Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

High mobility topological insulator Bi2Se3 exfoliated devices with hexagonal Boron Nitride dielectrics HADAR STEINBERG, VALLA FATEMI, LUCAS ORONA, JAVIER SANCHEZ-YAMAGISHI, MIT, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, Japan, PABLO JARILLO-HERRERO, MIT — We report electronic transport measurements on double-gated topological insulator Bi2Se3 devices. To obtain both top- and bottom-gating, we exfoliate the Bi2Se3 on standard SiO2-capped Si and coat it with an ultrathin layer of hexagonal Boron Nitride (h-BN), which serves as a dielectric for a top gate. Using both top and bottom gates, we are able to identify the individual contributions of both surfaces and the bulk channel, and show that all three channels have mobilities exceeding 1000 cm2/Vs. Our results suggest that the h-BN transfer technique holds potential for providing a future path for high quality TI density-tunable devices.

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Date submitted: 07 Nov 2012 Electronic form version 1.4