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**Stability of the U(1) Dirac spin liquid state on the kagome lattice** MICHAEL LAWLER, Binghamton University, BRYAN CLARK, Princeton University, JESSE KINDER, Case Western Reserve University, Cornell University, ERIC NEUSCAMMAN, UC Berkeley, Cornell University, GARNET CHAN, Cornell University — The ground state of the spin 1/2 nearest neighbor Heisenberg antiferromagnet on the kagome lattice is still unknown. Recent DMRG calculations[1] have challenged the proposal[2] that this ground state is an algebraic spin liquid with Dirac fermions and photons as elementary excitations. We numerically study all time reversal invariant Gutzwiller projected variational wave functions for this system and find a state with mild symmetry breaking as the lowest energy state. To avoid getting stuck in a local minimum, we begin our Monte-Carlo calculation from all Z2 spin liquid states cataloged in Ref. [3]. Analyzing the resulting wave function, we find it lies very close to the U(1) Dirac state proposed in Ref. [2] in terms of its gauge fluxes, but with lower energy. We believe these results strongly emphasize the dominance and stability of the U(1) Dirac spin liquid state among Gutzwiller projected wave functions. However, our state has higher energy than the DMRG matrix product state, so correlations beyond those captured by it must play a fundamental role in the characterization of the ground state. [1]S. Yan, D.A. Huse, and S.R. White, Science 332, 1173 (2011) [2]Y. Ran, M. Hermele, P.A. Lee, and X.-G. Wen, PRL, 98, 117205 (2007) [3]Y.-m. Lu, Y. Ran, and P. Lee, PRB, 83, 12 (2011)

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