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Absence of Superconductivity in Doping Kagome Quantum Spin Liquid THOMAS DEVEREAUX, Stanford Univ, HONGCHEN JIANG, SHENXIU LIU, Stanford Institute for Materials and Energy Sciences, STEVE KIVELSON, Stanford Univ — We study the effects of doping a Mott insulator on the kagome lattice where spins interact via antiferromagnetic Heisenberg couplings. This model is known to have a quantum spin liquid ground state at half-filling. The effect of hole doping is studied within the context of the t-J model using large-scale density-matrix renormalization group. Surprisingly, we find that there is no long-range superconductivity in the ground states of the system although the spin-spin correlations remain short-ranged for doping concentrations up to 11%. The effective interaction between doped holes is repulsive. The ground states have robust long-range charge density wave order, which is either unidirectional stripe or two-dimensional Wigner crystal, whose pattern depends on the lattice geometry and hole doping concentration. These results may be relevant to kagome lattice Herbertsmithite ZnCu3(OH)6Cl2 upon doping.

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