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Phase transitions and symmetries of quantum dots in applied magnetic fields WOLFGANG GEIST, M.Y. CHOU, Georgia Institute of Technology — The ground state of harmonically confined two dimensional electronic systems can be changed by varying the strength of an applied external magnetic field. At certain magnetic field strength, which depends on the confinement, a maximum density droplet (MDD) is formed where all electrons are spin polarized and the system has angular momentum value $L_{MDD} = N(N-1)$, where N is the particle number. A good approximation to the MDD many body ground state is obtained by limiting single particle Fock Darwin states to the lowest Landau level (LLL). In this subspace the MDD is a single determinant with single particle angular momentum values $l_i = 0 \cdots N-1, i = 1 \cdots N$. We use variational and diffusion quantum Monte Carlo methods in order to study the instability of the MDD as well as phase transitions and pair correlation densities for several phases beyond the MDD. Monte Carlo results are compared with results obtained from diagonalizing the Hamiltonian in a subspace limited to the two Slater determinants that result in the lowest Coulomb matrix elements. We find good agreement between these two methods and unique configurations for the lowest energy determinants.

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