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Probing high energy, unoccupied states on the surface of pristine and Fe doped Bi_2Te_3 by scanning tunneling spectroscopy WENWEN ZHOU, YOSHINORI OKADA, DANIEL WALKUP, CHETAN DHITAL, Boston College, HSIN LIN, ARUN BANSIL, Northeastern University, STEPHEN WILSON, VIDYA MADHAVAN, Boston College — We probe the surface state of pristine and Fe-doped topological Insulator Bi_2Te_3 by using Fourier Transform Scanning Tunneling Spectroscopy (FT-STS). FT-STS allows us to probe the surface state dispersion far above the Fermi energy, a regime inaccessible to angle resolved photoemission spectroscopy. We report the observation of novel multi scattering channels that emerge at high energies along the ΓM and ΓK directions. The possible origins of these channels including spin-orbit scattering will be discussed.

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