

Abstract Submitted
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Massive Dirac surface states in topological insulator/magnetic insulator heterostructures¹ WEIDONG LUO, Shanghai Jiao Tong University, XIAO-LIANG QI, Stanford University — We study the behavior of topological surface states in heterostructures formed by a topological insulator (TI) and a magnetic insulator (MI). Several MIs with compatible magnetic structure and relatively good lattice matching with TIs are identified, and the best candidate material is found to be MnSe, an anti-ferromagnetic insulator. We perform first-principles calculation in Bi₂Se₃/MnSe superlattices and obtain the surface state bandstructure. The magnetic exchange coupling with MnSe induces a gap of 54 meV at the surface states. In addition we tune the distance between Mn ions and TI surface to study the distance dependence of the exchange coupling. Finally, we study the band bending effect at the Bi₂Se₃/MnSe interface, and propose possible solutions to avoid band bending.

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Weidong Luo
Shanghai Jiao Tong University

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