

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

“Wire constructions of topological phases in three or more dimensions”

Thomas Iadecola, Boston University

Abstract: Coupled-wire constructions have proven to be useful tools to characterize Abelian and non-Abelian topological states of matter in two spatial dimensions. In many cases, their success has been complemented by the vast arsenal of other theoretical tools available to study such systems. In three dimensions, however, much less is known about topological phases. Since the theoretical arsenal in this case is smaller, it stands to reason that wire constructions, which are based on one-dimensional physics, could play a useful role in developing a greater microscopic understanding of three-dimensional topological states of matter. In this talk, I will present a comprehensive strategy, based on commuting projector models, to generate and characterize coupled-wire realizations of strongly-interacting three-dimensional Abelian topological phases, starting from itinerant fermions or bosons. I will also demonstrate that this approach generalizes readily to arbitrary dimensions. Finally, I will discuss prospects for realizing more exotic non-Abelian topological orders in three spatial dimensions within the coupled-wire framework.

12:00pm
Wednesday, December 7, 2016
Duboc Room (4-331)

Host: Liang Fu