Abstract Submitted
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Pauli-like principle for Abelian and non-Abelian FQHE quasiparticles[1] F. D. M. HALDANE, Princeton University — A general formulation of condensed matter physics describes the Hamiltonian as $H_0 + H_1$, where H_0 is a positive "topological" Hamiltonian with a highly-degenerate zero-energy ground state (extensive $T = 0$ entropy) and H_1 is the "physical" Hamiltonian that splits this huge multiplet. Usually, H_0 is a non-interacting Hamiltonian, with zero modes that form a simple Fock space spanned by Wannier orbitals of low-energy electron bands, or a Landau level, etc. Systems of Laughlin FQHE quasiholes are described by a more general H_0 that removes low-relative-angular momentum two-particle states from the zero-mode spectrum, and the non-Abelian Moore-Read and Read-Rezayi quasihole systems involve removal of $n > 2$ particle states. The latter are candidates systems for topological quantum computation. The zero-modes count has been previously obtained by counting the number of linearly-independent polynomials of various types. I give a simpler Pauli-principle-like formulation that transparently gives the counting rules, and allows the creation of subsets of lowest-Landau-level Slater determinant states from which the zero-mode states can be constructed. This aids numerical diagonalization of $P_0 H_1 P_0$, where P_0 is the projection into the zero-modes space of H_0, for exact-diagonalization simulations of the manipulations of non-Abelian quasiparticles proposed for topological quantum computations.

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