

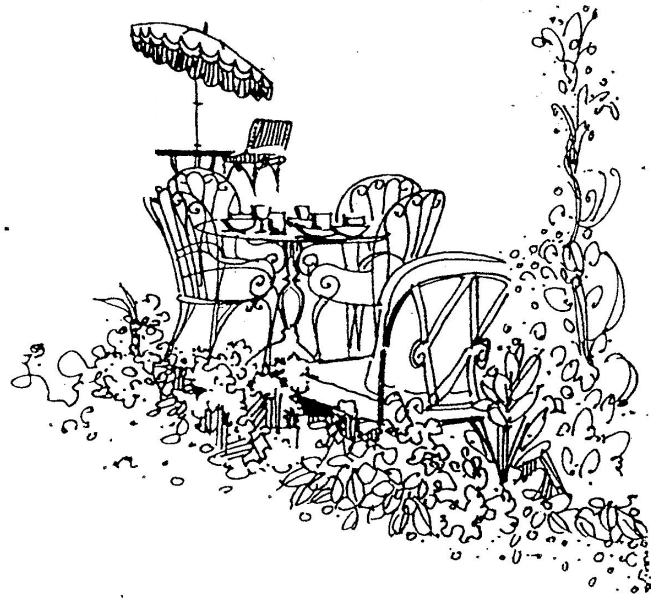
Chez Pierre

Presents ...

Tuesday, February 22, 2011

11:00am

MIT Room 4-331



SPECIAL CHEZ PIERRE SEMINAR

Liang Fu

Harvard University

“Topological Superconductor and Majorana Fermion”

Traditionally phases of matter are classified by spontaneous symmetry breaking. The discovery of quantum Hall effect in 1980s led to the concept of topological phases characterized by topological quantum numbers. In the past few years, new topological phases has been theoretically predicted and experimentally observed in band insulators at zero magnetic field. The rapid development in topological insulators has inspired search for topological phases of electron systems in which many-body interactions play a fundamental role. In the first part of the talk, I will describe theory of unconventional pairing stabilized by strong spin-orbit coupling in a recently discovered superconductor Cu-doped Bi_2Se_3 . This theorized superconducting state realizes a topological superconductor phase in which symmetry breaking and topological order are strongly intertwined. I will also describe the general criterion for topological superconductors.

The second part of the talk focuses on Majorana zero mode of topological superconductor — an exotic excitation with non-Abelian statistics. I will show that the interplay between phase dynamics of topological superconductor and the nonlocality of Majorana fermion leads to a dramatic phase-coherent electron teleportation phenomena waiting to be detected.