DMRG Study of the $S > 1/2$ quantum Heisenberg Antiferromagnet on the Husimi Cactus

Subject area: Kagome systems

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Using a DMRG procedure tailored for tree graphs, we consider the quantum Heisenberg antiferromagnet on the Husimi cactus for $S > 1/2$. The geometry of the Husimi cactus replicates the Kagome lattice locally, but contains no loops. Properties of the Kagome lattice which are dominated by nearest-neighbor spin fluctuations should therefore be captured adequately by the same interactions on the Husimi cactus. Comparison with previous results for the Kagome lattice may shed light on how much of the physics is determined by nearest-neighbor interactions, and how much is dependent on loop corrections. We also investigate whether or not there is a transition from a possible small-S spin liquid state to the known coplanar state at large S, a problem which is prohibitively difficult on the regular Kagome lattice.

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