Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Aharonov-Bohm interference in topological insulator nanoribbons DESHENG KONG, Dept. Materials Science and Engineering, Stanford Univ, HAILIN PENG, College of Chemistry and Molecular Engineering, Peking Univ, KEJI LAI, Dept. Applied Physics, Stanford Univ, STEFAN MEISTER, Dept. Materials Science and Engineering, Stanford Univ, YULIN CHEN, Dept. Applied Physics, Stanford Univ, XIAO-LIANG QI, SHOU-CHENG ZHANG, Dept. Physics, Stanford Univ, ZHI-XUN SHEN, Dept. Applied Physics, Stanford Univ, YI CUI, Dept. Materials Science and Engineering, Stanford Univ, YI CUI TEAM, ZHI-XUN SHEN COLLABORATION, SHOU-CHENG ZHANG COLLABORATION — Topological insulators represent novel phases of quantum matter with an insulating bulk gap and gapless edges or surface states. Barrier exists in studying topological surface states by direct transport measurements, presumably due to the predominance of bulk carriers from crystal defects or thermal excitations. Topological insulator nanoribbons are promising candidate to manifest the surface effects due to larger surface-to-volume ratio than bulk materials. We provide unambiguous transport evidence of topological surface states from magnetoresistance measurements of topological insulator material Bi_2Se_3 nanoribbons. Pronounced Aharonov-Bohm magnetoresistance oscillations clearly demonstrate the coherent propagation of two-dimensional electrons around the perimeter of the nanoribbon surface, as expected from the topological nature of the surface states.

Desheng Kong
Dept of Materials Science and Engineering, Stanford Univ

Date submitted: 20 Nov 2009 Electronic form version 1.4