Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Generalized Gibbs Ensemble vis a vis Standard Thermodynamics: A Rigorous Lower Bound on Accuracy Gain[1] MAXIM OLSHANII, University of Massachusetts Boston — Consider a situation where one additional integral of motion is incorporated into an existing microcanonical description of a quantum system. For these two ensembles, we compare their abilities to predict the value of a particular observable after a relaxation from an initial non-equilibrium state. We derive a rigorous lower bound on the accuracy gain resulting from an additional conserved quantity. For a sufficiently fine microcanonical partitioning of the axis of the additional integral, the bound does not depend on the details of this partitioning. Instead, there, a recently introduced Frobenius-Hilbert-Schmidt inner product between the integral of motion and the observable of interest naturally emerges [M. Olshanii, arXiv:1208.0582]. The bound can be used to optimise the choice of integrals of motion for Generalized Gibbs Ensembles. We illustrate our findings on a numerical example of momentum distributions of lattice hard-core bosons with soft-core repulsion after a quench of the soft-core strength.

[1]Supported by ONR, NSF, and IFRAF

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Date submitted: 25 Jan 2013 Electronic form version 1.4