

Abstract Submitted
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Onset of quantum chaos in one-dimensional bosonic and fermionic systems and its relation to thermalization¹ LEA SANTOS, Yeshiva University, MARCOS RIGOL, Georgetown University — By means of exact diagonalization, we study level statistics and the structure of the eigenvectors of one-dimensional gapless bosonic and fermionic systems across the transition from integrability to quantum chaos. These systems are integrable in the presence of only nearest-neighbor terms, whereas the addition of next-nearest neighbor hopping and interaction may lead to the onset of chaos. We show that the strength of the next-nearest neighbor terms required to observe clear signatures of nonintegrability is inversely proportional to the system size. The transition to chaos is also seen to depend on particle statistics, bosons responding first to the integrability breaking terms. In addition, we discuss the use of delocalization measures as main indicators for the crossover from integrability to chaos. The analysis and findings described in this work ² are intimately reflected by studies of thermalization.

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²L. F. Santos and M. Rigol, arXiv:0910.2985

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