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Optical Demonstration of the Zeno Effect[1] JULIA SPINA, COURTNEY KRAFCZYK, PAUL KWIAT, University of Illinois at Urbana-Champaign — The quantum Zeno effect occurs when repeated projective measurements are applied to an otherwise evolving quantum state, thereby freezing the state in its current configuration. We investigate an optical implementation of the Zeno effect. Specifically, we induce state evolution by applying perturbative displacements to the transverse spatial mode of a Gaussian light beam. By administering frequent projective measurements to the evolving state using a single mode fiber, we demonstrate that the evolution of the spatial mode from its initial state is, indeed, inhibited. While implementing this experiment with a laser admits a classical explanation, incorporating a true single photon source would demonstrate the quantum nature of the effect.

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