Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Gauging spatial symmetries and the classification of topological crystalline phases"

Dominic Else, UC Santa Barbara

Abstract: In this talk, I explain a systematic approach to interacting topological phases protected by space-group symmetries. The motivation is the observation that topological phases protected by internal symmetries such as charge conservation U(1) are best understood through the topological response to an external gauge field. In this work, we develop the theory of "gauging" spatial symmetries. This allows us to give the classification of topological phases with spatial symmetries, under a "topological crystalline liquid" assumption which is expected to be satisfied in a large class of phases. In the case of bosonic systems without intrinsic topological order (i.e. bosonic SPT phases), we argue that they are classified by "equivariant cohomology" and discuss physical interpretations. More generally, we have the "Crystalline Equivalence Principle": for systems in Euclidean space R^n, the classification of topological phases with spatial symmetries is the *same* as if the symmetries acted internally. Based on work with Ryan Thorngren [1].

[1] https://arxiv.org/abs/1612.00846

12:00pm
Friday, April 14, 2017
Duboc Room 4-331

Host: Max Metlitski