Probing the quantum limit of a chaotic system. JACKSON ANGONGA, ERIC MEIER, FANGZHAO AN, BRYCE GADWAY, Univ of Illinois - Urbana — The study of quantum chaos presents the opportunity to observe new and interesting phenomena. This work focuses on the quantum limit of a classically chaotic system. Our approach involves mapping the dynamics ^{87}Rb condensate in a (2J+1)-site momentum-space lattice to those of an effective non-linear spin-J model. By performing spin rotations and squeezing operations we implement the quantum kicked top, a paradigmatic model for studying chaotic dynamics. We present linear entropy measurements as a probe of the quantum-classical crossover in our kicked top lattice. We also highlight, for a squeezing Hamiltonian, the first atomic quantum gas measurements of out-of-time ordered correlators, which serve both as signatures of quantum chaos and as a measure of information scrambling in complex quantum systems.

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Date submitted: 27 Jan 2017   Electronic form version 1.4