Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Open quantum transport phenomena in nanowires[1] NATHANAEL C. SMITH, DANIEL JASCHKE, Colorado School of Mines, Golden, CO, 80401, USA, INÉS DE VEGA, Ludwig-Maximilians-Universität München, Theresienstrasse 37, 80333 Munich, Germany, LINCOLN D. CARR, Colorado School of Mines, Golden, CO, 80401, USA — The analysis of many-body dynamics in open quantum systems has important applications for the development of quantum technologies. In the context of nanoelectronics, we investigate transport through multi-site nanostructures coupled to thermal reservoirs. Using a single channel Lindblad master equation, we simulate the steady state dynamics of local and global observables of these systems via the diagonalization of the Liouville operator. We measure the dependence of transport on the temperatures and chemical potentials of the reservoirs, representing the sites of the structure using established many-body models. For example, we study spin transport along a 5-site nanowire within the ferromagnetic and paramagnetic limits of the quantum Ising model, observing induced current due to biased reservoir chemical potential and transport damping at increased reservoir temperatures.

[1]Funded by NSF and AFOSR

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Date submitted: 20 Sep 2017 Electronic form version 1.4