Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Luminescence studies of pairs of quantum dots formed on quantum rings by droplet epitaxy SAMAR ALSOLAMY, Department of Physics & Astronomy, Ohio University, Athens, OH, MORGAN WARE, YURIY MAZUR, ZHIMING WANG, JIHOON LEE, GREG SALAMO, Insitute for Nanoscience and Engineering, University of Arkansas, Fayetteville, Arkansas, G. LINARES, LILIA MEZA-MONTES, Instituto de Física "Luis Rivera Terrazas", Mexico, Puebla, ERIC STINAFF, Department of Physics & Astronomy, Ohio University, Athens, OH —
The use of metal droplet epitaxy may provide a novel method of growing laterally coupled nanostructures. We will present optical studies of InAs/GaAs nanostructures which result in twin quantum dots (QD) formed on a quantum ring (QR). Previous studies have investigated the coupling between vertically grown quantum dot pairs. Here we have used photoluminescence (PL) and photoluminescence excitation (PLE) to examine the possibility of energy transfer and coupling between quantum dot pairs in a single InGaAs quantum ring grown by droplet epitaxy. Power dependent photoluminescence spectra reveals a few peaks at low power, which are identified with emission from the ground state of the individual dots. As the power is increased we observe multi-exciton and excited state emission. We then perform PLE, tuning the excitation laser energy continuously from the high energy ring emission down to the individual dot states. We have observed resonant PLE emission in the QD/QR structures both at high energy and when resonant with the indentified ground states of one of the QDs which may indicate energy transfer and/or coupling between the dots.

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Date submitted: 17 Dec 2012 Electronic form version 1.4