Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A renormalization group approach to identifying the local quantum numbers in a many-body localized system[1] DAVID PEKKER, University of Pittsburgh, BRYAN K. CLARK, UIUC, VADIM OGANESYAN, College of Staten Island and the Graduate Center, CUNY, GIL REFAEL, Caltech, BINBIN TIAN, University of Pittsburgh — Many-body localization is a dynamical phase of matter that is characterized by the absence of thermalization. One of the key characteristics of many-body localized systems is the emergence of a large (possibly maximal) number of local integrals of motion (local quantum numbers) and corresponding conserved quantities. We formulate a robust algorithm for identifying these conserved quantities, based on Wegners flow equations a form of the renormalization group that works by disentangling the degrees of freedom of the system as opposed to integrating them out. We test our algorithm by explicit numerical comparison with more engineering based algorithms Jacobi rotations and bi-partite matching. We find that the Wegner flow algorithm indeed produces the more local conserved quantities and is therefore more optimal. A preliminary analysis of the conserved quantities produced by the Wegner flow algorithm reveals the existence of at least two different localization lengthscales.

[1]Work was supported by AFOSR FA9550-10-1-0524 and FA9550-12-1-0057, the Kaufmann foundation, and SciDAC FG02-12ER46875.

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Date submitted: 06 Nov 2015 Electronic form version 1.4