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A mean-field study of the Hubbard model on the kagome lattice[1]

MATTHEW ENJALRAN, Southern Connecticut State University — The experimental work on the herbertsmithite compound, $ZnCu_3(OH)_6Cl_2$, almost a decade ago ignited intense interest in the field of frustrated magnetism because it represented the best material realization of a spin-1/2 Heisenberg antiferromagnet (AFM) on the kagome lattice and its ground state was a gapless spin liquid. Many theoretical and numerical studies of the quantum Heisenberg AFM on the kagome lattice have been performed since and have coalesced around the general consensus of a small gapped spin liquid ground state for the model. Although there is not currently a metallic kagome material system, the work on $ZnCu_3(OH)_6Cl_2$ has motivated theoretical and numerical investigations of itinerant electrons on the kagome lattice. We contribute to this pursuit by studying the single band Hubbard model on the kagome lattice, where the frustration can be tuned by adjusting the hopping along different bonds, t_1 and t_2; however, we are mainly interested in the isotropic limit, $t_1 = t_2 = t$. We report preliminary results on the low temperature correlations in the half filled model as a function of frustration and interaction strength in the mean-field, Hartree-Fock, limit.

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