

Abstract Submitted
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Quantum Phase Transition to a Zigzag Wigner Crystal¹ A. C. MEHTA, Duke University, C. J. UMRIGAR, Cornell University, A. D. GUCLU, National Research Council of Canada, K. A. MATVEEV, Argonne National Lab, H. U. BARANGER, Duke University — We use Quantum Monte Carlo techniques to map out the phase diagram of interacting electrons in a quantum wire. Interacting quasi-one-dimensional systems provide excellent examples of quantum phase transitions that are tractable. Previous work gave a qualitative description of the phase diagram of a quasi-one-dimensional system [Meyer, Matveev, and Larkin, PRL 2007]. At low density, electrons confined to one dimension by a transverse harmonic potential form a linear one dimensional Wigner crystal; as the density increases, symmetry about the axis of the wire is broken and there is a transition to a quasi-one-dimensional zigzag crystal. We use variational and diffusion Monte Carlo to study the phase diagram of this system quantitatively.

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