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Transport in topological insulator films[1] JIAN WANG, International Center for Quantum Materials, Peking University, Beijing 100871, ASHLEY DASILVA, MEENAKSHI SINGH, JOON SUE LEE, JAINENDRA JAIN, NITIN SAMARTH, MOSES H.W. CHAN, The Center for Nanoscale Science and Department of Physics, The Pennsylvania State University, University Park, PA 16802, USA, CUI-ZU CHANG, KE HE, XU-CUN MA, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, QI-KUN XUE, Department of Physics, Tsinghua University, Beijing 100084, China, HANDONG LI, MAOHAI XIE, Physics Department, The University of Hongkong, Pokfulam Road, Hongkong, China — The prediction and the subsequent confirmation of topological insulators is one of the most exciting discoveries in condensed matter physics. In the transport study of topological insulator films, we demonstrate that an excellent agreement between theory and experiment is achieved when both disorder and interaction are taken into account. In addition, measurements under an in-plane magnetic field, along and perpendicular to the bias current show opposite magnetoersistance. Furthermore, Bi2Se3 topological insulator thin films contacted by superconducting (In, Al and W) electrodes show an abrupt resistance upturn when the electrodes become superconducting. Concomitant with the upturn in resistance, there is a significant weakening of the superconductivity of the electrodes.

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