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CONICAL AND CYLLINDRICAL SEMICONDACTOR QUANTUM DOTS: ENERGIES, WAVE FUNCTIONS AND OPTICAL TRANSITIONS*

Beka Bochorishvili[1,2] and Hariton M. Polatoglou[1]

[1]Physics Department
Aristotle University of Thessaloniki
GR-54124, Greece
[2]Faculty of Exact and Natural Sciences
Tbilisi State University
Ge-0128, Georgia

Quantum Dots (QDs) are nanostructures created to confine the motion of electrons in three dimensions and are very interesting because of their wide range of potential applications. Semiconductor Quantum Dots (QDs) are very attractive in micro and nano-optoelectronics, practical laser and optical applications as well as for quantum computing. Recently it has become possible to fabricate semiconductor QDs with a variety of comprising materials, sizes and shapes.

We explore conical and cylindrical semiconductor QDs by solving the Schrödinger's equation. To solve the Schrödinger's equation we use Finite Element Method (FEM). This is a very convenient method, and can be used to study QDs of any geometry. In addition the eigenfunctions can be used to calculate the probability of optical transitions.

We report on the electronic states for cylindrical and conical semiconductor QDs, give the energy levels and corresponding wave functions of the states close to the fundamental gap and the optical transitions and the dependence of these electronic properties on size and form of the QDs.

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