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**Dipolar order by disorder in the classical Heisenberg antiferromagnet on the kagome lattice** GIA-WEI CHERN, Theoretical Division, Los Alamos National Laboratory, RODERICH MOESSNER, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany — Ever since the experiments which founded the field of highly frustrated magnetism, the kagome Heisenberg antiferromagnet has been the archetypical setting for the study of fluctuation induced exotic ordering. To this day the nature of its classical low-temperature state has remained a mystery: the non-linear nature of the fluctuations around the exponentially numerous harmonically degenerate ground states has not permitted a controlled theory, while its complex energy landscape has precluded numerical simulations at low temperature. Here we present an efficient Monte Carlo algorithm which removes the latter obstacle. Our simulations detect a low-temperature regime in which correlations saturate at a remarkably small value. Feeding these results into an effective model and analyzing the results in the framework of an appropriate field theory implies the presence of long-range dipolar spin order with a tripled unit cell.

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