



University of Pavia

Ph.D. School of Electrical and Electronics Engineering and Computer Science

SEMINAR

Ghost modalities with thermal light emitted by a broad-band superluminescent diode: ghost imaging, ghost spectroscopy and ghost polarimetry

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Friday, April 13, 2018, 12:00

Aula seminari ex Dipartimento di Elettronica, piano D

Abstract: The talk will start with a short review of the Hanbury-Brown & Twiss experiment from 1956 with its tremendous outreach into nowadays quantum optics research.

In the wake of the HBT experiment, results from a comprehensive investigations of the second-order coherence properties of broadband amplified spontaneous emission (ASE) light generated by semiconductor-based opto-electronic quantum dot superluminescent diodes (SLDs) will be shown, demonstrating that these sources exhibit perfect photon bunching with a normalized 2nd order correlation coefficient of two, thus having a Bose-Einstein photon statistics similarly to a thermal source.

Then, a ghost imaging (GI) experiment will be explained. In close analogy to the exploitation of spatial correlations in GI, the spectral correlations of broadband light emitted by an SLD will be presented, realizing the first SLD ghost spectroscopy experiment by measuring the absorption feature of chloroform at 1300nm.

Finally, the functionality and advanced applications of ghost spectroscopy and ghost polarimetry will be discussed.

Bio: Wolfgang Elsässer received the diploma degree in Physics from the Technical University of Karlsruhe in 1980, the Ph.D. degree in Physics from the University of Stuttgart in 1984, and a Habilitation degree in Experimental Physics from the Philipps-University Marburg in 1991. From 1981 to 1985, he was with the Max-Planck-Institute for Solid State Research Stuttgart. From 1985 to 1995, he was with the Philipps-University Marburg. Since 1995, he is Full Professor in the Institute of Applied Physics, Darmstadt University of Technology.

His research interests concern quantum optics of semiconductor emitters, light squeezing, quantum metrology, phase conjugation and multi-wave mixing, nonlinear dynamics, nonlinear optics in semiconductor waveguides, ultrashort pulse generation and mode-locking of semiconductor lasers, generation of THz frequencies with semiconductor devices and mid-infrared-emitting quantum cascade lasers.

Organizers

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