Abstract Submitted
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Investigation of exciton states under two color optical excitation in quantum dot molecules[1] RAMANA THOTA, ERIC STINAFF, Department of Physics and Astronomy, and Nanoscale and Quantum Phenomena Institute, Ohio University, Athens, Ohio 45701-2979, USA, ALLAN BRACKER, DAN GAMMON, Naval Research Laboratory, Washington, DC 20375, USA — It has been shown that vertically stacked InAs quantum dots may form quantum dot molecules (QDMs) where the tunneling of the carriers results in molecular wavefunction formation. These states are potentially useful for the preparation and manipulation of entangled spins, necessary components for quantum information processing. It has also been previously shown that certain charged exciton states can be created optically resulting in a straightforward method for optical spin initialization. We will present a study of optical charge state creation in vertically stacked $In_xGa_{1-x}As$ quantum dots grown by molecular beam epitaxy. This includes using a two color micro-photoluminescence experiment where we tune one laser through the states associated with the quantum dot (resonant excitation) and keep the other laser fixed with its excitation at the energy of the wetting layer (non-resonant excitation). This technique may result in a method for enhancement of various charged and neutral exciton states. In particular we have investigated the doubly charged exciton state, where the ground state is two spins in a know configuration, as well as biexciton enhancement, possibly useful for generating entangle photon pairs.

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Ramana Thota
Department of Physics and Astronomy, and Nanoscale and
Quantum Phenomena Institute, Ohio University,
Athens, Ohio 45701-2979, USA

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