Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Pairing states for the ring exchange t-J model MING LOU, MICHAEL MA, University of Cincinnati, FU-CHUN ZHANG, University of Hong Kong — Multiple spin interactions, introduced by ring exchange process, are important for many systems, including solid ^{3}He and High Tc cuprates. In high Tc cuprates, the dominant term is the 2-spin antiferromagnetic interaction, which leads to d-wave singlet pairing upon doping. In solid ^{3}He, on the other hand, the 4-spin interaction plays an important role, and it's interesting to determine how the Cooper pairing state may differs from that of cuprates. In this work, we apply the renormalized mean-field theory [1] to a modified t-J model, where the J term includes the 4-spin interaction introduced by the ring exchange. Our result shows that a mixed state of singlet and triplet pairing optimizes the energy. At half filling, the pairing state is unphysical, due to the fact that there is no double occupancy. Upon doping or with intrinsic vacancies, the paring state becomes physical. Such a mechanism may introduce supersolidity in bulk solid ^{3}He and solid ^{3}He absorbed on a substrate at very low temperature. [1] F.C. Zhang, C. Gros, T.M. Rice and H. Shiba, Supercond. Sci. Technol. 1 36 (1988)

Ming Lou
University of Cincinnati

Date submitted: 27 Nov 2007 Electronic form version 1.4