

Quasiparticle Interference in Fe doped Bi_2Te_3 by Scanning Tunneling Spectroscopy

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We probe the surface state of Fe doped Topological Insulator Bi_2Te_3 by performing Fourier Transform Scanning Tunneling Spectroscopy measurements over a wide energy region. The experimental data clearly show several novel scattering channels that reflect the rich physics of 3D topological insulators. By combining our measurements with angle-resolved photoemission spectroscopy data, we find the emergence of forbidden backward scattering channel, which provide evidence of time reversal symmetry breaking induced by magnetic impurities [1]. In addition to this backscattering channel along the ΓK direction, we have recently discovered novel multi scattering channels that emerge at high energies along the ΓM direction. The possible origins including spin-orbit scattering are discussed.

[1] Yoshinori Okada, Chetan Dhital, Wenwen Zhou, Erik D. Huemiller, Hsin Lin, S. Basak, A. Bansil, Y.-B. Huang, H. Ding, Z. Wang, Stephen D. Wilson, and V. Madhavan (to be appear in PRL).