Area Seminar

Title	Chip-based sources of entangled photons from a single quantum dot.
Date and Time	01/04/2010 16:00:00
Speaker	Dr. Pradyumna Pathak Professor Department of Physics, Queen&#65533;s University, Kingston, ON, Canada
Area	Theoretical Physics
Venue	Room No. 469
Abstract	A source of polarization-entangled photon pairs has wide uses in quantum optics, leading to applications such as quantum computation, quantum information processing, quantum cryptography, and quantum metrology. There has been considerable progress for developing scalable sources of entangled photons using single quantum dots. In semiconductor quantum dots, entangled photons are typically generated in a biexciton-exciton cascade decay. However, the entanglement between the generated photons is limited by inherent cylindrical asymmetries and various dephasing processes. The cylindrical asymmetries produce fine structure splitting (FSS) in the exciton states; as a result, the emitted x-polarized and y-polarized photon pairs become distinguishable in frequency, and the entanglement between the photons is largely destroyed. In this talk, I will discuss "within generation" and "across generation" of entangled photons when a quantum dot is coupled in a photonic crystal cavity. I will also show that the entanglement can be distilled in both cases using a simple spectral filter.