



«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

64th Course: *PROGRESS IN PHOTOACOUSTIC AND PHOTOTHERMAL PHENOMENA: FOCUS ON BIOMEDICAL, NANOSCALE, NDE, GAS SENSING AND THERMOPHYSICAL PHENOMENA AND TECHNOLOGIES*

ERICE-SICILY: 16 – 23 OCTOBER 2021

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

PROGRAMME AND LECTURERS

Ultrafast Thermo-Optical Dynamics of Nanoparticles
• F. BANFI, Université Claude Bernard Lyon 1, FR

Overview the state of QCL technology and new directions in devices development
• M. BELKIN, Technical University Munich, DE

Conception of thermionic cooling semiconductor device: from double barrier heterostructure to Quantum Cascade Cooler
• M. BESCOND, LIMMS IRL CNRS IIS, Marseille, FR

Achieving sub-ppt gas detection with cavity-enhanced photoacoustic sensors
• S. BORRI, Istituto Nazionale di Ottica CNR, Firenze, IT

Spatial resolution in photothermal and photoacoustic imaging
• P. BURGHOLZER, Research Center for non-destructive testing, Linz, AT

SRAS & SRAS++ Microstructural Imaging
• M. CLARK, University of Nottingham, UK

Hybrid lasers for spectroscopy
• W.W. CURTIN, Munster Technological University, Cork, IE

Biomedical PA Imaging Using Nanoscale Theranostic Agents: Principles, Approaches, and Applications
• S. EMELIANOV, Georgia Tech, Atlanta, GA, US

Optoacoustic Diagnostics, Therapy, and Theranostics
• R. ESENALIEV, University of Texas Medical Branch, TX, US

Thermal Lens Spectrometry: Theory and Applications
• M. FRANKO, University of Nova Gorica, SI

Photoacoustic imaging system towards more miniaturization and intelligence
• F. GAO, ShanghaiTech University, Shanghai, CN

Laser ultrasonics for material characterization and defect detection
• C. GLORIEUX, Katholieke Universiteit Leuven, BE

Nonlinear photothermal microscopy in biomedicine
• T. KOBAYASHI, National Chiao-Tung University, Hsinchu, TW

Photothermal expansion nanoscale spectroscopy
• B. LENDL, Technical University of Wien, AT

Lock-in Carrierography and Dynamic Thermography of Solar Cells
• Jun-Yan LIU, Harbin Institute of Technology, Harbin, CN

Photothermal Deflection Technique: Historical background, Principle and Applications
• R. LI VOTI, Sapienza University of Rome, IT

Biomedical and Dental Imaging applications of Truncated Correlation – Photothermal Coherence Tomography (eTC-PCT)
• A. MANDELIS, University of Toronto, CA

Measuring aerosol absorption and their role in climate change – PT interferometry to the rescue!
• G. MOCNIK, University of Nova Gorica, SI

Thermographic Approach to the Investigation of Cultural Heritage
• S. PAOLONI, Università di Roma Tor Vergata, Rome, IT

Tuning a diapason to the sound of molecules: the power of Quartz-Enhanced Photoacoustic Spectroscopy
• P. PATIMISCO, Politecnico di Bari, IT

Progress and perspective on modulated photothermal and photoluminescence methods of semiconductors and other materials
• M. PAWLAK, Nicolaus Copernicus University, Torun, PL

A short review on the use of "infrared vision" for the inspection of cultural heritage: the contribution of mock-ups.
• S. SFARRA, Università degli Studi de l'Aquila, IT

Designing acoustic metamaterials for wave blocking and modulation
• O.B. WRIGHT, Hokkaido University, Sapporo, JP

PURPOSE OF THE COURSE

The Course shows and discusses key recent advances and progress in Photoacoustic & Photothermal (PA/PT) techniques as applied to biomedical, nanoscale, nondestructive evaluation and testing of materials, gas sensing, and thermophysical phenomena and technologies which has been the main theme of the biennial series of courses organized at EMFCSC since 2010. The Course will bring together natural and biomedical scientists, engineers, technology developers and users who are interested and/or involved in principles and applications of PA/PT. The wealth of present-day PA/PT topics indicates that this field has developed a broad range of tools for fundamental and applied research. PA/PT research has reached a mature state, firmly established as a non-destructive measurement and materials characterization technology on the macro- and nano-scale, as well as a non-invasive biomedical imaging modality. Future progress will be seamlessly linked to close synergy with advances in new laser and detector technologies. The Course emphasizes the explosive growth of biomedical PA, and will focus on the growing biophotoacoustic and emerging biophotothermal imaging modalities and their applications around the world and in Europe, in particular. It also emphasizes the significant and growing contributions of PA/PT to the non-destructive evaluation / characterization of nanoscale, opto-electronic, and other advanced materials. Participants are strongly encouraged to present their own results in the field. Part of the Course will be the School "Foundations of Photothermal and Photoacoustic Techniques: Theory, Instrumentation and Applications" that will be organized together with the Graduate School of the University of Nova Gorica, Slovenia coordinated by M. Franko and V. Spagnolo. The School is intended for students at the graduate level, who have research and future professional interests in photothermal instrumental techniques and related issues. The School will be organized as a series of comprehensive lectures and case study presentations with compulsory attendance to lectures of the Course and presentation of participants' own papers. Students will earn 10 ECTS credits for having completed the School. The Course is supported by "Sapienza" University of Rome.

APPLICATIONS

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

Professor Roberto LI VOTI
Dipartimento S.B.A.I. - Università La Sapienza di Roma
Via A. Scarpa 16 - 00161 Roma, Italy
Fax: +39.06.44240183 – e-mail: roberto.livoti@uniroma1.it

They should specify: i) full name(s), address, age, nationality; ii) academic qualifications and degree; iii) present position and place of work; iv) current research activity; v) list of publications.

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 Anchises, 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.ccssem.infn.it>

PLEASE NOTE

Participants must arrive in Erice no later than 7 p.m. on 16 September June 2021.