



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



# INTERNATIONAL SCHOOL OF ATOMIC AND MOLECULAR SPECTROSCOPY

## 24th Course: FRONTIER DEVELOPMENTS IN OPTICS AND SPECTROSCOPY

ERICE-SICILY: 17 JUNE – 2 JULY 2007

Sponsored by the: • Boston College • Italian Ministry of Education, University and Scientific Research  
• Sicilian Regional Government • ENEA

### PROGRAMME AND LECTURERS

#### *Optical Spectroscopy: Selectivity and Sensitivity*

• W. DEMTROEDER, Universität Kaiserslautern, D

#### *Extraction of Weak Signals in the Presence of Strong Noise*

• R. VON BÄLTZ, Universität Karlsruhe, D

#### *Photonic Metamaterials: Optics Starts Walking on Two Feet*

• M. WEGENER, Universität Karlsruhe, D

#### *Nanophotonics: Linear and Nonlinear Optics at the Nanoscale*

• E. MAZUR, Harvard University, Cambridge, MA, USA

#### *Wide-Band Luminescent Emitters*

• B. DI BARTOLO, Boston College, Chestnut Hill, MA, USA

#### *Luminescence Spectroscopy as Material Science*

• J. COLLINS, Wheaton College, Norton, MA, USA

#### *New Developments in Laser Physics*

• G. BALDACCINI, ENEA, Frascati, I

#### *Semiconductor Lasers – from Basics to Devices*

• C. KLINGSHIRN, Universität Karlsruhe, D

#### *Inventing and Improving Lasers Using Quantum Mechanics*

• N. BARNES, NASA Langley Research Center, Hampton, VA, USA

#### *Ceramic Materials for Lasers and Other Applications*

• X. CHEN, Wheaton College, Norton, MA, USA

#### *Laser Induced Breakdown Spectroscopy (LIBS)*

• R. FANTONI, ENEA, Centro Ricerche Energia Frascati, I

#### *LIBS, Mid-Infrared and Evanescent Field Spectroscopy*

• W. SCHADE, Technische Universität Clausthal, D

#### *Lidar Systems for Stand-off Detection of Hazardous and Pollutant Molecules*

• A. PALUCCI, ENEA, Frascati, I

#### *The Physics of Nanomaterials*

• L. OTTAVIANO, Università dell'Aquila, I

#### *Luminescence of Very Small Semiconductor Particles*

• C. RONDA, Philips Research Laboratories Aachen, D

#### *Spectroscopy at the Nanoscale Level*

• G. LIU, Argonne National Laboratory, IL, USA

#### *Harmonic Generation and Cooperative Emission in Nanocrystals*

• G. BOULON, Université Claude Bernard Lyon I, Villeurbanne, F

#### *Quantum Entanglement*

• P. MATALONI, Università di Roma "La Sapienza", I

#### *Spectroscopy of Photonic Atoms*

• S. ARNOLD, Brooklyn Polytechnic University, NY, USA

#### *Single InGaAs Quantum Dots*

• M. HETTERICH, Universität Karlsruhe, D

### PURPOSE OF THE COURSE

The purpose of this Course will be to present the new developments in the field of spectroscopy including the realm of new phenomena and the new techniques that allow their exploration.

New techniques open the possibility of probing into new and unexplored areas. The discovery of new effects spurs the growth of new and more refined techniques which may in turn be used to discover new phenomena, and so on, in a sort of inexorable and never ending spiral "technique-phenomenon-new technique-new phenomenon-new technique, etc." This process has accelerated in recent times, leaving people entering the field of spectroscopy - as well as people in the field - with a serious difficulty in grasping the magnitude and the variety of the new developments.

The Course will consider seriously this problem and will present in a pedagogical fashion the new aspects, both theoretical and experimental, of the spectroscopic optical research. Recent developments in laser technology and optical technology in general, coupled with rapid advancements in materials research, synthesis, and fabrication (e.g. nanomaterials and photonic metamaterials) have opened the door to completely new regimes of optical spectroscopy that the course will explore. New developments in the fields of laser technology, semiconductors, luminescence and quantum entanglement will also be reported.

### APPLICATIONS

Persons wishing to attend the Course should apply in writing to the Director of the School:

- Professor Baldassare DI BARTOLO  
Department of Physics, Boston College  
CHESTNUT HILL, MA 02467, USA  
e-mail: [dibartob@bc.edu](mailto:dibartob@bc.edu)

Applications can be done by e-mail or by regular mail. If using the e-mail system, do not send the application as attachment or with attachments. The applicants should provide the following:

- date and place of birth, together with their present nationality;
- degrees and other academic qualifications;
- present position and place of work and current research activities;
- a letter of recommendation from their research group leader or from a senior scientist active in the field;
- a list of graduate courses attended (if the applicant is a graduate student);
- a list of publications (optional).

### 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 Sicanians 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 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>

#### • PLEASE NOTE

Participants must arrive on June 17, not later than 7 pm.

**Closing Date for Applications: May 15, 2007**