

Spin textures and their interactions in Coulomb spin liquids

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Magnetic compounds on lattices composed of corner-sharing triangular or tetrahedral units provide us with many experimental realizations of frustrated magnetism. Classical Heisenberg spins on such lattices lead to the formation of a “Coulomb” spin liquid phase, which is well understood by now. In this talk, I will discuss what happens when such a phase is doped with non-magnetic impurities. The low temperature magnetic response of such a system is most naturally described in terms of the properties of spatially extended spin textures that cloak an “orphan” spin. In the $T \rightarrow 0$ limit, these orphan-texture complexes each carry a net magnetization that is exactly half the magnetic moment of an individual spin in the undiluted system. These textures leave an unmistakable imprint on the measured Ga NMR line shapes in the well-known frustrated antiferromagnet SCGO. I will also discuss how these extended textures interact with each other at low temperatures. Both the texture and its interactions can be understood in terms of appropriate correlation functions of the parent spin liquid state.

[1] AS, K. Damle and R. Moessner, PRL 106, 127203 (2011)

[2] AS, K. Damle and R. Moessner, arXiv:1204.4970 (to appear in PRB)