Abstract Submitted
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Imaging a One Dimensional Quantum Dot in an InAs/InP Nanowire[1] ERIN E. BOYD, HALVAR J. TRODAHL, Dept of Physics, Harvard Univ, R.M. WESTERVELT, Dept of Physics and Sch of Eng and App Sci, Harvard Univ, LINUS E. FROBERG, KRISTIAN NILSSON, LARS SAMUELSON, Dept of Solid State Physics, Lund Univ — Nanowires are promising contenders for use in novel spintronic and nanoelectronic devices. An InAs/InP nanowire containing a long InAs quantum dot (length>2xdiameter), is an ideal system to use a liquid He-4 cooled scanning gate microscope tip to probe electron behavior. This increased understanding would help in the design of quantum devices. For a few electron long dot, no excited states in the transverse direction will be occupied, making the system 1D. The electron density in these systems will change their state, as a function of dot length, from a liquid state to a Wigner-crystal like state[1]. Using a weak tip potential, it should be possible to probe this spatial distribution of the electron probability. By applying a large tip potential, and using the transitions between different partitionings of the dot, information on the relative strength of the electron interaction could be obtained. [1] Jiang Qian et. al arXiv:0809.0834 (September 2008)

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