



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
COLLOQUIUM

Exploratory Photonics with Quantum Emitters

by

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Date: March 1, 2012 (Thursday)

Time: 1:30 - 2:30 p.m.

Place: ERB 404, William M W Mong Eng Bldg, CUHK

(Light refreshments will be served 20 minutes prior to the colloquium.)

ALL INTERESTED ARE WELCOME

Abstract

On November 15th 2011, IBM announced the next generation supercomputing project “Mira” featuring 750,000 processor cores and the peak performance up to 100 petaflops. In view of this trend, electrical data processing and interconnection are becoming insufficient for the steady increase of bandwidth demand. Not only supercomputing but also telecommunication requires conceptual improvements to handle the data explosion in the next decades. All-optical data processing, and in the long term, photonic quantum technologies, promise a bright future for the information industry.

After giving an introduction to quantum light emitters I will discuss how do they influence the design of “classical” photonic components, such as laser, switch and microresonators. One important example is polariton devices that based on strong light-matter interaction of organic dye molecules embedded in microcavities. Our aim is to realize ultralow threshold organic polariton laser operating at room temperatures. The second part of my talk emphasizes the most exciting applications of quantum emitters. We are using III-V semiconductor nanostructures as test bed for quantum optics. The aim is to achieve “non-classical” photonic components, such as indistinguishable single photon sources and entangled light emitting diode, both of which are major building blocks for the realization of quantum computation, cryptography key distribution and telecommunication.