Abstract Submitted
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Realistic Many-Body Quantum Systems vs. Full Random Matrices: Static and Dynamical Properties[1] JONATHAN KARP, Yeshiva University, JONATHAN TORRES-HERRERA, Universidad Autnoma de Puebla, MARCO TVORA, LEA SANTOS, Yeshiva University — We study the static and dynamical properties of isolated spin 1/2 systems as prototypes of many-body quantum systems and compare the results to those of full random matrices from a Gaussian orthogonal ensemble. Full random matrices do not represent realistic systems, because they imply that all particles interact at the same time, as opposed to realistic Hamiltonians, which are sparse and have only few-body interactions. Nevertheless, with full random matrices we can derive analytical results that can be used as references and bounds for the corresponding properties of realistic systems. In particular, we show that the results for the Shannon information entropy are very similar to those for the von Neumann entanglement entropy, with the former being computationally less expensive. We also discuss the behavior of the survival probability of the initial state at different time scales and show that it contains more information about the system than the entropies.

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Jonathan Karp
Yeshiva University

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