

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Variational study of the  $J_1 - J_2$  Antiferromagnetic Heisenberg model on square lattice using correlated valence bond state** LING WANG, OLEXEI MOTRUNICH, california Institute of Technology — We propose a variational ansatz in the context of resonating valence bond state for the  $J_1 - J_2$  Antiferromagnetic model on square lattice in the strongly frustrated regime. The ansatz modifies the nearest neighbor valence bond state by considering short range bond-bond correlations and their local resonances. The correlated bond-bond pairs have their local sign factor, which can produce the correct sign structure (nodal structure) as can be checked on  $4 \times 4$  and  $6 \times 6$  torus. The variational energy (up to size  $10 \times 10$ ) is highly competitive with the recent DMRG study on torus and the slave fermion variational Monte Carlo study with two step lanczos projection. We will discuss phases in the intermediate coupling region.

Ling Wang  
california Institute of Technology

Date submitted: 15 Nov 2013

Electronic form version 1.4