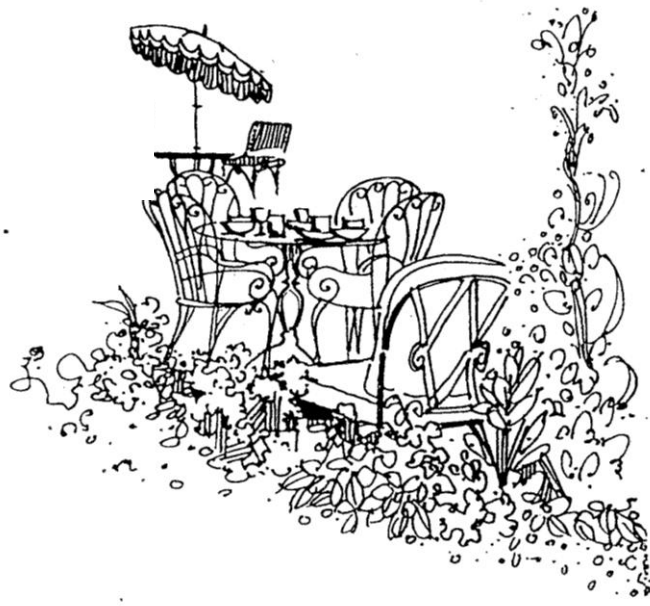
Chez Pierre

Presents ...

Monday, March 4, 2013
12:00pm
MIT Room 4-331



SPECIAL CHEZ PIERRE SEMINAR

Joseph G. Checkelsky
University of Tokyo

"Measurements of Topological Insulators with Broken Symmetry"

Topological insulators are a newly discovered class of materials in which helical conducting modes exist on the surface of a bulk insulator. The usefulness of such states has attracted interest ranging from engineering high efficiency thermoelectric materials to tools for topological quantum computing. Recently, theoretical works have shown that breaking gauge symmetry or time reversal symmetry in these materials produces exotic states that, if realized, represent substantial steps toward realizing these goals. Here, we present the breaking of time reversal symmetry in the form of ferromagnetism arising from the interaction between doped magnetic impurities and the Dirac fermions in the topological insulator Bi2Te3. Results of growth and electrical transport measurements of bulk crystals and thin films are presented. We discuss the implications of this surface ferromagnetic state for realization of the quantum anomalous Hall effect and exotic conducting modes. Toward realization of other broken symmetries, we further discuss exploration of topological systems with broken inversion symmetry.