



Presenter

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*Abstract*

**Title:** *Photonic Crystals for Quantum and Classical Information Processing*

Photonic crystals cavities can localize light into nanoscale volumes with high quality factors. In addition to building high-density photonic integrated circuits, this also provides a strong interaction of light and matter, which enables construction of optoelectronic devices (e.g., lasers and optical switches) with improved properties, and of novel devices such as single photon sources for quantum communication. We have recently demonstrated a number of photonic crystals devices, including an ultrafast nanocavity laser with low threshold and direct modulation speed exceeding 100GHz, a quantum dot-photonic crystal cavity single photon source, and ultrafast (20GHz) switching in photonic crystal cavities with 60fJ control pulses. In addition, we have performed cavity QED experiments with a single quantum dot embedded in photonic crystal cavities. I will describe these devices, their efficient design and fabrication methods that we have developed, as well as our recent progress in integrating them into small photonic networks on a chip.

*Biography*

*Ilya Fushman* received his B.S. in Physics from the California Institute of Technology in 2003, and has been a Graduate Student in the Group of Prof. Jelena Vuckovic at Stanford University since 2004. His interests include Quantum Optics and Cavity Electrodynamics as well as all-optical switching and fast light sources based on Photonic Crystals. He is also pursuing applications of Photonic Crystals to Biophotonics and combination of these devices with novel materials, such as colloidal quantum dots, which may result in a new class of light sources for a variety of applications.

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