phenomena in cold atoms in optical lattices and high Tc cuprates.

Author: A. Yazdani

Title:
Nodal Quasi-Particles & the Suppression of Superconductivity with Doping & Temperature in Cuprates

In this talk I will present STM experiments that show how local pairing strength as measured by the behavior of nodal qausi-particle in high-Tc cuprate superconductors evolves with doping and temperature. These experiments provide a rather surprising picture of how superconductivity evolves as it approaches the Mott insulating ground state. They also provide a new perspective on the physics of Fermi arcs that has been the hallmark of underdoped cuprate samples.