

Abstract Submitted
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Delayed-Choice Quantum Eraser Using Thermal Light TAO PENG, Texas AM University, College Station, TX 77843, HUI CHEN, YANHUA SHIH, University of Maryland, Baltimore County, Baltimore, MD 21250, MARLAN O. SCULLY, Texas AM University, College Station, TX 77843, Baylor University, Waco, TX 76798 and Princeton University, Princeton, NJ 08544 — In a Young’s double-slit interferometer, the common understanding is that the position-momentum uncertainty relation makes it impossible to determine which slit a photon or wavepacket passes through without at the same time disturbing the photon or wavepacket enough to destroy the interference pattern. It has been shown that this common understanding may not be true. In 1982, Scully and Druhl showed that a “eraser” may erase the which-path information even after the annihilation of the quantum itself and determine its early wave-like or particle-like behavior. We discuss two experimental realizations of delayed choice quantum eraser in this talk. One experiment was demonstrated in 2000 based on the coincidence measurement or the photon-number correlation measurement of entangled photon pairs. Another recent demonstration has a similar experimental setup, however, the coincidence measurement is on the photon-number fluctuation correlation of randomly paired photons of thermal light.

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