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Experimental realization of diffusion with stochastic resetting

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Stochastic resetting is prevalent in natural and man-made systems, giving rise to a long series of nonequilibrium phenomena. Diffusion with stochastic resetting serves as a paradigmatic model to study these phenomena but lacked a well-controlled platform by which it can be studied experimentally. Here, we report the experimental realization of colloid diffusion and resetting via holographic optical tweezers. We provide the first experimental corroboration of theoretical results and measure the energetic cost of resetting in steadystate and first-passage scenarios. In both cases, we show that this cost cannot be made arbitrarily small because of fundamental constraints on realistic resetting protocols.

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