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Quantitative study of the non-Abelian statistics of quasiholes and quasiparticles in the nu=5/2 paired Hall state CSABA TOKE, JAINENDRA JAIN, Penn State University — We analyze quantitatively various properties of a collection of quasihole and quasiparticle excitations of the paired composite fermion state, described by a Pfaffian wave function proposed by Moore and Read (Nucl.Phys.B 360, 362, 1991), which are relevant to the validity of the notion of non-abelian braiding statistics. Working in the spherical geometry, we study the coupling of two quasiholes as a function of their distance by evaluating both the density profile and the interaction energy of a quasihole pair. Further, we perform a numerical study to check whether the 2^{n-1} independent states of $2n$ quasiholes are almost degenerate, i.e. the coupling between these states is exponentially suppressed as a function of their separation, which will be crucial for any practical realization of non-Abelian statistics. We also compare the exact diagonalization spectra of the Coulomb interaction in the second Landau level and the model three-body contact interaction for which the Pfaffian state and its quasihole variants are known to be exact. Based on the connection between Halperin's 331 state and the Pfaffian state (Greiter, Wen, and Wilczek, PRL 66, 3205, 1991) we construct a class of quasiparticle wave functions, which we study with respect to both the three- body contact interaction and the Coulomb interaction to test their accuracy.

Csaba Toke
Penn State University

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