Abstract Submitted for the MAR14 Meeting of The American Physical Society

**Emergent irreversibility and entanglement spectrum statistics**<sup>1</sup> EDUARDO MUCCIOLO, University of Central Florida, CLAUDIO CHAMON, Boston University, ALIOSCIA HAMMA, Tsinghua University — We study the problem of irreversibility when the dynamical evolution of a many-body system is described by a stochastic quantum circuit. Such evolution is more general than Hamitonian, and since energy levels are not well defined, the well-established connection between the statistical fluctuations of the energy spectrum and irreversibility cannot be made. We show that the entanglement spectrum provides a more general connection. Irreversibility is marked by a failure of a disentangling algorithm and is preceded by the appearance of Wigner-Dyson statistical fluctuations in the entanglement spectrum. This analysis can be done at the wavefunction level and offers a new route to study quantum chaos and quantum integrability.

<sup>1</sup>We acknowledge financial support from the U.S. National Science Foundation through grants CCF 1116590 and CCF 1117241, from the National Basic Research Program of China through grants 2011CBA00300 and 2011CBA00301, and from the National Natural Science Fo

Eduardo R. Mucciolo University of Central Florida

Date submitted: 13 Nov 2013

Electronic form version 1.4