

Congratulations to New ICFO PhD graduate

Dr. Ji?i Svozilik graduated with a thesis in ?Photonic Entanglement: New Sources and New Applications?

October 17, 2014

Dr. Ji?i Svozilik received his Master Degree Master in Optics and Optoelectronics in Palacky University, Czech Republic. After completing his degree, he joined the Quantum engineering of light research group at ICFO, led by Prof. Juan Perez-Torres, and centered his doctoral work on the photonic entanglement and coherence on a both theoretical and experimental level. Dr. Svozilik?s thesis, entitled ?Photonic Entanglement: New Sources and New Applications? was supervised by Prof. Juan Perez-Torres.

Abstract:

Non-classical correlations, usually referred as entanglement, are ones of the most studied and discussed features of Quantum Mechanics, since the initial introduction of the concept in the decade of 1930s. Even nowadays, a lot of efforts, both theoretical and experimental, are devoted in this topic, that covers many distinct areas of physics, such as a quantum computing, quantum measurement, quantum communications, solid state physics, chemistry and even biology.

Thesis concentrates on the tasks related to the generation and use of entanglement. We theoretically explore innovative ways of generation of entangled and non-entangled photon pairs utilizing semiconductor-based Bragg reflection waveguides. Also, we present experimental results of polarization-entangled photon pairs violating Bell inequalities. Next, we show a new approach of achieving massive OAM entanglement using chirped nonlinear crystals and also present a novel method of generation of photon pairs with defined OAM in ring-shaped silica fibers. Finally, we develop new experimental schemes of implementation of the 2D quantum random walk and the measurement-based tailoring of Anderson localization employing entanglement.

Thesis Committee:

Prof. Ramon Corbalan Yuste - UAB

Prof. German Valcarcel - Univ. Valencia

Prof. Darrick Chang - ICFO