Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Plasma Etching Effects on the Transport in Topological Insulator Bi_2Te_3 Nanoplates[1] SUKRIT SUCHARITAKUL, NICHOLAS GOBLE, Department of Physics, Case Western Reserve University, 2076 Adelbert Road, Cleveland OH 44106-7079, ZHENHUA WANG, ZHIDONG ZHANG, Institute of Metal Research, Chinese Academy of Sciences, 72 Wenhua Road, Shenyang, China 110016, XUAN GAO, Department of Physics, Case Western Reserve University, 2076 Adelbert Road, Cleveland OH 44106-7079 — Carrier transport in various topological insulators (TIs) such as Bi_2Se_3 and Bi_2Te_3 exhibits a novel linear magneto-resistance (LMR) [1] in addition to the more extensively studied weak anti-localization effect. The robustness against raising temperature and 2D nature of this LMR [1] allude to its connection with the topologically protected 2D surface transport in TI. In this work, we study how the plasma etching induced surface roughness or corrugation impacts the transport in TI Bi_2Te_3 nanoplates, to understand how the topological surface transport responds to controlled perturbation to material surface. Bi_2Te_3 nanoplates with varied thickness were grown using CVD method and hall bar devices were studied under different Argon plasma etching conditions. Our experiments show that plasma etching induces drastic change in the Hall coefficient but has relatively weak effect on the LMR. We will also discuss the data analyzed by the two band carrier m! a ngo-transport model which allows quantitative separation of the surface carrier concentration and mobility from the bulk carriers.

[1]Z.H.W. acknowledges China Scholarship Council. Z.D.Z. acknowledges the NSF China for Grant No. 51331006. X.P.A.G. acknowledges NSF CAREER Award (DMR-1151534), AFOSR (FA9550-12-1-0441) and Lee Hsun Young Scientist Award, IMR and CAS for support.

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Date submitted: 15 Nov 2013 Electronic form version 1.4