

Abstract Submitted
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Quantum Interference of Two Independent Sources¹ JUSTIN DOVE, Adelphi University — An experiment performed by Pfleegor and Mandel demonstrated temporal interference between two attenuated lasers. This study explores the possibility of producing double-slit interference in a similar manner using two lasers of equal wavelength and polarization. Each is focused and aligned such that at the double-slit one is directed through one slit and the other through the other slit, with effectively no overlap. The lasers are then attenuated greatly such that in a given detector time window the probability of more than one photon being transmitted is negligible. Classically, one would expect interference from independent sources to wash out due to lack of coherence. We explore the possibility of quantum interference if we can erase any information that distinguishes the sources. If it is possible to achieve indistinguishability, a superposition state generating identical results as from a single broad, coherent source may be achieved. Alternatively, if a distinguishable mixture is formed, no interference should result. Ultimately, this experiment will address questions of knowledge of a state versus reality of a state.

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