Abstract Submitted
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Holomorphic state within a Landau level: a new discrete formulation in periodic (torus) geometry[1] F. D. M. HALDANE, Princeton University — It is widely believed that the holomorphic character of model states of particles projected into a Landau level (e.g., the Laughlin state) results from their being "lowest Landau level Schrödinger wavefunctions". In fact this "common wisdom" is incorrect, as should have been obvious after the observation of a Laughlin-type state in the second Landau level. Indeed, even the notion that these states are described by a "wavefunction" is misleading, because non-locality after projection into (any) Landau level removes the possibility of using a local basis that defines $\Psi(x) = \langle x|\Psi\rangle$, and a Heisenberg formalism must be used. I have found this reinterpretation of the holomorphic states is not just a "debating point" but leads to powerful new identities on the torus that were previously missed. I present a new discretized and modular-invariant formulation based on a "lattice" of $(N_\Phi)^2$ points in the fundamental region through which N_Φ flux quanta pass. This mathematically-exact reformulation allows a greatly-improved (faster) formulation for Monte-Carlo studies of model FQH states, as well as explicitly implementing the physical requirement of modular invariance, and expansions in an orthonormal Landau basis.

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F. D. M. Haldane
Princeton University

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