Abstract Submitted
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**Imaging Electrons in Few-Electron Quantum Dots** P. FALLAHI, A.C. BLESZYNSKI, R.M. WESTERVELT, E.J. HELLER, Harvard University, M. HANSON, A.C. GOSSARD, U.C. Santa Barbara — Single-electron quantum dots are important candidates for quantum information processing. We have developed a new technique to image electrons inside a single-electron quantum dot in the Coulomb blockade regime, using a scanning probe microscope (SPM) at liquid He temperatures (1). A single-electron quantum dot was formed in a two-dimensional electron gas (2DEG) inside a GaAs/AlGaAs heterostructure by surface gates. Spatial images of an electron inside the dot were obtained by fixing the tip voltage and recording the dot conductance while scanning the SPM tip above the quantum dot. The images show a ring of increased conductance about the center of the dot, where the dot conductance is on the Coulomb blockade conductance peak between 0 and 1 electrons. Simulations show that this technique can be used to extract the wavefunction of electrons inside the dot if the tip perturbation is narrower than the wave function (2). A charged SPM tip promised to be a useful tool for manipulating electrons in quantum dot circuits. 1) P. Fallahi, A.C. Bleszynski, *et al* submitted to Nanoletters. 2) P. Fallahi, *et al* Proc. 27 Int. Conf. on Physics and Semiconductors (ICPS27), Flagstaff, July 26-30, 2004, in press.
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Parisa Fallahi

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