PHYSICS AND ASTRONOMY

COLLOQUIUM

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University of Utah

"Controlling the Fluorescence Emission from Individual Quantum Dots"

Abstract

Colloidal quantum dots (QDs) are fluorescent nanometer-scale semiconductor crystals that have a number of interesting optical properties including large absorption cross-sections, spectral tunability, and high quantum efficiencies. Due to these properties, QDs have been employed in a wide variety of applications including next-generation solar cells, novel light sources, and as fluorescent labels in bioimaging. In many applications, it would be advantageous to control both the direction and intensity fluctuations of the emitted fluorescence. In this talk, I will discuss our work using the sharp tip of an atomic force microscope to suppress emission fluctuations and manipulate the emission pattern from individual QDs. We find that when the tip is within ~10 nanometers of the QD, the emission fluctuations associated with QD "blinking" are suppressed, and further that the emitted photons are directed toward particular angles depending on the position of the tip.

Wednesday, October 31, 2012
3:30 p.m.
Bob Wright Centre
Room A104