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Vanishing spin gap in a competing spin-liquid phase in the kagome Heisenberg antiferromagnet FEDERICO BECCA, Istituto Officina dei Materiali del CNR and International School for Advanced Studies, YASIR IQBAL, The Abdus Salam International Centre for Theoretical Physics, DIDIER POILBLANC, Laboratoire de Physique Theorique, CNRS and Universite de Toulouse — We provide strong numerical evidence, using improved variational wave functions, for a ground state with vanishing spin gap in the spin-1/2 quantum Heisenberg model on the kagome lattice. Starting from the algebraic U(1) Dirac spin liquid state proposed by Y. Ran *et al.* Phys. Rev. Lett. **98**, 117205 (2007)] and iteratively applying a few Lanczos steps, we compute the lowest S=2 excitation constructed by exciting spinons close to Dirac nodes. Our results are compatible with a vanishing spin gap in the thermodynamic limit and in consonance with a power-law decay of long distance spin-spin correlations in real space. The competition with a gapped (topological) spin liquid is discussed.

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