Quantum phase transitions in kagome lattice quantum Heisenberg antiferromagnets with Dzyaloshinskii-Moriya interactions

YEJIN HUH, Harvard University, LARS FRITZ, University of Cologne, SUBIR SACHDEV, Harvard University — Extending Sachdev’s work (PRB 45 12377 (1992)) on kagome lattice quantum Heisenberg antiferromagnets, the system is studied including Dzyaloshinski-Moriya interaction (DMI) using Schwinger boson methods with Sp(N) symmetry. Above critical size of spin(S), we argue that two distinct types of ordered ground states are found. For small values of spin, the ordering disappears and we observe a quantum disordered ground state. The DMI favors ordering and when this is increased the system undergoes a quantum phase transition to an ordered state. We discuss the phase diagram of the system as a function of DMI strength and S/N.

Yejin Huh
Harvard University

Date submitted: 22 Dec 2009