Quantum Monte Carlo study of Composite Fermions in Quantum Dots

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Composite fermion wave function projected onto the lowest Landau level, provide an accurate description of two-dimensional quantum dots in the limite of strong magnetic fields. In this work, we show that the range of validity of these wave functions can be accurately extended to smaller magnetic fields by incorporating Landau level mixing effects by using variational and diffusion Monte Carlo methods. We apply our method to a 15 electron system to study ground state properties in the fractional Hall regime. Landau level mixing is found to be important for a correct interpretation of experimental addition spectra.