Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Transport studies on Cr-doped (Bi,Sb)2Te3 thin films with nearly quantized anomalous Hall effect[1] MINHAO LIU, Physics Department, Princeton University, ANTHONY RICHARDELLA, ABHINAV KANDALA, Physics Department, Pennsylvania State University, WUDI WANG, ALI YAZDANI, Physics Department, Princeton University, NITIN SAMARTH, Physics Department, Pennsylvania State University, N. PHUAN ONG, Physics Department, Princeton University — We describe measurements of the quantum anomalous Hall effect in ferromagnetic Cr-doped $(Bi,Sb)_2Te_3$ thin films (6-8 QL thickness) grown on (111) $SrTiO_3$ (STO) substrates by molecular beam epitaxy. The Fermi level is tuned close to the neutral point by tuning the growth flux ratios of Cr, Bi and Sb. Transport measurements were carried out in a dilution fridge at a base temperature of 20 mK. By tuning the chemical potential with a back gate on the STO substrate, we observed an anomalous Hall effect as high as $0.95h/e^2$, with a coercive field ~ 0.15 T and a narrow transition between positive/negative Hall plateaus. Transport measurements in a non-local configuration showed a Hall-effect-like non-local resistance with a systematic dependence on the back gate voltage and with pronounced peaks which resembled the non-local resistance of the quantum Hall effect. The non-local signal has a maximum that coincides with the maximum in Hall conductivity, indicating the edge channel as its origin. Our results show that the edge channel manifests itself in various transport properties even though the Hall resistance is not perfectly quantized.

[1]Supported by DARPA SPAWAR Grant No. N66001-11-1-4110 and MURI grant on Topological Insulators (ARO W911NF-12-1-0461).

Minhao Liu
Physics Department, Princeton University

Date submitted: 14 Nov 2014 Electronic form version 1.4