Chez Pierre

Presents ...

Friday, May 3, 2013
12:00pm
MIT Room 4-331

Special Chez Pierre Seminar
Friday, May 3, 2013 12:00pm

Xiaoliang Qi
Stanford University

"Genons: a new twist on topologically ordered states"

Topologically ordered states are quantum states of matter with various exotic properties such as topological ground state degeneracy, and quasiparticles with fractional quantum numbers and fractional statistics. In this talk, I will describe a new aspect of topologically ordered states---the twist defects. Twist defects are extrinsic point defects in a topologically ordered state which couples to the topological properties of the state. A simplest example is a branchcut point in a bilayer system, around which the two layers are exchanged. Such defects, named as ``genons", turns out to have rich topological properties, and may be realizable in several physical systems. The concept of genons and twist defects provides a new approach to topological states of matter and topological quantum computation. In this talk I will first review the basic properties of genons and more general twist defects, and discuss the proposals of realizing genons in fractional Chern insulators (i.e. lattice fractional quantum Hall states) and conventional bilayer quantum Hall states. I will also describe a unified description of the most generic topological defects in Abelian topological states.