# Chiral spin liquid on kagome antiferromagnet induced by Dzyaloshinskii-Moriya interaction

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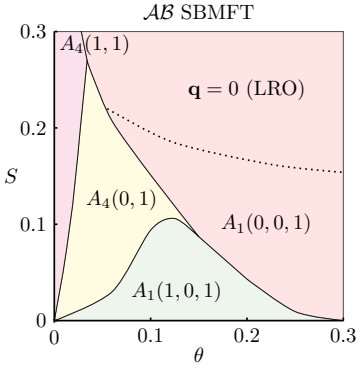
Herbertsmithite was the first perfect kagome compound, realised in 2005, leading to the first observation of a spin liquid. But the precise nature of this phase remains controversial as different spin liquids, characterized by unusual quantum number (symmetry fractionnalisation quantum numbers) exist. Since then, crystal synthesis revealed a quasi dispersionless low energy structure factor (Han et al, Nature 2012). This kagome antiferromagnet is notably perturbed by a small Dzyaloshinskii-Moriya interaction (DMI). We analyze the expression of this interaction and show that DMI reduces frustration on the kagome lattice. Schwinger boson mean-field theory (SBMFT) has recently been largely used combined with the projective symmetry group approach. Thus, only Ansaetze constrained to respect the lattice symmetries are considered. We use it here with the DMI, considering also time reversal symmetry breaking states and find a new chiral spin liquid having interesting low energy properties (Arxiv 1701.01243), comparable to the experimental results. We detail the specificities of this phase with respect to the previously proposed ones and present the theoretical phase diagram and dynamical structure factor calculations.




Phase diagram obtained with SBMFT. The new chiral phase is the yellow one.