

Abstract Submitted
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Hall Crystal States in Fractionally Filled Chern Bands GANPATHY MURTHY¹, University of Kentucky, RAMAMURTI SHANKAR², Yale University — Two-dimensional time-reversal-invariant topological insulators can be thought of as a time-reversed pair of Chern bands. Numerical evidence shows the existence of states at fractional filling which are analogous to FQH states[1]. In [2] it was noted that at small momenta, the algebra of the density operators projected to the Chern band resembles the magnetic translation algebra. The authors have constructed a mapping[3] between Chern bands and a Landau level in a periodic potential which works at all momenta. This mapping is dynamically faithful, and reproduces the commutators of the projected density operator. There turn out to be Hall Crystal states, characterized by a Hall conductance, and another integer which described the charged dragged when the potential is adiabatically moved by a lattice unit. Using the Hamiltonian formalism developed by the authors some time ago for the FQHE[4], we calculate gaps and collective mode dispersions for such states. 1. D. N. Sheng et al, arxiv:1102.2568, N. Regnault and B. A. Bernevig, arxiv:1105.4867. 2. S. Parameswaran, R. Roy, and S. L. Sondhi, arxiv:1106.4025. 3. G. Murthy and R. Shankar, arxiv:1108.5501 4. G. Murthy and R. Shankar, Rev. Mod. Phys. 75, 1101 (2003)

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