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Spin liquid state in the S=1 vanadium kagome $YCa_3(VO)_3(BO_3)_4$
CHRISTOPHER WIEBE, University of Winnipeg, HARLYN SILVERSTEIN, University of Manitoba, JASON GARDNER, NIST NCNR, HAIDONG ZHOU, University of Tennessee-Knoxville — Over the last decade, the search for model kagome compounds has been fruitful for S=1/2 Cu^{2+} spins in the minerals Herbertsmithite and Volborthite [1-2]. There are fewer comparable materials for S=1 analogues, but recent progress has been made with the discovery of $YCa_3(VO)_3(BO_3)_4$, which has a network of V^{3+} kagome spins [3]. Previous reports were made of no magnetic ordering down to 1.5 K in this compound, despite strong antiferromagnetic exchange [3]. Here we report a new synthesis method for this material which reduces impurity levels, resulting in high quality polycrystalline samples of $YCa_3(VO)_3(BO_3)_4$. Neutron scattering experiments show no evidence for long-ranged magnetic ordering down to 50 mK, with gapped inelastic excitations developing similar to S=1/2 kagome compounds. Heat capacity and susceptibility measurements also show a lack of long-range magnetic order and a lack of spin glassiness, placing this compound as a new spin liquid candidate.

[1] J. S. Helton *et al.* Phys. Rev. Lett. (2007) 98, 10724.
[2] Z. Hiroi *et al.* J. Phys. Soc. Japan (2001) 70, pp 3377-3384.
[3] W. Miller *et al.* Chem. Mater. (2011) 23 (5), pp 1315-1322.

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