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Thin films of topological crystalline insulators in IV-VI semiconductors JUNWEI LIU, Tsinghua University, TIMOTHY H. HSIEH, Massachusetts Institute of Technology, WENHUI DUAN, Tsinghua University, JAGADEESH MOODERA, LIANG FU, Massachusetts Institute of Technology — Topological crystalline insulators (TCI) are new topological states of matter protected by crystalline symmetry of solids. The first example of TCI has been recently predicted and subsequently observed in the SnTe class of IV-VI semiconductors. In this work, we show that thin films of TCI realize a two-dimensional Dirac fermion system with a tunable band gap and host the quantum spin Hall state in an extended thickness range. We propose a ferromagnet-TCI device to measure the spin-dependent transport through helical edge states.

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