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Fractional Chern Insulators and the W_∞ Algebra RAHUL ROY, Rudolf Peierls Centre for Theoretical Physics, Oxford University, SIDDHARTH PARAMESWARAN, University of California, Berkeley, SHIVAJI SONDHI, Princeton University — A set of recent results indicates that fractionally filled bands of Chern insulators in two dimensions support fractional quantum Hall states analogous to those found in fractionally filled Landau levels. We provide an understanding of these results by examining the algebra of Chern band projected density operators. We find that this algebra closes at long wavelengths and for constant Berry curvature, whereupon it is isomorphic to the W_∞ algebra of lowest Landau level projected densities first identified by Girvin, MacDonald and Platzman [Phys. Rev. B 33, 2481 (1986).] For Hamiltonians projected to the Chern band this provides a route to replicating lowest Landau level physics on the lattice.

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