condensed matter/applied physics seminar series

condensed matter/applied physics seminar

thursday, february 5 / 2004

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UCSB Physics

Photon Statistics and Energy Transfer in Artificial Molecules

Quantum dots are nanostructures that confine electrons in all three dimensions, displaying a discrete density of states similar to atoms. Analogous atomic properties include: an electronic shell structure, photon antibunching, controlled emission of quantum light, and Rabi oscillations. Constructing two neighboring quantum dots that exhibit coupling extends the artificial atom analogy to artificial molecules. Such molecules are promising candidates for quantum information processing technologies and have been lithographically defined in quantum wells or fabricated by cleaved edge overgrowth. An alternative method to build quantum dot molecules is to vertically stack self-assembled quantum dots, which is advantageous due to their high optical efficiency, long coherence times, and ease of scalability. I will discuss the optical emission of a self-assembled quantum dot molecule and photon statistics of the light using a Hanburry-Brown and Twiss apparatus. Evidence for two types of dipole-dipole interactions will be presented: Förster energy transfer and direct inter-dot Coulomb attraction. Photon cross-correlation measurements are used as a tool to reveal the identity of the states in the photoluminescence spectra.

thursday february 5 at 4 pm
department conference room (3302 broida)

winter quarter schedule
http://www.iquest.ucsb.edu/sites/cleland/classes/cmseminar/index.html

if you wish to be on the e-mail list for the seminar, send mail to cleland@physics.ucsb.edu