

INTERNATIONAL SCHOOL OF QUANTUM ELECTRONICS

46th Course

Atoms and Plasmas in super Intense laser fields

ERICE-SICILY: 10 - 16 July 2009

Sponsored by the: • Italian Ministry of Education and Scientific Research • Sicilian Regional Parliament
• University of Rome "Tor Vergata" • University of Milano-Bicocca • Programme SILMI" of the EUROPEAN SCIENCE FOUNDATION (ESF) • EUROPEAN PHYSICAL SOCIETY (EPS)

PROGRAMME AND LECTURERS

Guy Schurtz, CELIA, Bordeaux, France, Italy
Dimitri Batani, Univ. Milano Bicocca, Italy
John Collier, Rutherford Appleton Laboratory, UK
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Leonida Gizzi, CNR, Pisa, Italy
Matteo Passoni, Politecnico di Milano, Milan, Italy
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Hiroaki Nishimura, ILE, Osaka Univ., Japan
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Mauro Nisoli, Politecnico di Milano, Milan, Italy
Farhad Faisal, University of Bielefeld, Germany
Victor Malka, LOA, Palaiseau, France
Michael Tatarakis, TEI, Crete, Greece
Louis DiMauro, The Ohio State University, U.S.
Gerhard Paulus, MPQ, Garching, Germany

Modelling and Simulations of Laser Produced Plasmas
Physics of laser generated shocks
High-energy PW laser systems
Atoms in intense laser fields
Fast electron transport in matter
Laser-driven ion acceleration: theoretical models
Interaction of strong laser fields with molecules
An overview of inertial confinement fusion research
Molecules in intense laser fields
Recent advances in attosecond science
Electron-Electron Correlation & Double Ionization in Intense Fields
Principle and State of the Art of Laser Plasma Accelerators
Magnetic field generation in high intensity laser plasmas
Scaling in strong-field physics
Above-threshold ionization

PURPOSE OF THE COURSE

The advent of laser systems capable of delivering very short pulses and very high intensities has made accessible new regimes to experimental investigations and has opened new horizons in the interaction of laser fields with atoms, solids and plasmas. In these extreme conditions, electrons are accelerated at velocities close to the velocity of light and electromagnetic fields become much larger than atomic electric fields, so that strongly non-linear and relativistic interactions take place. The traditional distinction between solids and atoms on one side and plasmas on the other side tends to vanish and exotic states of matter are created. A large variety of applications has arisen, from novel light and X-ray sources, to new particle acceleration techniques and the "fast ignition" approach to Inertial Confinement Fusion. In particular the recent programme HiPER supported by the European Union aims at designing a large laser facility for achieving Inertial Fusion via Fast Ignition. The Course will cover areas of interest to the atomic physics and to the plasma physics scientific communities and is opened in particular to students and researchers wishing to enter this new field. Lectures and specialised seminars will cover current developments in theory and experiments but are also intended to give the basics of the field. Poster sessions allowing participants to show their work are planned.

POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (750 metres above sea level) more than three thousand years ago. The founder of modern history - i.e. the recording of events in a methodical and chronological sequence as they really happened without reference to mythical causes - the great Thucydides (~500 B.C.) writing about events connected with the conquest of Troy (1183 B.C.) says: "After the fall of Troy some Trojans on their escape from the Achaei arrived in Sicily on boats and as they settled near the border with the Sicilians all together they were named Elymi: their towns were Segesta and Erice". This inspired Virgil to describe the arrival of the Trojan royal family in Erice and the burial of Anchise, by his son Enea, on the coast below Erice. Homer (~1000 B.C.), Theocritus (~300 B.C.), Polybius (~200 B.C.), Virgil (~50 B.C.), Horace (~20 B.C.) and others have celebrated this magnificent spot in Sicily in their poems. During seven centuries (XIII-XIX) the town of Erice was under the leadership of a local oligarchy, whose wisdom assured a long period of cultural development and economic prosperity which in turn gave rise to the many churches, monasteries and private palaces which you see today. In Erice you can admire the Castle of Venus, the Cyclopean Walls (~800 B.C.) and the Gothic Cathedral (~1300 A.D.). Erice is at present a mixture of ancient and medieval architecture. Other masterpieces of ancient civilization are to be found in the neighbourhood: at Motya (Phoenician), Segesta (Elymian), and Selinunte (Greek). On the Aegadian Islands - theatre of the decisive naval battle of the first Punic War (264-241 B.C.) - suggestive neolithic and paleolithic vestiges are still visible: the grottoes of Favignana, the carvings and murals of Levanzo. Splendid beaches are found at San Vito Lo Capo, Scopello, and Cornino, and a wild and rocky coast around Monte Cofano: all at less than one hour drive from Erice.

More information about the activities of the Ettore Majorana Centre can be found on the WWW at the following address:
<http://www.ccsem.infn.it>

D. BATANI - C. J. JOACHAIN
DIRECTORS OF THE COURSE

GENERAL INFORMATION

Persons wishing to attend the Course, and those wishing to present a poster contribution, should apply in writing to:

Prof. Dimitri Batani
Dipartimento di Fisica "G. Occhialini"
Università di Milano Bicocca
Piazza della Scienza 3, I-20126 Milano (Italy)
fax: +39 02 6448 2585
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They should specify:

- full name(s), address, age, nationality;
- academic qualifications and degree;
- present position and place of work;
- current research activity;
- list of publications

Junior scientists should enclose a letter of recommendation from the head of their research group or from another senior scientist active in the field.

The total fee, which includes full board, a copy of the proceedings (CD) and lodging (arranged by the School), is EURO 650.

Closing date: applications must be received (by letter, fax, email) no later than June 10, 2009
No special application form is required

Admission to the Course will be decided by the three Directors of the course: Professors D. Batani, C. Joachain and S. Martellucci. All applicants will be notified about acceptance by June 17 (or earlier depending on the date of application). They will need to pay the registration fee before June 24 by bank transfer to the following bank account:

Banca Intesa San Palo, Piazza Udine 3, 20134 Milan, Italy, BIC code BCITITMM,
IBAN code IT54Q0306909562258704973173 Subject: 46th Erice School
Copy of the money transfer order must be sent by fax or email to Prof. D. Batani.

Grants covering half the fee (325 Euro) or the total fee (650 Euro) are available: these should be explicitly requested and strongly motivated in the application. No grants can be given to cover travel expenses. Priority will be given to applicants coming from groups already sending other "paying" students and to the students presenting a poster.

Persons receiving the grants need in any case register and pay for the fee and will be reimbursed at the end of the school. Deadline for request of grants is June 1st, 2009. By June 10, all grant applicants will be notified about the result of their request.

Participants must arrive in Erice on July 10, before 5 pm and leave no earlier than July 16 at 2 pm. Advanced research papers by participants are welcome for poster presentation, and will be considered for publication in the Proceedings of the Course together with the invited lectures. PowerPoint files of the posters (in several pages with A4 format) must be sent by email by June 24 so to be included in the CD of the proceedings. A prize for the best poster presented by young students will be awarded. Detailed information and the final programme of the Course, including timetable of lectures, will be sent to successful applicants together with the letter of acceptance.

S. MARTELUCCI
DIRECTOR OF THE SCHOOL