Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

The effect of Landau level mixing on spin polarization of composite fermions: a non-perturbative study YUHE ZHANG, JAINENDRA K. JAIN, Department of Physics, 104 Davey Lab, Pennsylvania State University, University Park, PA 16802, USA — The spin polarization transitions enable precise tests of the fractional quantum Hall (FQH) theory. Possible factors responsible for the deviations between theories and experiments include Landau level (LL) mixing and finite quantum well width. Previous works generally treat LL mixing perturbatively. Following [1], we perform a fixed-phase diffusion Monte Carlo study to solve the many-body Schrodinger equation within the approximation of fixing the phase of the wave function. We calculate the critical Zeeman energy (E_z) needed to fully spin polarize several FQH states, and find that E_z depends less sensitively on LL mixing than previously thought. We also take into account the effect of finite quantum well width by using an effective two-dimensional interaction based on the realistic charge distribution. We compare our results with experiments and make further predictions. [1] G. Ortiz, D. M. Ceperley, and R.M. Martin, Phys. Rev. Lett. 71, 2777 (1993).

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Date submitted: 04 Nov 2015 Electronic form version 1.4