Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The warped Fermi contours of Bi_2Te_3 topological surface states[1]
PEDRAM ROUSHAN, JUNGPIL SEO, HAIM BEIDENKOPF, YEW SAN HOR, ROBERT CAVA, ALI YAZDANI, Princeton University — It has been predicted and experimentally verified [1,2] that novel two-dimensional metallic states exist on the surface of certain insulators known as topological insulators. Among the known topological insulators, Bi_2Te_3 emerges as the most practical for device applications due to its large bulk band gap and surface states consisting of only a single Dirac cone. To study the Dirac Fermions on the surface of Bi_2Te_3, we have used a cryogenic scanning tunneling microscope. Close to atomic step edges, energy resolved conductance mapping of surface states shows interference pattern resulting from scatterings. The interference pattern observed enabled us to investigate the dispersion, the spin chirality, and the role of Fermi surface warping in scattering for these surface states. We will present these results in connection with angle-resolved photoemission measurements of the contours of constant energy. In addition, we touch upon the physical consequence of broken symmetry at atomic step edges for the surface states, which so far has been overlooked.

[1]ARO, MRSEC through PCCM

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Date submitted: 27 Nov 2009 Electronic form version 1.4