International School of Atomic and Molecular Spectroscopy

35th Course: QUANTUM NANO-PHOTONICS

A NATO Advanced Study Institute

Erice-Sicily: 20 July - 4 August 2017

Sponsored by: • Italian Ministry of University and Scientific-Technological Research • Sicilian Regional Government • Boston College

TOPICS AND LECTURERS

Quantum Nanophotonics
• S. GAPONENKO, National Academy of Sciences, Minsk, BE

Research on New Rare Earth-doped Cubic Optical Ceramics in Tungstate and Molybdate Matrices
• M. GÜZÜK, University of Wrocław, Wrocław, PL

Integrated Zero Index Nanomaterials
• E. MAZUR, Harvard University, Cambridge, MA, US

Quantum Sensing and Engineering
• L. NOVOTNY, ETH, Zürich, CH

Waveguide Based Superconducting-Nanowire Single-Photon Detectors
• W. PERNICE, University Münster, DE

Coxeter Forces: Fundamental Theory, Computation, and Nanodevice Applications
• F. PINTO, İzmir University of Economics, İzmir, TR

Quantum Noise in Lasers
• M. POLLNAU, Royal institute of Technology, Kista, SE

Simulations in Nanophotonics
• L. RAMUNNO, University of Ottawa, Ottawa, CA

Fundamentals and Applications of Nanoplasmonics
• M.I. STOCKMAN, Georgia State University, Atlanta, GA, US

When does Light get Quantum?
• M. WEGENER, Karlsruhe Institute of Technology (KIT), Karlsruhe, DE

Quantum Aspects of Biophotonics
• J.-P. WOLF, Université de Gênes, Gênes, Gêne

Colloidal Nanocrystals for Optoelectronics
• V. WOOD, ETH Zürich, CH

PurPOSE OF THE COURSE

Almost all fundamental experiments in quantum optics have relied on macroscopic light sources, detectors, spectrometers, and mirrors on optical tables, where photons are propagating through air or vacuum. In analogy to developments in integrated electronic circuits, the future will require an integrated approach to someday achieve quantum-optical chips. Recently, early steps in this direction have been taken, e.g., by miniaturizing optical setups using integrated passive dielectric waveguides on chips. Yet more recently, nano-plasmonics, nanostructured optical metamaterial components and their coupling to light emitters are intensively being investigated in the context of quantum optics.

The general aim of this Course will be to bring together more closely researchers working in the two fields of quantum optics and nano-optics. In this fashion, the Course will foster the goal of integrated quantum-optics on a micro- or nanostructured chip.

The Course will, for example, cover single-photon emitters and emitters of entangled photon pairs, coupled quantum bits based on trapped ions, photon pairs based on epitaxially grown semiconductor quantum dots, nitrogen vacancy centers in diamond as single-photon emitters, and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice. and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice.

The participants will have the opportunity to interact with each other in a stimulating atmosphere and to present their research work in the form of short seminars or posters.

APPLICATIONS

Interested participants should send a letter to the Director of the School:

• Professor Baldassare DI BARTOLO
Department of Physics, Boston College – Chestnut Hill, MA 02467, US
email: dibartob@bc.edu

Application can be done by e-mail or by regular mail. The applicants should provide the following information: i) Date and place of birth, together with the present nationality; ii) degree and other academic qualifications; iii) present position, place of work, and current research activities; iv) a letter of recommendation from their research group leader or from a senior scientist active in the field; v) a list of graduate courses attended (if the applicant is a graduate student).

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

POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (730 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 Sicans all together they were named Elyma: 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 (Elyman), and Selinunte (Greek). On the Aegean Islands — theatre of the decisive naval battle of the first Punic War (264-241 B.C.) — suggestive neolithic and palaeolithic 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.

http://www.ccsem.infn.it

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• PLEASE NOTE
Participants must arrive on July 20, not later than 7 pm.

The deadline for applications is June 15, 2017.