

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Tensor network simulation of phase diagram of frustrated J1-J2 Heisenberg model on a checkerboard lattice YANGHAO CHAN, Physics Department, University of Michigan, YONGJIAN HAN, Key laboratory of quantum information, University of Science and Technology of China, LUMING DUAN, Physics Department, University of Michigan — We use the recently developed tensor network algorithm based on infinite projected entangled pair states (iPEPS) to study the phase diagram of frustrated antiferromagnetic J1-J2 Heisenberg model on a checkerboard lattice. The simulation indicates a Neel ordered phase when $J2 < 0.88J1$, a plaquette valence bond solid state when $0.88 < J2/J1 < 1.11$, and a stripe phase when $J2 > 1.11J1$, with two first-order transitions across the phase boundaries. The calculation shows the cross-dimer state proposed before is unlikely to be the ground state of the model, although such a state indeed arises as a metastable state in some parameter region.

Yanghao Chan
Physics Department, University of Michigan

Date submitted: 28 Nov 2011

Electronic form version 1.4