



«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE
TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE
AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES



INTERNATIONAL SCHOOL OF QUANTUM ELECTRONICS

59th Course

THE FRONTIERS OF ATTOSECOND AND ULTRAFAST X-RAY SCIENCE

ERICE-SICILY: 19 – 28 MARCH 2017

Sponsored by the: • Italian Ministry of University and Research • Sicilian Regional Government
• EUROPE UNION • COST Action XLIC • Politecnico di Milano • "Tor Vergata" University Rome, Italy

TOPICS AND LECTURERS

Introduction to strong-field processes: scaling from multiphoton to tunnelling

• P. AGOSTINI, The Ohio State University, Columbus, OH, US

High harmonic generation, coherence and phase matching

• A. L'HUILLIER, Lund University, SE

The principles of attosecond technology: generation and metrology

• Z. CHANG, University of Central Florida, Orlando, FL, US

Ultrafast molecular dynamics

• J. MARANGOS, Imperial College, London, UK

Future perspectives in attosecond science enabled by ELI-ALPS

• K. VARJU, ELI-Hu, Szeged, HU

XFELs: a new vista in ultrafast x-ray science

• P. BUCKSBAUM, Stanford University, US

Time-dependent approaches in attosecond science

• K. SCHAFER, Louisiana State University, Baton Rouge, LA, US

Advanced XUV optics

• L. POLETTI, IFN-CNR, Padova, IT

Control of electron dynamics with ultrashort pulses and FELs

• F. MARTIN, Universidad Autonoma de Madrid, ES

Condensed-matter physics with attosecond pulses

• R. KIENBERGER, Technical University, Munich, DE

Nonlinear optics in the XUV

• D. CHARALAMBIDIS, FORTH - Heraklion, GR

Attosecond electron wave packet self-probing of molecules and solids

• P. CORKUM, NRC-CNRC, Ottawa, CA

Large facilities: Synchrotron radiation and FEL

• K. PRINCE, Elettra Sincrotrone, Trieste, IT

General instrumentation: Molecular target production, mass spectrometers, ion traps

• T. SCHLATHOLTER, University of Groningen, DE

Ion-molecule chemistry and Production of molecular beams by ESI technique

• A. CARTONI, La Sapienza, Roma, IT

Production of molecular cluster beams. Large facilities: Ion beam accelerators

• P. ROUSSEAU, Universite de Caen Normandie, FR

General instrumentation: Electron spectrometers. Experiments with synchrotron radiation

• P. BOLOGNESI, ISM-CNR, Roma, IT

Examples of experiments with FEL

• L. AVALDI, ISM-CNR, Roma, IT

Detection systems: detectors, acquisition systems and data analysis

• O. JAGÜTZKI, RoentDek, Kelkheim, DE

Electrostatic storage rings for atomic and molecular physics

• H. SCHMIDT, Stockholm University, SE

Ion collisions-fragmentation and reactivity

• A. DOMARACKA, CNRS-CIMAP, Caen, FR

PURPOSE OF THE COURSE

The new millenium witnessed two revolutionary breakthroughs in ultrafast x-ray science. In 2001, two independent groups reported the formation of attosecond pulses of XUV radiation. Since that time the field of attosecond science has grown exponentially and new attosecond laboratories have emerged throughout the world. Similarly in 2009 the world's first x-ray free-electron laser, XFEL, known as LCLS, became operational at SLAC in the USA. The LCLS has produced unprecedented coherent x-ray pulses with femtosecond brevity and gigawatt peak power. These x-ray devices impact is far reaching encompassing applications in fundamental physics to the biological sciences. Since the operation of the LCLS a number of XFELs have or will become operational in the near future. The tremendous growth in these two related areas will require the training of young scientists who will push the technology and applications. The primary objective of this new school is to educate the next generation of scientists who will impact the future of attosecond and ultrafast x-ray science. We anticipate that the School will meet on a regular basis every two years and become a foundation for the ultrafast community. Consequently, the main topics of the course are the following: i) attosecond science and technology, devoted to the generation and application of attosecond pulses to the investigation of electronic dynamics in atoms, molecules, nanostructures and condensed phases; ii) fundamentals, methods and applications of free electron lasers, synchrotron radiation, ion collisions in atomic and molecular science.

APPLICATIONS

Persons wishing to attend the Course should apply in writing to:

- Professor Mauro NISOLI
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Piazza L. da Vinci, 32 – 20133 Milano, Italy
Tel: +39 02 2399 6167 – Fax: +39 02 2399 6126
E-mail: mauro.nisoli@polimi.it

- PLEASE NOTE

Participants must arrive in Erice on March 19, not later than 5 pm.

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 methodic 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.) said: «After the fall of Troy some Trojans on their escape from the Achaei arrived in Sicily by boat 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 Aeneas, 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 to be found at San Vito Lo Capo, Scopello, and Cornino, and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice.

More information about the «Ettore Majorana» Foundation and Centre for Scientific Culture can be found on the WWW at the following address:
<http://www.ccsem.infn.it>