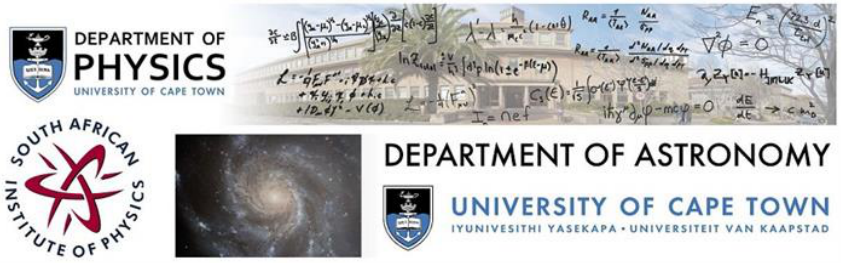

Contribution ID: **272** Type: **Oral Presentation**

Effect of atmospheric turbulence on entangled photon field generated by partially coherent pump beam

Friday, 8 July 2016 11:50 (20 minutes)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Spontaneous parametric down-conversion (SPDC) is one of the convenient sources of entangled photon fields. These photons are entangled in position, momentum and polarization. In all the previous studies pump field was considered to be spatially fully coherent. Recently, Jha and Boyd [1] showed theoretically that the spatial coherence properties of the pump field were entirely transferred to the down-converted two-photon field. Recently, the effect of atmospheric turbulence on the entangled photon fields produced by the down-conversion of the fully spatially coherent pump has been reported [2-3]. However, the effect of atmospheric turbulence on the entangled photon fields produced by partially coherent pump beam has not been reported yet. Recently, a theoretical model for the influence of atmospheric turbulence on entangled photon fields produced by partially coherent dark hollow beam has been reported [4]. It has been shown that the detection probability of the entangled two-photon field is higher and less susceptible to turbulence if the field is produced by a lower mode of partially coherent pump beam.
In the present paper, we have theoretically studied the influence of atmospheric turbulence on entangled photon fields produced by spatially partially coherent pump beam. We show that the photon field produced by spatially partially coherent pump beam is less affected by atmospheric turbulence than the photon field produced by the fully spatially coherent pump beam. Present work provides new insights into the nature of SPDC emission by considering pump beam spatially partially coherent and have application in free-space quantum communication.

References

[1] A. K. Jha, R. W. Boyd, Phys. Rev. A 81, 013828 (2010).
[2] C. Gopaul, R. Andrews, New J. Phys. 9, 94, (2007).
[3] A. Semenov,W Vogel, Phys. Rev. A 81, 023835 (2010).
[4] Y. Qiu, W She, Appl. Phys. B 108, 683-687 (2012).

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

No

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

N/A

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

Prof. Francesco Petruccione, Petruccione@ukzn.ac.za,University of KwaZulu-Natal,Westville Campus, Durban, South Africa

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

Yes

Please indicate whether
this abstract may be
published online
(Yes / No)

No

Primary author: Dr JOSHI, Stuti (University of KwaZulu-Natal, Westville Campus, Durban, South Africa)

Co-authors: Prof. PETRUCCIONE, Francesco (University of KwaZulu-Natal, Westville Campus, Durban, South Africa); Dr ISMAIL, Yaseera (University of KwaZulu-Natal, Westville Campus, Durban, South Africa)

Presenter: Dr JOSHI, Stuti (University of KwaZulu-Natal, Westville Campus, Durban, South Africa)

Session Classification: Applied Physics (1)

Track Classification: Track F - Applied Physics