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Antiferromagnetic topological insulators ROGER S.K. MONG, ANDREW M. ESSIN, JOEL E. MOORE, University of California, Berkeley — We consider antiferromagnets breaking both time-reversal (Θ) and a primitive lattice translational symmetry ($T_{1/2}$) of a crystal but preserving the combination $S = \Theta T_{1/2}$. The S symmetry leads to a Z_2 topological classification of insulators, separating the ordinary insulator phase from the "antiferromagnetic topological insulator" (AFTI) phase. This state is similar to the "strong" topological insulator with time-reversal symmetry, and shares with it such properties as a quantized magnetoelectric effect. However, for certain surfaces the surface states are intrinsically gapped with a half-quantum Hall effect [$\sigma_{xy} = e^2/(2h)$], which may aid experimental confirmation of $\theta = \pi$ quantized magnetoelectric coupling. Step edges on such a surface support gapless, chiral quantum wires. In closing we discuss GdBiPt as a possible example of this topological class.

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