

Abstract Submitted
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Quantum signatures of chaos in quantum tomography¹ VAIBHAV MADHOK, CARLOS RIOFRIO, IVAN DEUTSCH, University of New Mexico — We study the connection between quantum chaos and information gain in the time series of a measurement record used for quantum tomography. The record is obtained as a sequence of expectation values of a Hermitian operator evolving under repeated application of the Floquet operator of the quantum kicked top on a large ensemble of identical systems. We find an increase in information gain and hence higher fidelities in the process when the Floquet maps employed increase in chaoticity. We make predictions for the information gain using random matrix theory in the fully chaotic regime and show a remarkable agreement between the two. Finally we discuss how this approach can be used in general as a benchmark for information gain in an experimental implementation based on nonlinear dynamics of atomic spins measured weakly by a the Faraday rotation of a laser probe.

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