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Controlling the Bulk-surface Spectroscopic Separation in 3D Topological "Metals" Exploiting Hybridization YI-TING HSU, MARK FISCHER, Cornell University, TAYLOR HUGHES, University of Illinois at Urbana-Champaign, EUN-AH KIM, Cornell University — How to separately probe the surface state in 3D topological insulators (TI) with chemical potential crossing conduction bands, i.e. topological metals, is a key challenge in exploiting the topological nature of surface states. The advent of MBE grown thin films of TI's with varying thickness only adds to the importance of the issue. We study the effects of hybridization in the spirit of Fano model for the low-energy effective four-band model of Bi_2Se_3 on a slab. We find that the apparent bulk-surface spectroscopic separation in the ARPES data on 3D TI can be viewed as *a consequence of hybridization* rather than the evidence for the absence of hybridization. We describe how the separation depends on the film thickness and propose ways to control the separation using strain.

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