

MAR16-2015-000226

Abstract for an Invited Paper
for the MAR16 Meeting of
the American Physical Society

Love triangles, quantum fluctuations and spin jam

SEUNG-HUN LEE, University of Virginia

When magnetic moments are interacting with each other in a situation resembling that of complex love triangles, called frustration, a large set of states that are energetically equivalent emerge. This leads to exotic spin states such as spin liquid and spin ice. Recently, we presented evidence for the existence of a topological glassy state, that we call spin jam, induced by quantum fluctuations.[1,2] The case in point is $\text{SrCr}_{9p}\text{Ga}_{12-9p}\text{O}_{19}$ (SCGO(p)), a highly frustrated magnet, in which the magnetic Cr ions form a quasi-two-dimensional triangular system of bi-pyramids. This system has been an archetype in search for exotic spin states. Understanding the nature of the state has been a great intellectual challenge. Our new experimental data and theoretical spin jam model provide for the first time a coherent understanding of the phenomenon. Furthermore, the findings strongly support the possible existence of purely topological glassy states. Reference: [1] *Spin jam induced by quantum fluctuations in a frustrated magnet*, J. Yang *et al.*, Proc. Natl. Acad. Sci. of U.S.A. Vol. 127, 11519-11523 (2015). [2] *Glassiness and exotic entropy scaling induced by quantum fluctuations in a disorder-free frustrated magnet*, I. Kich, S.-H. Lee, K. Iida, Nature Communications **5**, 3497 (2014).