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Information gain in tomography - A quantum signature of chaos
VAIBHAV MADHOK, Wilfrid Laurier University, CARLOS RIOFRIO, Freie Universität Berlin, SHOHINI GHOSE, Wilfrid Laurier University, IVAN DEUTSCH, University of New Mexico — We find quantum signatures of classical chaos in various metrics of information gain in quantum tomography. We employ a quantum state estimator based on weak collective measurements of an ensemble of identically prepared systems. The tomographic measurement record consists of a sequence of expectation values of a Hermitian operator that evolves under repeated application of the Floquet map of the quantum kicked top. We find an increase in information gain and hence higher fidelities in the reconstruction algorithm when the chaoticity parameter map increases. The results are well predicted by random matrix theory.

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