Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Rank–2 U(1) spin liquid on the breathing pyrochlore lattice"

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Abstract: Higher–rank generalizations of electrodynamics have recently attracted considerable attention because of their ability to host "fracton" excitations, with connections to both fracton topological order and gravity. However, the search for higher–rank gauge theories in experiment has been greatly hindered by the lack of materially–relevant microscopic models. Here we show how a spin liquid described by rank–2 U(1) gauge theory can arise in a magnet on the breathing pyrochlore lattice. We identify Yb–based breathing pyrochlores as candidate systems, and make explicit predictions for how the rank–2 U(1) spin liquid would manifest itself in experiment. We also discuss the mechanism of partial confinement to realize the rank–2 U(1) spin liquid, and if time allows will show other examples of such mechanism.

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

Host: Liang Fu