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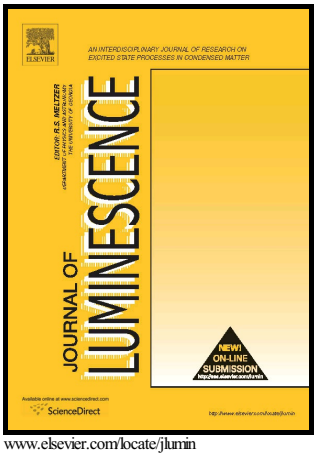

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Tuning fine structure splitting and exciton emission energy in semiconductor quantum dots

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Abstract

Semiconductor quantum dots (QDs) have been extensively investigated for potential applications such as *on-demand* sources of triggered single photons and entangled photon pairs. One of the methods to generate polarization-entangled photon pairs using the QDs requires vanishing fine structure splitting (FSS) of exciton emission, while another method involves the time-resolved tomographic measurements of the polarization state of pairs of photons emitted during the radiative cascade of the confined biexciton in a semiconductor QD. Efficient use of these methods requires the tuning of exciton emission energy or FSS in QDs. There has been a great progress in last decade to tune FSS and exciton emission energy. In this paper, we present a brief review of the tuning of FSS and exciton emission energies in semiconductor QDs. We presented the effect of different structural parameters and external perturbations on the FSS and exciton emission energy of QDs.

Keywords: Semiconductor quantum dots, excitons, fine structure splitting

1. Introduction

Semiconductor quantum dots (QDs) have emerged as one of the important quantum systems which have attracted enormous interest due to the fundamental explorations of various quantum phenomena and potential applications such as *on-demand* sources of triggered single photons, entangled photon pairs, spin quantum qubit devices, donor fluorophores etc [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]. Several potential applications of QDs require the tuning of exciton emission energy and fine structure splitting (FSS)

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