Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Influence of spinons fluctuations near the spin liquid Mott transition TSUNG-HAN LEE, Florida State University and National High Magnetic Field Laboratory, SERGE FLORENS, Institut Neel, CNRS and Universite Grenoble Alpes, VLADIMIR DOBROSAVLJEVIC, Florida State University and National High Magnetic Field Laboratory — We investigate the metal to Mott-insulator transition (MIT) in the Hubbard-Heisenberg model using the slave-rotor technique, which allows to combine for the first time the dynamical mean field theory (DMFT) with the Resonating Valence Bond (RVB) approach. In the spin-liquid phase at large Coulomb repulsion, the system shows a RVB transition from a trivial paramagnetic Mott insulator towards a low temperature insulating state with long lived spinons, as seen by the emergence of a linear specific heat. This quenching of the entropy in the spin liquid phase provides strong modifications in the shape of the standard DMFT phase diagram for the MIT occurring at intermediate values of the Coulomb repulsion. We find that the RVB transition happens concomitantly with the first order MIT lines at low temperature. This implies that the Mott insulator always accommodates a spinon Fermi surface, even in the coexistence regime of the MIT, and that the metallic state always stays a Fermi-liquid as it rejects the presence of free spinons, due to their strong scattering onto the holons.

Tsung-Han Lee
Florida State University and National High Magnetic Field Laboratory

Date submitted: 06 Nov 2015 Electronic form version 1.4