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Surface-dominated conduction in a 6nm-thick Bi₂Se₃ thin film LIANG HE, XINXIN YU, XUFENG KOU, MURONG LANG, KANG L. WANG, UCLA Electrical Engineering, FAXIAN XIU, Iowa State University, Department of Electrical and Computer Engineering, MARCUS TEAGUE, NAI-CHANG YEH, CalTech, department of Physics — We report a direct observation of surface dominated conduction in an intrinsic Bi₂Se₃ thin film with a thickness of 6 quintuple layers (QLs) grown on lattice-matched CdS (0001) substrates by molecular beam epitaxy (MBE). Shubnikov-de Haas (SdH) oscillations from the topological surface states suggest that the Fermi level falls inside the bulk band gap and is 53 +/-5 meV above the Dirac point, in agreement with 70 +/- 20 meV obtained from scanning tunneling spectroscopies (STS). Our results demonstrate a great potential of producing genuine topological insulator devices using Dirac Fermions of the surface states.

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