Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Searching for Topological Phases in Cold Atom Systems
STEPHEN INGLIS, ROGER MELKO, University of Waterloo — RVB (Resonating Valence Bond) phases represent a recurring theme in strongly-correlated systems, for example as a mechanism for cuprate pairing and in the search for deconfinement and fractionalization. Although there are few experimental candidates of quantum spin liquid states, engineering a RVB on an optical lattice would be feasible if the underlying Hamiltonian were known. Work by Moessner and Sondhi[1] has shown that a Quantum Dimer model on a triangular model is capable of realizing a short range RVB. In an effort to construct a RVB in a Bose-Hubbard Hamiltonian, we examine a fully frustrated Honeycomb lattice which, in the classical limit, has a duality mapping to the ground state of the classical triangular lattice dimer model. The effect of quantum fluctuations of this ground state is studied by stochastic series expansion quantum Monte Carlo. We have found that the configuration of the frustration give us ground states that can be described as a localized resonating valence bond crystal or a valence bond liquid that freezes into what may be a valence bond glass at low temperatures. [1] R. Moessner and S. L. Sondhi, Phys. Rev. Lett. **86**, 1881 (2001)

Stephen Inglis
University of Waterloo

Date submitted: 18 Nov 2009 Electronic form version 1.4