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Quantum and Classical Spins on the Distorted Kagome (volborthite) Lattice FA WANG, Dept. of Physics, UC Berkeley, ASHVIN VISHWANATH, Dept. of Physics, UC Berkeley; Material Science Division, LBNL, YONG BAEK KIM, Dept. of Physics, U of Toronto; Dept. of Physics, UC Berkeley — The spin-1/2 quantum antiferromagnet on the distorted Kagome lattice (with bonds along one direction stronger than along the other two directions) is realized in the mineral volborthite [F.Bert, et.al. Phys.Rev.Lett. 95, 087203 (2005)]. Here we study properties of antiferromagnetic spin systems on this lattice, in particular how the distortion affects the extreme frustration of the Kagome structure. We first consider ground states of classical O(3) spins on this lattice and show that there is a very large (although probably sub-extensive) number of them. Order-by-disorder effects resulting from thermal or quantum spin waves will be discussed. Finally, we consider approaching the problem directly from the quantum limit via Schwinger boson and fermion mean field theories.

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