

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Mixing of trion spin states in single and coupled dots from electron-hole and electron-electron exchange S. C. BADESCU, T. L. REINECKE, U.S. Naval Research Laboratory, Washington DC — Polarized light spectroscopy is of interest for initializing and reading the electron (e) spin state in quantum dot (QD) systems for quantum information applications. An additional electron-hole (e-h) pair is created in the QD giving rise to a transient trion [1]. The mechanisms behind the spin-nonconserving (asymmetric) e-e exchange and of the e-h exchange are important for understanding the spin dynamics of the trion. Here, first we show the importance of the long-range e-h exchange for the flip-flop mechanism in the lowest triplet of a single QD, particularly for highly-symmetric QDs. This adds to the strong e-e asymmetric exchange in a cylindrical QD [2]. Second, we consider a double-dot system, and we describe the combined effect of e-h and e-e asymmetric exchange in the lowest (delocalized) triplet by comparison to the first excited (localized) triplet [1] M. E. Ware et al., PRL 95(17), 177403 (2005) [2] S. C. Badescu and T. L. Reinecke, cond-mat/0610405

S. C. Badescu
US Naval Research Laboratory, Washington DC

Date submitted: 20 Nov 2006

Electronic form version 1.4