

PHOTONICS DISTINGUISHED LECTURER

Professor Sajeev John

Light Trapping and Solar Energy Harvesting in Thin Film Photonic Crystals

Faculty Host: Professor Luca Dal Negro

January 29, 2014

2:00-3:00 p.m.

Room 906

Photonics Center

8 Saint Mary's Street

*Refreshments will
be served!*

Photonic crystals are widely known for their light-trapping capabilities. This is often associated with the occurrence of a photonic band gap or other suppression in the electromagnetic density of states. This enables guiding of light on an optical micro-chip and unprecedented forms of strong-coupling between light and matter. In the past, practical applications of these effects have focused on information technology. More recently, an important opportunity has emerged in the area of energy technology. This arises from light-trapping in the higher bands of a photonic crystal, where the electromagnetic density of states is enhanced rather than suppressed. This enables unprecedented strong absorption of sunlight in a material with weak intrinsic absorption. In this talk, Professor John will describe designs of 3D photonic crystal silicon-based solar cells that enhance the overall absorption of sunlight using architectures consisting of less than 1 micron (equivalent bulk thickness) of silicon.

Sajeev John is a “University Professor” at the University of Toronto and Government of Canada Research Chair holder. He received his Bachelor’s degree in Physics in 1979 from the Massachusetts Institute of Technology and his Ph.D. in Physics at Harvard University in 1984. From 1986-1989 he was an Assistant Professor of Physics at Princeton University. While at Princeton, he co-invented (1987) the concept of photonic band gap materials, providing a systematic route to his original conception (1984) of the localization of light. In the Fall of 1989, he joined the senior physics faculty at the University of Toronto.

