Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Exploring 3D fracton topological order: gauged layers construction and entanglement renormalization"

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Abstract: In the first part of the talk I will describe a new family of 3D type-I fracton model built out of 2D layers of topological phases, which can realize non-Abelian fractons. I will present exactly solvable Hamiltonians where the 2D building blocks are string-net models, and explain how these models can be understood as gauging planar subsystem symmetries coupled with 1-form symmetries in 2D topological phases. I will also provide an alternative picture in terms of anyon condensation at intersection of layers.

In the second part of the talk I will study entanglement renormalization of stabilizer models with fractal logical operators, including type-II fracton models. In particular we will focus on a family of models known as cubic codes. We will show that all such models bifurcate under entanglement renormalization, namely they split into a copy of the same model plus one or more other models. In most cases the appearance of the other models can be related to the existence of excitations with restricted mobility. I will discuss the implications of these results for thermodynamic phase equivalence of fracton orders.

12:00pm noon
Tuesday, October 29, 2019
Duboc Room (4-331)

Host: Adrian Po