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Phase diagram and chirality of the spin-1/2 J1-J2 Heisenberg model on the kagome lattice SHOUSHU GONG, DONGNING SHENG, Department of Physics and Astronomy, California State University Northridge, Northridge, California, 91325, USA — We studied the spin-1/2 Heisenberg model on the kagome lattice with nearest (J_1) and next-nearest neighbor (J_2) interactions by means of the density matrix renormalization group. We set J_1 as antiferromagnetic coupling ($J_1 > 0$), and J_2 can be either ferromagnetic ($J_2 < 0$) or antiferromagnetic ($J_2 > 0$). By analyzing the spin-spin correlation function and the bond energy, we find a valence-bond crystal phase for $J_2 < -0.1$ and a magnetically ordered phase for $J_2 > 0.2$. In the intermediate paramagnetic phase, we investigate the evolution of spin and singlet gaps, topological entanglement entropy, dimer and chirality correlations as a function of the parameter J_2 . In particular, we investigate the local p6 chiral order parameter proposed recently by measuring the dimer-dimer correlation functions to study the possible reflection symmetry breaking in this spin liquid candidate.

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