Abstract Submitted
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Competing order in a 3D antiferromaget KEVIN BEACH, Boston University — It has long been believed that systems of interacting spins can support, in addition to the usual collinear Néel state, a variety of paramagnetic ground states with resonating or static valence bond order. Confirmation of their existence in candidate models has been complicated by the fact that the frustrating interactions that might support these exotic phases are generally sign problematic and not amenable to exact numerical simulation. Recent advances in projector valence bond Monte Carlo [A. W. Sandvik, Phys. Rev. Lett. **95**, 207203 (2005)], however, have expanded the limited class of models that can be simulated. This algorithm is compatible with a class of SU(2) invariant interactions that suppress antiferromagnetism. In particular, a continuous transition (a candidate for a deconfined quantum-critical point) between an antiferromagnetic and columnar bond phase in 2D can be engineered by tuning the strength of a four-spin interaction. We consider a generalization of this interaction in a 3D antiferromagnet, where it is suspected that the Néel and bond-ordered phases are separated not by a single quantum critical point but by an extended spin liquid phase. New developments for the valence bond basis allow us to calculate higher-order spin correlations, Binder cumulants, and the spin stiffness.

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