

Abstract Submitted  
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**Model Hamiltonian and Time Reversal Breaking Topological Phases in Anti-Ferromagnetic half-Heusler Materials** JIABIN YU, CHAO-XING LIU, Pennsylvania State Univ, BINGHAI YAN, Max Planck Institution — We proposed 4-band and 6-band  $\mathbf{k} \cdot \mathbf{p}$  models for half-Heusler materials with anti-ferromagnetism propagated along  $(1/2, 1/2, 1/2)$ . Dirac semimetal phase was found in 4-band model protected by inversion symmetry and the combination of half-translation and time reversal symmetry  $\hat{S}$ . 4-band model also gives rise to Weyl semimetal, Type-A triple point phase (if  $C_{3v}$  symmetries exist) and topological mirror insulating phase (if mirror or glide symmetry exists). In 6-band model, we found anti-ferromagnetic topological insulating phase protected by  $\hat{S}$  resulted from band inversion between  $\Gamma_6$  and  $\Gamma_8$  bands.

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