Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Classification and simulation of quantum phases by symmetric tensor networks"

Shenghan Jiang, Boston College

Abstract: In this talk, we introduce a general method to construct fully symmetric quantum wavefunctions using projected entangled pair states (PEPS). We find that quantum phases can be organized into crude classes distinguished by local tensor properties, which is related to the symmetry enriched topological phases (SET) and/or symmetry protected topological phases (SPT) of both on-site and lattice symmetries. The tensor network constructions also indicate a general connection between SET and SPT via anyon condensation. Based on the analytical work, we develop an efficient simulation algorithm, which is able to sharply determine crude classes in interacting quantum systems. We show the power of this method in half-integer quantum spin systems on the kagome lattice, where we identify the ground state likely to be a U(1) spin liquid.

12:00pm
Wednesday, November 23, 2016
Duboc Room (4-331)

Host: Liang Fu