Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Universal energy fluctuations in thermally isolated driven systems GUY BUNIN, Department of Physics, Technion, LUCA D'ALESSIO, Department of Physics, Boston University, YARIV KAFRI, Department of Physics, Technion, ANATOLI POLKOVNIKOV, Department of Physics, Boston University — When an isolated system is brought in contact with a heat bath, its final energy is random and follows the Gibbs distribution–this finding is a cornerstone of statistical physics. The system's energy can also be changed by performing non-adiabatic work using a cyclic process. Almost nothing is known about the resulting energy distribution in this set-up, which is in particular relevant to recent experimental progress in cold atoms, ion traps, superconducting qubits and other systems. Here we show that when the non-adiabatic process consists of many repeated cyclic processes, the resulting energy distribution is universal and different from the Gibbs ensemble. We predict the existence of two qualitatively different regimes with a continuous second-order-like transition between them. We illustrate our approach by performing explicit calculations for both interacting and non-interacting systems.

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Date submitted: 06 Dec 2011 Electronic form version 1.4