

# Mesoscopic Materials Research Laboratory

## Seminar

March 13, 2013, 14:00-15:00

Science and Technology Research Building 3, Room 125

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### **Individual silicon nanocrystals, nanowires, and their ensembles:**

#### **Investigation of light emission from single nano-objects**

Optical spectroscopy can be applied to study individual nanometer-sized objects in spite of limited resolution of the optical imaging providing the low enough concentration of optically addressed objects and many other conditions like very low background signal, high quality of optical imaging and optimized detection efficiency. Several micro-spectroscopy set-ups have been built by the author and applied to study semiconductor nanocrystals, nanowires, nanocrystalline waveguides, nanocrystals within photonic crystals, light-emitting diodes etc. Main attention is devoted to silicon nanowires, which have unique properties e.g. high degree of linear polarization, increased absorption cross section, suppressed Auger recombination etc. Some special phenomena, which are exclusive to observation of individual nanoobjects and cannot be observed in ensembles, mainly ON-OFF intermittency (emission blinking), will be described. Application potential of silicon nanostructures includes novel solar cells, sensors, bio-labels, photonic devices etc.