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The J_1 - J_2 Kagome Heisenberg Model with Dzyaloshinskii-Moriya Interaction TSEZAR SEMAN, Northern Illinois University, CHENG-CHIEN CHEN, Argonne National Laboratory, RAJIV SINGH, University of California, Davis, MICHEL VAN VEENENDAAL, Northern Illinois University, Argonne National Laboratory — We study the static and dynamic properties of an $S = 1/2$ kagome antiferromagnetic (AFM) Heisenberg model using large-scale exact diagonalization. We map out the phase diagram as functions of the next-nearest-neighbor exchange J_2 and the z-axis Dzyaloshinskii-Moriya interaction D_z . In particular, the phase boundary between a magnetically disordered state and a $\mathbf{Q} = 0, 120^\circ$ AFM long-range order is identified through finite-size extrapolation of the transverse spin-spin correlation function. We also compute the dynamical structure form factors and the cross sections of two-magnon Raman scattering in different regimes of the phase diagram. The implications of our numerical results to the $S = 1/2$ kagome compound herbertsmithite $\text{ZnCu}_3(\text{OH})_6\text{Cl}_2$ will be discussed.

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