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**The  $\nu = 0$  Quantum Hall state on the surface of a topological insulator** YING RAN, University of California Berkeley, HONG YAO, ASHVIN VISHWANATH — The surface states of a topological insulator such as  $\text{Bi}_2\text{Se}_3$  have a single Dirac node, which cannot be realized in any two dimensional system. We study the situation when the chemical potential is at the Dirac point. In this case, it is known that a metal to insulator transition occurs on the surface as interactions are increased. We study the effect of an applied magnetic field over this range of interaction strengths. A phase diagram that is rather different from that of graphene is obtained, by controlled calculations in different limits. Experimental predictions are discussed.

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