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**Interfacial Protection of Topological Surface States in Ultrathin Sb Films** GUANG BIAN, Department of Physics, University of Illinois at Urbana-Champaign, XIAOXIONG WANG, College of Science, Nanjing University of Science and Technology, YANG LIU, THOMAS MILLER, TAI-CHANG CHIANG, Department of Physics, University of Illinois at Urbana-Champaign — Spin-polarized gapless surface states in topological insulators form chiral Dirac cones. When such materials are reduced to thin films, the Dirac states on the two faces of the film can overlap and couple by quantum tunneling, resulting in a thickness-dependent insulating gap at the Dirac point. Calculations for a freestanding Sb film with a thickness of four atomic bilayers yield a gap of 36 meV, yet angle-resolved photoemission measurements of a film grown on Si(111) reveal no gap formation. The surprisingly robust Dirac cone is explained by calculations in terms of interfacial interaction. Our work suggests that quantum tunneling, an intrinsic property dependent on the film thickness, and substrate bonding, an extrinsic factor amenable to interfacial engineering, can be effectively manipulated to achieve desired electronic and spintronic properties of topological thin films.

Guang Bian
Department of Physics, University of Illinois at Urbana-Champaign

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