Spin dynamics of classical kagome antiferromagnets

Julien Robert[1], Mathieu Taillefumier[2], Benjamin Canals[3], Virginie Simonet[3] and Rafik Ballou[3]

[1] *Laboratoire Léon Brillouin - CEA Saclay, bât. 563, F-91191 Gif-sur-Yvette cedex, France*

[2] *Department of Physics, UIO, Postboks 1048 - Blindern 0316 Oslo, Norway.*

[3] *Institut Néel - 25 avenue des Martyrs, bât. K, BP 166, 38042 Grenoble cedex 9, France.*

By combining monte carlo and spin dynamics simulations, we investigate the possibility of coherent excitations in classical kagome antiferromagnets through the calculation of the dynamical structure factors $S(\mathbf{Q}, \omega)$ (resp. the powder averaged $S(|Q|, \omega)$).

In the dense, non disordered case, evidences for spin wave like excitations are given : we show that the heisenberg kagome antiferromagnet has two distincts low temperature dynamical regimes, whose temperature ranges are given by the entropically driven onset of spin plane coplanarity at $T/J \simeq 5 \times 10^{-3}$.

We furthermore show that the low temperature manifold is very fragile and that the spin dynamics strongly depends on the ratio of disorder, whatever its type (non magnetic impurities or bond distortions). Antisymmetric interactions are finally taken into account as another source of perturbation.

[1] J. Robert, B. Canals, V. Simonet and R. Ballou, Physical Review Letters 101, 117207 (2008).

[2] M. Taillefumier, J. Robert, and B. Canals, not published (2010).