Abstract

Two-photon interference due to the Hong-Ou-Mandel (HOM) experiment is analysed via the second-order correlation function. Photon representation is constructed with consideration to the Gaussian temporal mode function. The outputs of this experiment are represented using the second order correlation function $g^2(t)$. The $g^2(t)$ is graphed and the presence of the quantum beat is verified as the frequency difference between the two photons is varied. The $g^2(t)$ is then integrated over all possible detection times (t) and detection delays (τ) to determine the probability distribution of measuring two photons. Photon frequency is again varied to determine its effect on the presence of the HOM dip. HOM dip is seen to rise as the photon frequency difference increases. The presence of the quantum beat, along with a difference in the HOM dip due to change in frequency confirms that HOM experiment can be used to determine photon distinguishability.

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