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Electron Doping a Kagome Spin Liquid[1] ZACHARY KELLY, MIRANDA GALLAGHER, TYREL MCQUEEN, Johns Hopkins Univ — In 1987, Anderson proposed that charge doping a material with the resonating valance bond (RVB) state would yield a superconducting state. Ever since, there has been a search for these RVB containing spin liquid materials and their charge doped counterparts. Studies on the most promising spin liquid candidate, Herbertsmithite, $ZnCu_3(OH)_6Cl_2$, a two dimensional kagomé lattice, show evidence of fractionalized excitations and a gapped ground state. In this work, we report the synthesis and characterization of a newly synthesized electron doped spin liquid, $ZnLi_xCu_3(OH)_6Cl_2$ from $x = 0$ to $x = 1.8$ (3/5th per Cu^{2+}). Despite heavy doping, the series remains insulating and the magnetism is systematically suppressed. We have done extensive structural studies of the doped series to determine the effect of the intercalated atoms on the structure, and whether these structural differences induce strong localization effects that suppress the metallic and superconducting states. Other doped spin liquid candidates are also being explored to understand if this localization is system dependent or systemic to all doped spin liquid systems.

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