

Abstract Submitted
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DMRG studies of the frustrated kagome antiferromagnets and the application to volborthite¹ SHOU-SHU GONG, National High Magnetic Field Laboratory, Florida State University, Tallahassee, Florida 32310, USA, D. N. SHENG, Department of Physics and Astronomy, California State University, Northridge, California 91330, USA, KUN YANG, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, Florida 32306, USA — Motivated by the recent magnetization measurements on the high-quality single crystals of the kagome antiferromagnet volborthite, we study the ground state and magnetization properties of two kagome models proposed from the electronic structure simulations, which treat the volborthite as either the coupled trimers or the coupled frustrated chains on the kagome lattice. We study the models using density-matrix renormalization group on the cylinder geometry with the system width up to 4 legs. We find a quantum phase diagram of the models with changing couplings, and identify the magnetic properties of each phase. In the antiferromagnetic phases, we also study the magnetization curve and the different phases in the magnetic field. Finally, we compare the magnetization properties of the models with the experimental observations of volborthite.

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