Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Crystalline Topological Insulators and Semimetals with C_{nv} Symmetry A. ALEXANDRADINATA, CHEN FANG, Department of Physics, Princeton University, MATTHEW J. GILBERT, Department of Electrical and Computer Engineering, University of Illinois, Urbana, B. ANDREI BERNEVIG, Department of Physics, Princeton University — We explore a class of 3D materials with C_{nv} symmetry. For $n = 3, 4$ and 6, we find the first-known 3D topological insulators with robust surface modes, but *without* spin-orbit coupling, and *not needing* time-reversal symmetry; the relevant symmetries are purely crystalline. To describe these C_{nv} systems, we introduce the notion of a mirror chirality: an integer invariant which characterizes half-mirror-planes in the 3D Brillouin zone. In the evolution between two gapped phases with distinct mirror chiralities, we find that the intermediate gapless phase is a Weyl semimetal. Applications are discussed in the context of photonic crystals.

Aris Alexandradinata
Department of Physics, Princeton University

Date submitted: 12 Nov 2013 Electronic form version 1.4