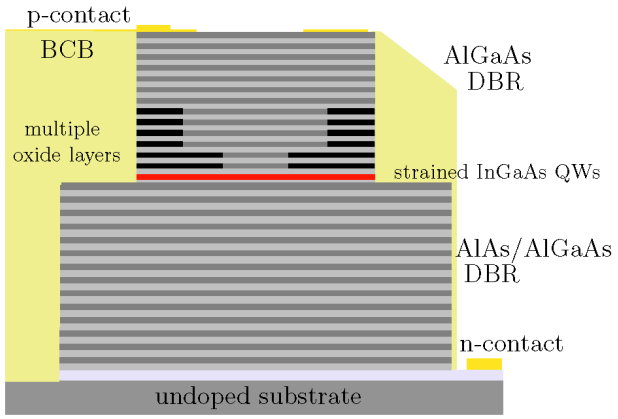
Photons after Dark

Prashant Baveja
Institute of Optics, University of Rochester



Wednesday, February 15th, 2012
6:00-7:00pm, Chester F. Carlson Center for Imaging Science-1125

Reduced Power Consumption Optical Signal Processing

Abstract: Due to an exponential increase in the number of consumers using voice, video and data services, the footprint of an optical transport system can no longer be ignored. To that end, this talk focuses on studying nonlinear effects in highly-nonlinear fibers (HNLFs) and semiconductor optical amplifiers (SOAs) along with thermally induced power saturation effects in vertical cavity surface emitting lasers (VCSELs) from the standpoint of reducing power consumption associated with wavelength converter and optical signal regenerator topologies based on these devices. This talk will begin with a brief overview and motivation. It will then address a regenerator based on highly-nonlinear fibers and will look at the interplay between fiber dispersion and nonlinearity for optimizing the performance of this telecom device. The talk will then focus on amplified spontaneous emission (ASE)-induced enhancement of nonlinear effects in SOAs. A numerical model of this performance enhancement will be then presented, followed by experimental results validating the model. The experiments germane to the SOA work were carried out at the Photonic Systems Laboratory at RIT under the supervision of Prof. Drew Maywar. Finally, a fairly novel photonic device, the VCSEL (shown in the picture), will be introduced to the audience. This device has an extremely low electrical footprint and can be used to implement energy-efficient wavelength converters provided the self-heating effects in these devices are understood. To that end, I will present an empirical thermal model which, together with basic experimental measurements, can be used for studying mechanisms contributing to thermally-induced optical power saturation in VCSELs.

Biography: Prashant Baveja obtained his Bachelor's degree at the University of Delhi, India, in 2006. He started his graduate studies at The Institute of Optics, University of Rochester in fall 2006 and obtained his Masters of Science in Optics in 2009. He has carried out his doctoral research under the supervision of Professor Govind P. Agrawal since the summer of 2007. Since Fall 2009, he has been a visiting researcher at the Photonic Systems Laboratory at the Rochester Institute of Technology where as part of a small team he implemented a new laboratory specializing in nonlinear fiber optics and photonics. His research interests include nonlinear optics in semiconductor optical amplifiers, thermal effects in vertical cavity surface emitting lasers, all-optical signal processing, nonlinear fiber optics, optical communication and Raman amplification.