Abstract Submitted
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The influence of future durations on past photon counts in an optical system[1] JULIA MOSSBRIDGE[2], Northwestern University — I conducted a series of double-slit experiments with extended time scales in order to test the hypothesis that photons emitted seconds in the future could influence the detection of photons emitted in the recent past, reasoning that photons being in two times at once is at least as weird as photons being in two places at once. Positive results supported the hypothesis. In each experimental run using a single-photon double-slit optical system, after a period (33 seconds) of normal functioning, a quantum-based random number generator was used to select the future on-time duration of the light source out of four possible options (0, 220, 330 and 660 seconds). After the selected duration, the system shut down. This procedure was followed for 50 runs per day for 30 days. At both a central peak and a central trough of the interference pattern, photon counts differed significantly between durations both prior to and following the decision about the duration of the light source, revealing an oscillating retrocausality on the scale of minutes. The results support the growing trend of examining the influence of future boundary conditions on event probability, but they also suggest the horizon for those conditions may be farther out in time than previously imagined.

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[2]I have my PhD and post-doc training in cognitive neuroscience with a focus on time perception; this is my first foray into experimental physics related to time. I am grateful to Dr. Daniel Sheehan and Dr. Stephen Baumgart for their support.

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