Additional authors for the experimental section:

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Text to be tacked onto the end of the abstract:

These results are also applied to experimental measurements in the quantum kicked rotor system.

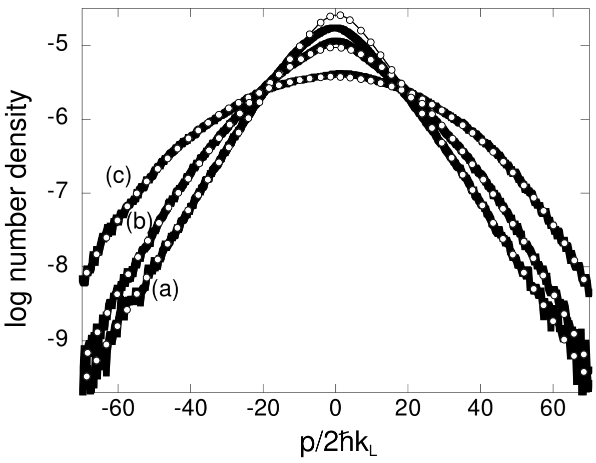

FIG. 1. Experimental quantum kicked rotor data (heavy lines) with best fits (open circles), shown only at the time of 70 kicks for clarity. The three regimes shown are (a) exponential localization, (b) anomalous diffusion, and (c) noise-induced delocalization, for which the respective exponents are $\gamma = 1.06$, 1.48, and 2.03.

We also used Eqs. (1) and (2) to analyze experimental momentum distributions of the quantum kicked rotor. The details of the atom-optics experiment and the measurement conditions are described in Ref. [1]. In each case that we study, the distributions after 30, 40, 50, 60, and 70 kicks are fit simultaneously to Eq. (1) while imposing Eq. (2) as a constraint. To more accurately reflect the experiment, the fundamental distribution in Eq. (2) is convolved with the initial atomic momentum distribution, and a correction is applied for the known response of the detection system. In order to obtain more accurate fits, the center of the distribution ($|p/2\hbar k_{\mathrm{L}}| < 15$, where $\hbar k_{\mathrm{L}}$ is the photon recoil momentum) is excluded from the fit, along with the extreme tails ($|p/2\hbar k_{\mathrm{L}}| > 70$), where the signal levels are unreliably small and where "momentum boundary" effects are most significant [1]. We study three distinct cases, beginning with dynamical localization (with a stochasticity parameter $K = 11.2$), where we find an exponent $\gamma = 1.06 \pm 0.19$, which is consistent with exponential localization. In the next case, the corresponding classical dynamics exhibit anomalous diffusion ($K = 8.4$), where the fit yields $\gamma = 1.48 \pm 0.16$; this larger exponent is consistent with the curved, nonexponential distribution tails observed in the experiments [2]. Finally, we study the kicked rotor with $K = 11.2$ driven strongly (200%) by amplitude noise, where the dynamics mimic classical diffusion; in this case we find $\gamma = 2.03 \pm 0.14$, which is consistent with normal diffusion. The largest contribution to the quoted uncertainties is the sensitivity of the fit to changing the cutoff boundaries described above. The data and fits for all three cases are shown at 70 kicks in Fig. 1, showing excellent agreement in the tails of the distributions.

Additions to the acknowledgements section

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[1] D. A. Steck, V. Milner, W. H. Oskay, and M. G. Raizen, Phys. Rev. E **62**, 3461 (2000).
[2] B. G. Klappauf, W. H. Oskay, D. A. Steck, and M. G. Raizen, Phys. Rev. Lett. **81**, 4044 (1998).