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Theoretical investigation of the Hong-Ou-Mandel interference in turbulence

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The effect of turbulence on the Hong-Ou-Mandel (HOM) is analysed theoretically. The analysis is performed with two types of entangled input states, a Bell state and a spontaneous parametric down converted input state. In this work, two scenarios have been considered. The first scenario is when only one of the entangled photons is sent through the turbulence and the second scenario is when both the entangled photons are sent through turbulence. For the purpose of the calculations, we use a single phase screen approximation of the turbulent medium and a quadratic structure function to approximate the Kolmogorov theory of turbulence. The results show that the visibility of the HOM dip (or peak) is independent of the scintillation strength when only one photon goes through the turbulence for both types of entangled input states. However, in the case when both photons are sent through the turbulence, the visibility of the HOM dip (or peak) is reduced for increasing scintillation strength.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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