

NITheCS Colloquium

Monday, 16 May 2022, 16h00 – 17h00

Prof Andrew Forbes (School of Physics, University of the Witwatersrand)

‘Quantum-like classical light’



ABSTRACT

Entanglement is a quintessential property of quantum systems, and captures the fact that the state may be written in a manner that is non-separable, so that a measurement on one part affects the outcome of the other. But non-separability is not unique to quantum mechanics: weather maps are non-separable, and more pertinently, so are certain forms of structured classical light, controversially referred to as “classically entangled”. In this talk I will outline the basics of structured light, with particular emphasis on non-separable vector states of light, and how to describe, create and detect them. Pertinently, I will show how they can be used to blur the classical-quantum divide, demonstrating quantum tools applied to the classical world, and classical beams used in quantum processes.

BIOGRAPHY

Andrew has at various times in his career been a teacher, janitor, secretary, receptionist, webmaster, systems engineer, sales rep, manager, director and sometimes a scientist. He is presently a Distinguished Professor at the WITS School of Physics where he established a new laboratory for Structured Light in 2015.

A founding member of the Photonics Initiative of South Africa and South Africa’s Quantum Roadmap, Andrew is active in promoting photonics in Africa. He is a Fellow of SPIE, the OSA and the SAIP; he is also an elected member of the Academy of Science of South Africa. He holds an A-rating by the NRF and three honorary

professorships. He is editor-in-chief of the UK’s *Journal of Optics* and sits on the editorial board of three other international journals.

Andrew has won several awards, including the NSTF national award for his contributions to photonics in South Africa, the Georg Forster prize from the Alexander von Humboldt Foundation for outstanding contributions to photonics, and the SAIP Gold Medal, which is the highest award for physics in South Africa.

Andrew spends his time exploring structured light in lasers as well as classical and quantum optics.

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