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**Strongly confined excitons in self-assembled InGaAs quantum dot clusters** MEGAN CREASEY, XIAOQIN LI, Department of Physics, University of Texas at Austin, JIHOON LEE, Department of Electrical Engineering, Kwangoon University, ZHIMING WANG, GREGORY SALAMO, Institute of Nanoscale Science and Technology, University of Arkansas — Quantum dot clusters (QDCs) consisting of regular geometric patterns of six InGaAs quantum dots (QD) are grown on a GaAs substrate using a hybrid growth method that combines droplet homoepitaxy and Stranski-Krastonov growth. These novel structures have potential applications as tunable single photon sources, entangled photon sources, or error corrected qubits - devices critical to the fields of secure optical communications and quantum computing We study the photoluminescence arising from a single cluster using both continuous wave and ultrafast spectroscopic techniques with variations in the sample temperature and excitation power. Our results suggest excitons (bound electron-hole pairs) are strongly confined within the individual QDs rather than loosely confined throughout the entire QDC. The work at Texas is supported financially by NSF, ARO, AFOSR, ONR, the Welch Foundation, and the Alfred Sloan Foundation. The work at Arkansas is supported by the NSF.

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