

JOINT ICTP-INFN SCHOOL/WORKSHOP ON "ENTANGLEMENT AT THE NANOSCALE"

28 October - 8 November 2002

Miramare - Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP) and the Istituto Nazionale per la Fisica della Materia (INFN, Genova, Italy) are organizing a **School/Workshop on "Entanglement at the Nanoscale"**, to be held at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, from 28 October to 8 November 2002. The activity is co-sponsored by the Dipartimento di Metodologie Fisiche e Chimiche (DMFCI), Facoltà di Ingegneria, Università di Catania, Italy and by the National Enterprise for Nanoscience and Nanotechnology - Istituto Nazionale per la Fisica della Materia (NEST-INFN) and Scuola Normale Superiore, Pisa, Italy.

This Bulletin contains preliminary information and the "Request for Participation" form.

DIRECTORS

Giuseppe Falci - Università di Catania, Italy

Frank Hekking - CNRS and Université Joseph Fourier, Grenoble, France

Vittorio Pellegrini - NEST-INFN and Scuola Normale Superiore, Pisa, Italy

LOCAL ORGANIZER

Vladimir E. Kravtsov - The Abdus Salam ICTP, Trieste, Italy

PURPOSE AND NATURE

The field of coherent nanoelectronics information and communication has become an impressively fertile meeting point of multidisciplinary research. The rapid down-scaling of devices on one hand and the possibility of accurate control on atomic-size systems on the other, have opened the entirely new fields in information technologies. Control of entanglement is a key requirement in quantum computation.

The purpose of this activity is to provide the state-of-the-art on experimental and theoretical approaches to the problem of understanding, producing, manipulating and measuring entanglement in nanosized solid state devices.

The School/Workshop will be organized in such a way as to cover the present day theoretical and experimental activity in the field, with about 25 talks delivered by world leading scientists and several advanced seminars by young scientists. In addition, about 10 longer tutorial talks will be delivered.

MAIN TOPICS

Among others, the following topics will be discussed:

- **Decoherence in condensed matter systems**
- **Entanglement in strongly correlated many-particle systems**
- **Coherence and computation in molecular and biological systems**
- **Nanoelectronics and photonics with proteins and DNA molecules**

PRELIMINARY LIST OF SPEAKERS

D. Averin - State University of New York at Stony Brook, USA
F. Beltram - NEST-INFM and Scuola Normale Superiore, Pisa, Italy
H. Bouchiat - CNRS, Université d'Orsay, France
E. Braun - Technion, Haifa, Israel
C. Bruder - Universität Basel, Switzerland
M. Büttiker - Université de Genève, Switzerland
S. Das Sarma - University of Maryland, College Park, USA
F. De Martini - Università La Sapienza, Roma, Italy
P. Delsing - Chalmers University of Technology, Göteborg, Sweden
A. Ekert - Clarendon Laboratories, Oxford, UK
R. Fazio - NEST-INFM and Scuola Normale Superiore, Pisa, Italy
L. Fortuna - Università di Catania, Italy
J.-M. Gerard - CEA/DRFMC and Université Joseph Fourier, Grenoble, France
V.J. Goldman - State University of New York at Stony Brook, USA
C. Jacoboni - Università degli Studi di Modena e Reggio Emilia, Italy
P. Lafarge - CNRS-MPI High Magnetic Field Laboratory, Grenoble, France
D. Loss - Universität Basel, Switzerland
J. Mooij - Delft University of Technology, The Netherlands
J. Pekola - University of Jyväskylä, Finland
A. Pinczuk - Columbia University, New York, USA
D. Porath - Hebrew University and Tel-Aviv University, Israel
N.C. Seeman - New York University, USA
E. Shapiro - Weizmann Institute, Rehovot, Israel
D. Shepelyansky - CNRS, Université Paul Sabatier, Toulouse, France
A. Shnirman - Universität Karlsruhe, Germany
V. Torre - Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy
C. Urbina - SPEC-CEA Saclay, Gif-sur-Yvette, France
I. Vagner - CNRS-MPI High Magnetic Field Laboratory, Grenoble, France
V. Vedral - Imperial College, London, United Kingdom
W. Wernsdorfer - CNRS Grenoble, France

PARTICIPATION

Scientists and students from all countries that are members of the UN, UNESCO or IAEA can attend the activity. The main purpose of the Centre is to help researchers from developing countries through a programme of training activities within the framework of international cooperation. However, students, post-doctoral scientists and researchers from developed countries are most welcome to attend. As the School/Workshop will be conducted in English, participants must have an adequate working knowledge of that language.

As a rule, travel and subsistence expenses of the participants are borne by their home institutions. However, limited funds are available for applicants from, and working in, developing countries, to be selected by the organizers. As scarcity of funds allows travel to be granted only in a few exceptional cases, every effort should be made by candidates to secure support for their fare (or at least half-fare) from their home country. Such financial support is available only to those attending the entire School/Workshop. There is no registration fee to attend this activity.

Those wishing to participate should complete, sign and return the "Request for Participation" form, to be found at the back of this Bulletin (also obtainable via e-mail: smr1438@ictp.trieste.it, using as subject "get index", or via WWW Server: <http://www.ictp.trieste.it/>).

We would like to stress that the list of recent publications is necessary to evaluate the pertinence to the subject of the activity.

The Request for Participation form should be sent to:

the Abdus Salam International Centre for Theoretical Physics
Joint ICTP-INFM School/Workshop on:
"Entanglement at the Nanoscale"
c/o Ms. Nicoletta Ivanissevich
Strada Costiera 11
I-34014 Trieste, Italy

Deadline for receipt of requests for participation is:

15 July 2002

School/Workshop updatings:

<http://agenda.ictp.trieste.it/agenda/current/fullAgenda.php?ida=a01166>

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
and
INTERNATIONAL ATOMIC ENERGY AGENCY

the ABDUS SALAM INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS

Strada Costiera 11
I-34014 Trieste
Italy

Telephone: +39-040-2240383
Telefax: +39-040-224163
E-mail: smr1438@ictp.trieste.it

REQUEST FOR PARTICIPATION

JOINT ICTP-INFM SCHOOL/WORKSHOP ON
"ENTANGLEMENT AT THE NANOSCALE"

28 October - 8 November 2002

INSTRUCTIONS

Each question must be answered clearly and completely. Type or print in ink. If more space is required, attach additional pages. This form should be forwarded to: the Abdus Salam International Centre for Theoretical Physics, Joint ICTP-INFM School/Workshop on "Entanglement at the Nanoscale" (c/o Ms. N. Ivanishevich), Strada Costiera 11, I-34014, Trieste, Italy, **to arrive no later than 15 July 2002**.

A recent photograph of the candidate should be attached here, signed legibly on the reverse.

NOTE: This request will be processed **only** if the permanent address (and present address, if different) is clearly indicated. The ICTP cannot process any visa request, unless **all** requested personal data are provided.

PERSONAL DATA

SURNAME/FAMILY Name: MAIDEN Name: First name: Middle name(s): Sex:
For women only (if applicable)

IMPORTANT: PLEASE ALSO COMPLETE THIS SECTION, IF YOUR NAME(S) IN YOUR PASSPORT ARE SPELT DIFFERENTLY FROM THE ABOVE.

SURNAME/FAMILY Name: MAIDEN Name: First name: Middle name(s):
For women only (if applicable)

Place of birth (City and Country): Present nationality: Date of birth:
Day - Month - Year

Full name/address of permanent Institution: Institute: Tel. No.
Your Office: Telefax
E-mail: * Tel. No.
Telefax

Full name/address of present Institution : Institute: Tel. No.
(if different from permanent) Your Office: Telefax
E-mail: * Tel. No.
Telefax

until: Date

Home address: Tel. No.

Mailing address - please indicate whether: Permanent ☐ Present ☐ Home ☐

Name and address of person to notify in case of emergency - Relationship: Tel. No.

EDUCATION (higher degrees)University or equivalentName and placeYears attendedFromtoDegrees

Seminars, summer schools, conferences or research

Name and placeYear

SCIENTIFIC EMPLOYMENT AND ACADEMIC RESPONSIBILITYResearch Institution or UniversityName and placePeriod of dutyFromtoAcademicresponsibilities

Present employment and duties, and foreseen employment upon return to home country after the activity:

Have you participated in past ICTP activities? If yes, which?

Yes

☐

No

☐

Are you applying to any other 2002 ICTP activities? If yes, which?

Yes

☐

No

☐

Mention briefly your previous research experience, and explain your reasons for wishing to participate in this activity:

NB: Our Scientific Information System keeps track of all applications made by the candidate to earlier ICTP activities. As a consequence, when the subject of the present activity is far from your previous applications, an explanation (not more than 200 words) of your change of interest should be included.

PRESENT FIELD OF INTEREST (please indicate on the list below your **TWO** primary fields of interest, in order of priority).

10. PHYSICS OF CONDENSED MATTER

- 11. Solid State Physics
- 12. Atomic and Molecular Physics
- 13. Materials Science
- 14. Surfaces and Interfaces
- 15. Statistical Physics
- 16. Computational Physics in Condensed Matter

20. PHYSICS OF HIGH AND INTERMEDIATE ENERGIES

- 21. High Energy and Particle Physics
- 22. Relativity, Cosmology and Astrophysics
- 23. Plasma Physics
- 24. Nuclear Physics

30. MATHEMATICS

- 31. Applicable Mathematics, including:
Mathematical Ecology,
Systems Analysis
Mathematical Economy
Mathematics in Industry
- 33. Algebra
- 34. Geometry
- 35. Topology
- 36. Differential Equations
- 37. Analysis
- 38. Mathematical Physics

40. PHYSICS AND ENERGY

- 41. Physics of Nuclear Reactors
- 42. Physics of Controlled Fusion
- 43. Non-Conventional Energy
(*Solar, Wind & others*)
- 44. Nuclear Energy related technologies

50. PHYSICS AND ENVIRONMENT

- 51. Solid Earth Geophysics
- 52. Soil Physics
- 53. Climatology and Meteorology
- 54. Physics of the Oceans
- 55. Physics of Desertification
- 56. Physics of the Atmosphere, Troposphere, Magnetosphere, Aeronomy
- 57. Environmental Monitoring and Remote Sensing

60. PHYSICS TEACHING

- 61. English
- 62. French
- 63. Spanish
- 64. Arabic

80. MISCELLANEOUS

- 81. Others
- 82. Digital Communications & Computer Networking

90. PHYSICS OF THE LIVING STATE

- 91. Neurophysics
- 92. Biophysics
- 93. Medical Physics

AO. APPLIED PHYSICS

- A1. Physics in Industry
- A2. Microelectronics
- A3. Fibre Optics for Communications
- A4. Instrumentation
- A5. Synchrotron Radiation
- A6. Non-destructive Evaluation
- A7. Lasers
- AA. Applied Superconductivity

B1. SPACE PHYSICS

Kindly supply a keyword description of your current scientific activities, as follows (*strictly within indicated lengths*) :

1) Area of research: (e.g. QUANT. MEASUR., QUANT. COHER.)

(no more than 15 characters)

2) Specific topic of interest: (e.g. THEORY OF QUANT. MEASUR, THEORY OF INFO.)

(no more than 30 characters)

List your **scientific publications** including books and articles (authors, title, Journal) in the period 1997-2002:

Kindly state any positions you hold in the scientific administration of your Institution or any of the national scientific Institutions.

It would be of assistance to the Selection Committee if this request for participation were accompanied by a letter of recommendation, especially for junior physicists,

Indicate below your proficiency in the English language

Reading:	Good	<input type="checkbox"/>	Writing:	Good	<input type="checkbox"/>	Speaking:	Good	<input type="checkbox"/>
	Average	<input type="checkbox"/>		Average	<input type="checkbox"/>		Average	<input type="checkbox"/>
	Poor	<input type="checkbox"/>		Poor	<input type="checkbox"/>		Poor	<input type="checkbox"/>

APPLICABLE ONLY FOR CANDIDATES FROM DEVELOPING COUNTRIES (**Important:** Owing to limited funds, support for travel will be granted only in exceptional cases. Therefore, every effort should be made by applicants to secure support for their fare (or at least a partial contribution) from their home country).

Request for Financial Assistance: **(Please tick ONE box only)**

- | | |
|----------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> Full Travel + Subsistence | <input type="checkbox"/> Subsistence only |
| <input type="checkbox"/> Half Travel + Subsistence | <input type="checkbox"/> No financial support requested |
| <input type="checkbox"/> Travel only | |

I certify that if granted funds for my travel, I shall attend the whole activity

.....
Signature

I certify that the statements made by me above are true and complete. If accepted, I undertake to refrain from engaging in any political or other activities which would reflect unfavourably on the international status of the ICTP. I understand that any breach of this undertaking may result in the termination of the arrangements relating to my visit at the Centre.

Signature of applicant

Date