Contribution ID: **459** Type: **Oral Presentation**

PLENARY: 1,2,3 .... infinity: high-dimensional quantum entanglement with patterns of light

Friday, 3 July 2015 08:40 (1 hour)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Photons can be described in terms of their spatial modes – the "patterns" of light. As there are an infinite number of spatial modes, entanglement in this degree of freedom offers the opportunity to realise high-dimensional quantum states. In this talk I will review the recent progress in quantum entanglement of photons in their spatial degree of freedom. I will explain how to create high-dimensional quantum states in the laboratory, how to measure them, and what the present state of the art is in terms of applications. In particular, I will outline the advantages and disadvantages of using such entangled states as a means to encode information for secure quantum communication channels, and will consider the preservation of entanglement through noisy channels, e.g., a turbulent atmosphere. Finally I will outline some ideas on mimicking quantum entanglement behaviour with classical light.

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

No

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

N?A

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

NO

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

Yes

Primary author: Prof. FORBES, Andrew (U. Witwatersrand)

Presenter: Prof. FORBES, Andrew (U. Witwatersrand)

Session Classification: Plenary

Track Classification: Track H - Plenaries