Physics
AT QUEENS COLLEGE

Colloquium Notice

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Plasmonics in the Whispering Gallery

Whispering gallery mode (WGM) resonators are optical cavities with extremely high quality factors (up to 10^8) in air and water. In this talk I will present results on chip-based microtoroids as nanoparticle sensors and discuss their feasibility as single molecule detectors. I will discuss a variety of approaches for enhancing the sensitivity in the context of biosensing. In particular, we show through numerical modeling that coupling of plasmonic nanoparticles to WGM fields leads to large enhancements in sensitivity which may enable single molecule detection under practical experimental conditions. In addition, we observe experimentally that coupling of plasmonic nanoparticles (39x10 nm gold nanorods) leads to interesting changes in the optical spectra which are currently not fully understood, but related to theoretical predictions in the literature. These effects have the potential for enhanced measurement in sensing both the position and size of nanoscale objects. Lastly, I will present results on the first ever optomechanical magnetometer, with current sensitivity of 400 pT/root Hz; and experiments towards achieving the quantum ground state of vibrational modes in microtoroids, an enabling step towards quantum optomechanics.

Monday
October 22, 2012
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326