

CLXII COURSE
QUANTUM COMPUTERS, ALGORITHMS AND CHAOS

5-15 July

Topics:

- Introduction to quantum computing
- Quantum logic, information and entanglement
- Quantum algorithms
- Error-correcting codes for quantum computations
- Quantum measurements and control
- Quantum communication
- Quantum optics and cold atoms for quantum information
- Quantum computing with solid state devices
- Theory and experiments for superconducting qubits
- Interactions in many-body systems: quantum chaos, disorder and random matrices
- Decoherence effects for quantum computing
- Future prospects of quantum information processing

The program will include oral presentations of selected research results obtained by students

Lecturers and Seminar Speakers:

D. AVERIN – Department of Physics and Astronomy, Stony Brook University, NY (USA)
C. W. J. BEENAKKER – Instituut-Lorentz, Universiteit Leiden (The Netherlands)
I. BLOCH – Institut für Physik, Johannes Gutenberg-Universität, Mainz (Germany)
D. BOUWMEESTER – Department of Physics, University of California, Santa Barbara, CA (USA)
H. J. BRIEGEL – Institute for Theoretical Physics, University of Innsbruck (Austria)
N. DAVIDSON – Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israel)
R. DUM – European Commission, Brussels (Belgium)
J. ESCHNER – Institute for Photonic Sciences, Barcelona (Spain)
D. ESTEVE – CEA, Service de Physique de l'Etat Condensé, Centre d'Etudes de Saclay, Gif-sur-Yvette (France)
H. EVERITT – Physics Division, U.S. Army Research Office, Research Triangle Park, NC (USA)
R. FAZIO – Scuola Normale Superiore, Pisa (Italy)
B. GEORGEOT – Laboratoire de Physique Théorique, IRSAMC, CNRS, Université Paul Sabatier, Toulouse (France)
M. GRASSL – Institut für Algorithmen und Kognitive Systeme, Universität Karlsruhe (Germany)
R. LAFLAMME – Institute for Quantum Computing, University of Waterloo, Ontario (Canada)
H. MABUCHI – Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, CA (USA)
A. STEANE – Department of Atomic and Laser Physics, Clarendon Laboratory, Oxford (UK)
P. TOMBESI – Dipartimento di Fisica and Unità INFN, Università di Camerino, MC (Italy)
L. M. K. VANDERSYPEN – Kavli Institute of NanoScience, Delft University of Technology (The Netherlands)
G. VIDAL – Institute for Quantum Information, California Institute of Technology, Pasadena, CA (USA)

Directors of the Course:

G. CASATI – Center for Nonlinear and Complex Systems, Università dell'Insubria, Como (Italy)
D. L. SHEPELYANSKY – Laboratoire de Physique Théorique, IRSAMC, CNRS, Université Paul Sabatier, Toulouse (France)
P. ZOLLER – Institute for Theoretical Physics, University of Innsbruck (Austria)

Scientific Secretary:

G. BENENTI – Center for Nonlinear and Complex Systems, Università dell'Insubria, Como (Italy)

Deadline for application: May 10th, 2005

Correspondence and application forms should be sent to:

G. BENENTI
Center for Nonlinear and Complex Systems
Università dell'Insubria
Via Valleggio 11, 22100 COMO (Italy)
Tel.: ++39-031-2386271 Fax: ++39-031-2386209
giuliano.benenti@uninsubria.it

Opening of the Course: Tuesday, July 5th, 2005 – 9.00 a.m.

Closing of the Course: Friday, July 15th, 2005 – 12.30 a.m.

Participation fee:

EUR 1.300,00 (for attendance, full board, lodging and Proceedings)

GENERAL INFORMATION

A) – In addition to the official lectures, several seminars on related subjects will be held by visiting scientists.

B) – The scientific organization and direction of the Course are entrusted to the Directors.

C) – The number of students at each Course is limited to about 60. Students are requested to attend all lectures and seminars.

D) – Whoever may be interested in attending the Course and is not entitled—for his age or other reasons—to be considered a student, may follow the Course as observer. *Registration fee charged to observers is EUR 500,00.* Observers should provide for their board and lodging; if required, the School may take care of their hotel accommodation.

E) – Applicants will be informed of the decision on their admittance within 30 days from the beginning of each Course.

F) – Owing to the limited number of places available in the lecture hall, it will not be possible to allow any person not selected by the Committee of the School to follow the Courses.

G) – Students are requested to arrive at Varenna the day preceding the opening of the Course, *i.e. respectively on Monday, June 20th (1st Course), Monday, July 4th (2nd Course), Monday, July 18th (3rd Course).* Accommodation for the students will be provided in rooms with 2 beds in hotels at Varenna. Meals will be served at the hotels.

H) – Fees should be paid by students and observers *following the instruction and within the date indicated in the letter of admittance.*

I) – Scholarships may be granted to deserving students who need financial help. Such requests must be specified in the application and justified in the recommendation letter. Scholarships will be assigned by the President of the Italian Physical Society.

J) – Students should avoid being accompanied by relatives. In view of the holiday season local accommodation is very limited. Quite exceptionally the School could see to the accommodation of members of students' families in local hotels. Hotel expenditure for students' relatives will be payable separately and directly to the hotel management.

The President
Società Italiana di Fisica
GIUSEPPE-FRANCO BASSANI

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INTERNATIONAL SCHOOL OF PHYSICS "ENRICO FERMI"

APPLICATION FORM

COURSE CLXI "Polarons in Bulk Materials and Systems with Reduced Dimensionality" ☐
COURSE CLXII "Quantum Computers, Algorithms and Chaos" ☐
COURSE CLXIII "CP Violation: from Quarks to Leptons" ☐

To be sent to:

COURSE CLXI

G. DE FILIPPIS
Dipartimento di Fisica
Università "Federico II"
Complesso Universitario Monte S. Angelo
Via Cintia, 80126 NAPOLI
(Italy)

Tel.: ++39-081-676854

Fax: ++39-081-676828

giuliod@na.infn.it

Closing date for application:
May 1st, 2005

COURSE CLXII

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and Complex Systems
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giuliano.benenti@uninsubria.it

Closing date for application:
May 10th, 2005

COURSE CLXIII

M. SOZZI
Scuola Normale Superiore
Piazza dei Cavalieri 7, 56126 PISA
(Italy)

Tel.: ++39-050-509085/2214258

Fax: ++39-050-563513

marco.sozzi@cern.ch

Closing date for application:
May 20th, 2005

Name and surname _____

Place and date of birth _____

Nationality _____

Male ☐ Female ☐

Degree _____

Date and place of acquisition _____

Present activity _____

Affiliation with complete postal address _____

Tel. _____ Fax _____

E-mail _____

Recommended by _____

Enclose a letter of reference from your research group leader or professor testifying to your qualifications and interest in participating in the Course; enclose also list of publications)

I request student status ☐ I request observer status ☐

Date _____ Signature _____