SES19-2019-000168

Abstract for an Invited Paper
for the SES19 Meeting of
the American Physical Society

Spin Dynamics and Hidden Plaquette ordering in the Frustrated Honeycomb Gamma Model

GIA-WEI CHERN, University of Virginia

I present our recent studies on a new class of highly frustrated magnets characterized by strong anisotropic spin-orbit coupling. In particular, I will focus on the so-called Gamma model in which the dominant spin interaction is given by the symmetric anisotropic, or off-diagonal, exchange process. Recently, it has been shown that a huge degeneracy exists in the ground-state manifold of the classical model. I will discuss a new classical spin liquid in which the collective flux degrees of freedom break the translation symmetry of the honeycomb lattice. We demonstrate that the system undergoes a phase transition driven by thermal order by disorder at an unusually low temperature compared with the exchange energy scale. We further compute the dynamical structure factors of the spin-liquid phase and reveal unusual dynamical properties of the hexagonal flux parameters. Finally, I will discuss effects of magnetic field on the hidden plaquette order.