Chez Pierre

Presents ...

Monday, October 24, 2011
12:00pm
MIT Room 4-331

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"Stripes in Topological Insulators "

Many of the unusual properties of topological insulators such as the Majorana Fermions can only be realized through a delicate tuning of the Dirac surface state rendering their detection thus far elusive. Here we demonstrate that the surface state dispersion of a prototypical topological insulator can be continuously tuned via a novel topographical route. STM topography of Bi2Te3 shows one-dimensional stripes with 100nm periodicity. By studying the scaling behavior of the Landau level (LL) spectra as a function of magnetic field, we show that the stripes induce a spatially modulated non-linear component in the surface state dispersion close to the Dirac point. This ability to tune the surface state dispersion locally opens the door to a host of new phenomena in topological insulators. Importantly, the stripes act as topological channels for chiral spin modes at the boundaries such that placing the Fermi energy between the LLs of these periodic stripes would result in the first experimental realization of the ideal 1D dissipationless quantum wire.