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Numerical Study of Realistic Models of the $\nu = 5/2$, 7/3, 8/3 Hamiltonians: Effects of Landau-level mixing and Finite Well-width[1] MICHAEL PETERSON, California State University Long Beach, University of California Santa Barbara, CHETAN NAYAK, Microsoft Research, University of California Santa Barbara — We construct a realistic effective Hamiltonian for electrons in the first excited Landau level, taking into account the effects of both Landau-level mixing and the finite width of the GaAs quantum well. The latter includes both short-distance softening of the Coulomb interaction as well as sub-band mixing. Through exact diagonalization, we find a rich phase diagram as a function of the Landau level mixing parameter κ and quantum well width d. In particular, small changes in either parameter can drive phase transitions between states in the universality classes of the Moore-Read Pfaffian, anti-Pfaffian, and exotic compressible metallic states.

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