
Contribution ID: **281** Type: **Oral Presentation**

# Experimental investigation of the Hong-Ou-Mandel interference in turbulence

*Thursday, 6 July 2017 11:30 (20 minutes)*

In this work, the effect of turbulence on the Hong-Ou-Mandel (HOM) effect is investigated experimentally. For this purpose, we produce entangled photonic states generated by spontaneous parametric down-conversion. In our experiment, the entangled photons propagate through different turbulent media, which are simulated using spatial light modulators. The atmospheric turbulence is simulated according to the Kolmogorov theory of turbulence and modelled as a single phase screen. Without any turbulence, one finds that symmetric states (anti-symmetric states) produce a dip (peak) in the coincidence counts, after passing through the beam-splitter, thanks to the HOM effect. With the addition of turbulence in one of the photon paths, we found that there is no change in the visibility of the dips or peaks. While in cases where the turbulence affects both photons, the visibility of the dip or peak is reduced. This phenomenon can be explained by the way in which the turbulence in a single-sided or doubled-sided channel affects the symmetry of the input state. Experimental results for all these various scenarios are presented.

## Apply to be<br> considered for a student <br>   award (Yes / No)?

No

## Level for award<br> (Hons, MSc, <br>   PhD, N/A)?

N/A

## Main supervisor (name and email)<br>and his / her institution

Dr. Filippus S. Roux
froux@nmisa.org

NMISA, PO Box 395, Pretoria 0001, South Africa
School of Physics, University of the Witwatersrand, Johannesburg 2000, South Africa

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

No

**Primary author:** Dr PRABHAKAR, Shashi (School of Physics, University of the Witwatersrand, Johannesburg 2000, South Africa)

**Co-authors:** Mr MABENA, Chemist (School of Physics, University of the Witwatersrand, Johannesburg 2000, South Africa); Dr ROUX, Filippus (NMISA, PO Box 395, Pretoria 0001, South Africa); Prof. KONRAD, Thomas (UKZN)

**Presenter:** Dr PRABHAKAR, Shashi (School of Physics, University of the Witwatersrand, Johannesburg 2000, South Africa)

**Session Classification:** Photonics

**Track Classification:** Track C - Photonics