Physics
AT QUEENS COLLEGE

Colloquium Notice

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Quantum Size Structures for Photonic Applications

Nanophotonics, dealing with optical science and technology at nanoscale, is an exciting new frontier, which provides numerous opportunities both for fundamental research and new applications. Quantum dots (nanocrystals) and nanowires are among the most important building blocks of nanophotnic devices. Therefore, the understanding of underlying fundamental physical phenomena in such structures is very important for future progress in the field.

Mainly two approaches are used to fabricate nanostructures: colloidal chemistry and self-assembly during epitaxial growth. Self-assembled nanostructures are generally divided into two categories, depending on their band alignment: type-I and type-II. We thus present our recent results on both types of quantum dots (QD) and discuss the differences in their optical properties. Moreover, using unique properties of type-II QDs we shall show that there is a smooth transition from isoelectronic centers (few-atom systems) to quantum dots, shedding light on the validity of scaling laws in the "small" size range.

Next, we consider colloidal ZnO nanowires that attracted much interest recently for near-UV lasing applications. It is interesting that there are few reports, if any, on excitonic quantum confinement in such nanowires. We shall present here very recent results on quantum size ZnO nanowires and discuss the difficulties with observing quantum size effects in this material.

Wednesday
February 18, 2004
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326