

Abstract Submitted  
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**Fractional Chern Insulator** NICOLAS REGNAULT, Ecole Normale Supérieure Paris, CNRS, BOGDAN ANDREI BERNEVIG, Princeton University — Chern insulators are band insulators exhibiting a nonzero Hall conductance but preserving the lattice translation symmetry. We conclusively show that a partially filled Chern insulator at  $1/3$  filling exhibits a fractional quantum Hall effect and rule out charge-density wave states that have not been ruled out by previous studies. By diagonalizing the Hubbard interaction in the flat-band limit of these insulators, we show the following: the system is incompressible and has a 3-fold degenerate groundstate whose momenta can be computed by postulating a generalized Pauli principle with no more than 1 particle in 3 consecutive orbitals. The groundstate density is constant, and equal to  $1/3$  in momentum space. Excitations of the system are fractional statistics particles whose total counting matches that of quasiholes in the Laughlin state based on the same generalized Pauli principle. The entanglement spectrum of the state has a clear entanglement gap which seems to remain finite in the thermodynamic limit. The levels below the gap exhibit the identical counting of Laughlin  $1/3$  quasiholes. The 3 groundstates and excited states exhibit spectral flow upon flux insertion. All the properties above disappear in the trivial state of the insulator.

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