

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**A variational wave function for two-dimensional quantum-dot helium**<sup>1</sup> M. GOLAM FARUK, Department of Electrical Engineering and Department of Physics, Prairie View A&M University, Prairie View, Texas 77446, ORION CIFTJA, KEVIN STORR, Department of Physics, Prairie View A&M University, Prairie View, Texas 77446 — We introduce a variational wave function for two-dimensional quantum dot helium (a system of two interacting electrons in a two-dimensional parabolic confinement potential) in an arbitrary perpendicular magnetic field. This variational wave function contains a Jastrow pair correlation factor of displaced Gaussian form in addition to the commonly used Laughlin correlation factor. The Gaussian correlation factor assures the overall quality of the variational wave function at all values of the magnetic field including weak (or zero) and strong magnetic fields. The accuracy of the variational wave function is gauged through exact numerical diagonalization results. We find out that this trial wave function is a very accurate representation of the true ground state for the whole range of magnetic fields.

<sup>1</sup>This research was supported by the U.S. D.O.E. (Grant No. DE-FG52-05NA27036)

Orion Ciftja  
Department of Physics, Prairie View A&M University,  
Prairie View, Texas 77446

Date submitted: 23 Nov 2005

Electronic form version 1.4