Kagome Frustrated Antiferromagnets

P. Mendels[1], F. Bert[1], A. Olariu[1], A. Zorko[2], E. Kermarrec[1], M. Cheong[1]

[1]*Lab. Physique des Solides, Univ Paris-Sud, CNRS France*
[2]*Jožef Stefan Institute, Ljubljana, Slovenia*

The frustration of antiferromagnetic interactions on the loosely connected kagome lattice associated to the enhancement of quantum fluctuations for S=1/2 spins was acknowledged long ago as a keypoint to stabilize novel ground states of magnetic matter. Only very recently, the model compound Herbersmithite, $ZnCu_3(OH)_6Cl_2$, could be synthesized and does not show any sign of freezing [1]. Its discovery has been coined as the "end to the drought of spin liquids".
I'll present first a short review of the major contributions of NMR to the study of earlier kagome-based frustrated antiferromagnets, spanning over the case of the (Cr^{3+} $S = 3/2$ kagome bilayer SrCrGaO, and the recent case of $S = 1/2$ Cu^{2+} based compound, Volborthite.
I will then discuss in detail our and others' results obtained over the recent years on Herbertsmithite and underline some of the pending issues. We will also discuss the specific NMR signature associated with unavoidable spinless defects in the kagome planes and how rewarding this "perturb to reveal approach" could be, in order to establish firmly the ground state of the kagome Heisenberg antiferromagnet. A comparison will be performed with other studies which give results which complement NMR[3-5].

[1] P. Mendels *et al*, Phys. Rev. Lett. **98**, 077204 (2007).

[2] A. Olariu *et al*, Phys. Rev. Lett. **100**, 087202 (2008).

[3] F. Bert *et al*, Phys. Rev. B **76**, 132411 (2007).

[4] A. Zorko *et al*, Phys. Rev. Lett. **101**, 026405 (2008).

[5] For a review, see P. Mendels and F.Bert, J. Phys. Soc. Jpn **1**, 011001 (2010).