Quantum Kagome Spin Liquids : a local view

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The discovery of Herbertsmithite, $ZnCu_3(OH)_6Cl_2$, which features a perfect kagome geometry –the most frustrated 2D antiferromagnet- and was first in this geometry not to show any freezing at any temperature, has been coined as the "end to the drought of spin liquids" [1,2]. It has triggered an intense activity on new kagome materials and related theories for the ground state of the quantum kagome Heisenberg antiferromagnet.

I'll first review pending debates and issues about this emblematic compound. I'll then illustrate some of our research thrusts in tracking down kagome or hyperkagome quantum spin liquid physics in S=1/2 materials through thermodynamic, NMR and μSR measurements, and will discuss on selected example(s) the experimental phase diagrams which result from deviations from the pure Heisenberg case. Selected examples encompas kapellasite [3], a polymorph of Herbertsmithite, which is recognized as a representative of the J1-Jd model and compounds with hyperkagome geometry [4,5].

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