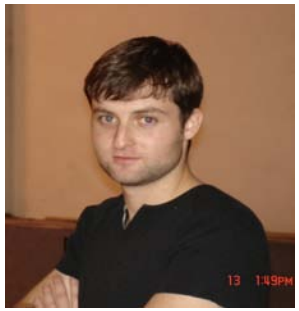
Nanotechnology Seminar Series

“Nano-Photonic Devices Based on Modified Light-Matter Interactions”



Friday October 22, 2010
BNC , ROOM 2001, 1:30 PM

Pavel (Pasha) Ginzburg
Electrical Engineering Department, Technion, Haifa, Israel

The nowadays challenges in micro-electronics and photonics are partially directed to increase the speed of devices and reduce their physical dimensions and operation power. Novel materials, light sources, and development of electronics-to-photonics interfaces, can provide solutions for some of the challenges.

We demonstrated both theoretically and experimentally various devices for nano-confinement of IR light along with some of their fundamental focusing limits and new families of plasmonic particles with unique optical properties. In addition, we introduce all-semiconductor tunable low-loss negative-index metamaterials based on coupled quantum wells and dots and quantum-cascade plasmonic sources. As additional type of sources, we investigate a novel process of semiconductor two-photon emission, employed to generation and detection non-classical states of light, and opening new horizons for all-semiconductor room-temperature quantum communication technologies.

Pavel Ginzburg **was** born in Russia, in 1980. He is currently a PhD student in the Micro-photonics group at the Technion (Israel) in the "Clore Scholars Programme", working on multi-photon processes in semiconductors, quantum optics and information semiconductor based applications, quantum artificial materials and nano-plasmonics. His theoretical work led to the discovery of several new phenomena such as the breakdown of diffraction limit of light confinement by metal structures winning the "Best recognized Nano Poster, 1st European Topical Conference on Nanophotonics and Metamaterials". In his current research he is involved in the discovery of semiconductor two-photon emission and its application for quantum information processing - awarded the "Hershel Rich Innovation Award" and "Wolf Excellence Award". He has authored 23 journal papers, over 60 conference papers and a patent.

Host: Professor Vladimir Shalaev