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Discrete Symmetry Breaking in Fractional Chern Insulators AKSHAY KUMAR, Department of Physics, Princeton University, Princeton, NJ 08544, RAHUL ROY, Department of Physics and Astronomy, University of California, Los Angeles, California 90095-1547, S.L. SONDHI, Department of Physics, Princeton University, Princeton, NJ 08544 — We study the interplay between quantum hall ordering and spontaneous translational symmetry breaking in a multiple Chern number (C $>$ 1) band at partial filling. We begin with non-interacting fermions in a family of square lattice models with flat C=2 bands and a wide band gap, and add nearest neighbor density-density repulsive interactions. By means of Hartree-Fock theory supplemented by numerical exact diagonalization for a small system at 1/2 filling, we find that the system generically develops charge density wave order with two degenerate ground states. We note that this physics is especially transparent in the limit in which the C=2 band describes two decoupled C=1 bands. We discuss the nature of domain walls in this phase and note the close analogy to the quantum Hall Ising ferromagnet in the multivalley problem. Finally we discuss generalizations to other fillings and higher Chern numbers.

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