

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

“Chiral spin liquid in kagome antiferromagnets and its physical origin as a gauged U(1) SPT phase”

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Abstract: I will talk about our recent study on the spin liquid phases in kagome antiferromagnets, including the numerical discovery and theoretical investigation in the framework of the lattice gauge theory. I will first present our numerical (DMRG) study on kagome XXZ spin model that identifies two distinct spin liquid phases, namely the chiral spin liquid and the kagome spin liquid (the groundstate of the nearest neighbor kagome Heisenberg model). Both phases extend from the extreme easy-axis limit, through SU(2) symmetric point, to the pure easy-plane limit. And they are separated by a continuous phase transition. Motivated by these numerical results, I will then focus on the easy-axis kagome spin system, and reformulate it as a lattice gauge model. Such formulation enables us to achieve a controlled theoretical description for the spin liquid phase, and we show that the chiral spin liquid is indeed a gauged U(1) symmetry protected topological (SPT) phase.

- [1] Yin-Chen He, Subhro Bhattacharjee, Frank Pollmann, and R. Moessner, arXiv:1509.03070
- [2] Yin-Chen He, Subhro Bhattacharjee, R. Moessner, and Frank Pollmann, PRL 115, 116803 (2015)
- [3] Yin-Chen He and Yan Chen, PRL 114, 037201 (2015).
- [4] Yin-Chen He, D. N. Sheng and Yan Chen, PRL 112, 137202 (2014).

12:00pm noon
Tuesday, November 3, 2015
Duboc Seminar Room (4-331)