Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Infinite bandwidth of a Mott-Hubbard insulator[1] JAMES FREERICKS, JEFFREY COHN, Georgetown University, PETER VAN DONGEN, University of Mainz, HULIKAL KRISHNAMURTHY, Indian Institute of Science, Bangalore — The conventional viewpoint of the strongly correlated electron metal-insulator transition is that a single band splits into two upper and lower Hubbard bands at the metal-insulator transition. Much work has investigated whether this transition is continuous or discontinuous. Here we focus on another aspect and ask the question of whether there are additional upper and lower Hubbard bands, which stretch all the way out to infinity—leading to an infinite bandwidth for the Mott insulator. While we are not yet able to provide a rigorous proof of this result, we use exact diagonalization studies on small clusters to motivate the existence of these additional bands, and we discuss some different methods that might be utilized to provide a rigorous proof of this result. Even though the extra upper and lower Hubbard bands have very low total spectral weight, those states are expected to have extremely long lifetimes, leading to a nontrivial contribution to the transport density of states for dc transport and modifying the high temperature limit for the electrical resistivity.

[1]JKF supported by the Department of Energy, Office of Basic Energy Sciences, under Grant No. DE-FG02-08ER46542, and by the McDevitt bequest at Georgetown University. HRK supported by the Indian Science Foundation.

James Freericks
Georgetown University

Date submitted: 06 Nov 2015 Electronic form version 1.4