

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

The nature of the quantum spin-liquid state in Herbertsmithite
MATTHIAS PUNK, University of Innsbruck, DEBANJAN CHOWDHURY, SUBIR SACHDEV, Harvard University — Recent neutron scattering experiments on the layered spin-1/2 kagome lattice antiferromagnet Herbertsmithite revealed the first signature of fractionalized excitations in a quantum spin liquid state. The precise nature of this state remains unclear, however. Mean-field models of gapped as well as gapless spin liquids exhibit sharp features in the dynamic structure factor, none of which have been observed in experiment. We are going to show that several of the experimentally observed details can be explained by the presence of topological vortex excitations in a gapped Z_2 spin liquid. These so called vison excitations form almost flat bands on the kagome lattice and act as a momentum sink for the spin-carrying excitations probed by neutron scattering.

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Date submitted: 11 Nov 2013

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