Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Non-Equilibrium Conductivity at Quantum Critical Points ANDREW BERRIDGE, London Centre for Nanotechnology, M.J. BHASEEN, King's College London, A.G. GREEN, London Centre for Nanotechnology — The behaviour of quantum systems driven out of equilibrium is a field in which we are still searching for general principles and universal results. Quantum critical systems are useful in this search as their out of equilibrium steady states may inherit universal features from equilibrium. While this has been shown in some cases, the calculational techniques used often involve simplified models or calculational tricks, which can obscure some of the underlying physical processes. Here we use a Boltzmann transport approach to study the steady-state non-equilibrium properties - conductivity and current noise, of the Bose-Hubbard model head-on. We must explicitly consider heat-flow and rate limiting processes in the establishment of the steady-state to show that it can indeed be universal. Our analysis reveals the importance of the hydrodynamic limit and the limitations of current approaches.

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Date submitted: 09 Nov 2012 Electronic form version 1.4