MAR14-2013-006279

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Gapless Spin Liquid Behaviour in the S = 1/2 Vanadium Oxyfluoride Kagome Antiferromagnet $[NH_4]_2[C_7H_{14}N][V_7O_6F_{18}]$

LUCY CLARK, McMaster University

The ionothermal synthesis of the magnetic bilayer compound diammonium quinuclidinium vanadium oxyfluoride, $[NH_4]_2[C_7H_{14}N][V_7O6F_{18}]$, or DQVOF was recently reported [1]. Its structure contains two crystallographically distinct vanadium sites. On one site sit V^{4+} d^1 cations, which form a geometrically frustrated kagome network of S = 1/2 spins. At the second site, between these kagome layers, reside V^{3+} d^2 S = 1 cations to give the kagome bilayer-type units. Here, I will show that DQVOF can be considered as an experimental realization of an S = 1/2 kagome antiferromagnet, with non-interacting S = 1/2 kagome planes, as evidenced by the paramagnetic behaviour of the interlayer S = 1 spins of the V^{3+} cations in our low temperature magnetization and specific heat data. Furthermore, I will show that the combination of strong geometrical frustration and quantum effects within the kagome planes results in exotic magnetic behaviour, with significant experimental evidence in the form of specific heat and muon spin relaxation measurements pointing towards a gapless quantum spin liquid ground state in DQVOF [2].

[1] F. H. Aidoudi et al. Nat. Chem. 3, 801 (2011).
[2] L. Clark et al. Phys. Rev. Lett. 110, 207208 (2013).