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Landau quantization and the thickness limit of topological insulator thin films of Sb_2Te_3 XUCUN MA, YEPEING JIANG, YILIN WANG, Institue of Physics, CAS, MU CHEN, Department of Physics, Tsinghua University, CANLI SONG, ZHI LI, LILI WANG, KE HE, Institue of Physics, CAS, XI CHEN, QI-KUN XUE, Department of Physics, Tsinghua University — We report the experimental observation of Landau quantization of molecular beam epitaxy grown Sb_2Te_3 thin films by a low-temperature scanning tunneling microscope. Different from all the reported systems, the Landau quantization in Sb_2Te_3 topological insulator is not sensitive to the intrinsic substitutional defects in the films. As a result, a nearly perfect linear energy dispersion of surface states as 2D massless Dirac fermion system is observed. We demonstrate that 4 quintuple layers are the thickness limit for Sb_2Te_3 thin film being a 3D topological insulator.

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