SEMINAR

Quantum Photonics with Ordered Quantum Dot and Quantum Wire Systems

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Dipartimento di Scienza dei Materiali

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Ed. U5, Via Cozzi, 55 20126 Milano

Organizers: Prof. Stefano Sanguinetti (UniMIB)

Dr. Silvia M. Pietralunga (CNR-IFN)

IEEE – Photonics Italy, President

The seminar will be English-spoken

Eli Kapon- Biography, 3.2017

Eli Kapon received his Ph.D. in physics from Tel Aviv University, Israel in 1982. He then spent two years at the California Institute of Technology, Pasadena, as a Chaim Weizmann Research Fellow, and then nine years at Bellcore, New Jersey, as member of technical staff and District Manager. Since 1993 he has been Professor of Physics of Nanostructures at the Swiss Federal Institute of Technology in Lausanne (EPFL), where he heads the Laboratory of Physics of Nanostructures. In 1999-2000 he was a Sackler Scholar at the Mortimer and Raymond Sackler Institute of Advanced Studies in Tel Aviv University, Israel. During that period he helped establishing the Tel Aviv University Center for Nanoscience and Nanotechnology and served as its first Director from 2000 to 2002. In 2001 he founded the start up *BeamExpress*, serving as its Chief Scientist. His research interests include quantum- and nano-photonics, low-dimensional semiconductors, and vertical cavity semiconductor lasers. Prof. Kapon is Fellow of the Optical Society of America, the Institute of Electrical and Electronics Engineers, and the American Physical Society of America, a recipient of a 2007 Humboldt Research Award, and a Photonics Society Distinguished Lecturer for 2015-2017.

Abstract

Quantum Photonics with Ordered Quantum Dot and Quantum Wire Systems

Quantum wire (QWR) and quantum dot (QD) systems offer means for tailoring the electronic structure of semiconductors thanks to multi-dimensional quantum confinement. By placing them in confined photonic structures (waveguides, cavities) it is possible to tailor light-matter interaction via the introduced modifications in the density of states of excitons and photons. We review the technology of ordered QWR and QD structures grown by metallolrganic vapor phase epitaxy on patterned substrates and their integration with photonic components. Tailoring exciton wavefunctions, controlling their recombination dynamics, and observing cavity quantum electrodynamic effects in the integrated structures are described. Applications in quantum information technology and ultralow threshold lasers are discussed.