Integrating Nanotechnology with Cell Biology and Neuroscience

INCBN IGERT Seminar

Monday, 25 Feb. 2013, 2:30 pm
Speaker: Young-Shin Park
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Single-Particle Spectroscopy of Nanocrystal Quantum Dots

Nanocrystal quantum dots (NQDs) are promising nanomaterials for a broad range of applications, including LEDs, solar cells, bio-sensing, lasers, and single-photon sources. In NQDs, in spite of near-perfect emission efficiency of a single exciton level, however, that of multiexciton still remains extremely low due to nonradiative Auger process, preventing an access to full-functionality of NQDs. In this talk, I will present single-dot level micro-photoluminescence (PL) study of newly developed “giant”-NQDs (g-NQDs, CdSe core overcoated with CdS shell of up to 19 monolayers). We demonstrate strong suppression of the Auger process in g-NQDs by observing incomplete antibunching in photon correlation measurements. I will also discuss dramatic change in photon statistics (from sub- to super-Poissonian ) when g-NQDs are coupled with a rough silver film.