

Chez Pierre

Presents ...

Wednesday, March 2, 2016

11:00AM

MIT Room 4-331

Special Chez Pierre Seminar

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” Topological gapped and gapless phases protected by nonsymmorphic lattice symmetries“



In the first part of the talk, I will show that a nonsymmorphic glide reflection symmetry can protect a new Z_2 topological gapped phase in three-dimensions. Unlike topological insulators, this new phase can be realized in either spinful or spinless (or having full spin rotation symmetry) systems. I will show one realization in photonic crystals in detail. In the second part, I will discuss how nonsymmorphic symmetries can protect topological gapless phases, or topological semimetals. A twofold screw axis can protect a double-nodal line in a system with strong spin-orbital coupling; and a glide plane can protect a new type of Dirac semimetal, which, unlike any Dirac semimetal so far proposed, has protected double "Fermi arcs" on the surface. A proposal of materials realization in iridates will be discussed. Finally, I will demonstrate that the surface states of topological semimetals that have protected Fermi arcs can be related to noncompact Riemann surfaces representing simple meromorphic functions.