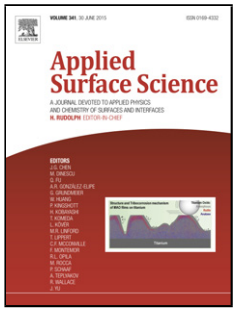

Title: Optical studies on a single GaAs laterally coupled quantum dot in comparison with an uncoupled quantum dot

Authors: Heedae Kim, Jin Dong Song

PII: S0169-4332(17)32591-6
DOI: http://dx.doi.org/10.1016/j.apsusc.2017.08.231
Reference: APSUSC 37068

To appear in: *APSUSC*

Received date: 20-4-2017
Revised date: 22-8-2017
Accepted date: 31-8-2017

Please cite this article as: Heedae Kim, Jin Dong Song, Optical studies on a single GaAs laterally coupled quantum dot in comparison with an uncoupled quantum dot, Applied Surface Sciencehttp://dx.doi.org/10.1016/j.apsusc.2017.08.231

Optical studies on a single GaAs laterally coupled quantum dot in comparison with an uncoupled quantum dot

Heedae Kim[1,*], Jin Dong Song[2]

[1]*Clarendon Laboratory, Department of Physics, University of Oxford, Oxford, OX1 3PU, U.K*

[2]*Center for Opto-Electronics Convergence Systems, KIST, Seoul, 136-791, Republic of Korea*

*corresponding author: bluewater700@gmail.com

Highlights

- . Direct comparisons between a single laterally coupled quantum dot (CQD) and a regular quantum dot (QD) are reported in terms of the optical coupling states.
- . The exciton dipole-dipole interaction is mainly determined by the separation distance of dipoles and the two dipole elements, which rely on the relative orientation between the two dipoles.
- . The optical coupling states were investigated in terms of the integrated photoluminescence intensities and redshift of the emission energies with increasing excitation power.
- . The exciton photoluminescence decay time of two exciton states is clearly shorter for the lateral CQD than for the single QD as a consequence of extended wavefunction overlaps via optical coupling.

Abstract

We performed spectroscopy studies on a single GaAs laterally coupled quantum dot and an uncoupled quantum dot. Photoluminescence spectra confirmed the presence of optical coupling in the coupled quantum dot through dipole-dipole interactions. The optical coupling was investigated in terms of the integrated photoluminescence intensities and redshift of emission energies as the