

Departmental Seminar

The origin of the probability amplitude for quantum entanglement and its link to interferometric communications

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Quantum entanglement can be described via two alternative paths: the Einstein-Podolsky-Rosen-Bohm-Aharonov-Bell (EPRBAB) route or the Dirac-Wheeler-Pryce-Ward (DWPW) route. Most in the quantum entanglement community are familiar with the EPRBAB route which emphasizes a philosophical perspective. The DWPW route which emphasizes the physics, exclusively, is unknown or only vaguely known, to most practitioners in the field. This talk describes in detail both approaches and elucidates the interferometric origin of the probability amplitude for quantum entanglement. A generalized version of the Pryce-Ward probability amplitude, applicable to n -pair of quanta, and N -pairs of propagation channels is described. The link of this physics to secure space-to-space interferometric communications is also described.

F. J. "Frank" Duarte graduated with First Class Honours in Physics from Macquarie University where he later completed a PhD in laser physics (with J. A. Piper). He then did post-doctoral research at the University of NSW (with B. J. Orr). Duarte has discovered various tunable laser oscillator configurations and is the author of the generalized multiple-prism grating dispersion theory. He has also done research on high-power tunable lasers, N -slit interferometry, and interferometric imaging. In the US he has practiced physics in academia, industry, and the defense establishment. His book titles are held in more than 3700 libraries world wide. Duarte has received the *David Richardson Medal* (2016) and the *Paul F. Forman Engineering Excellence Award* (1995) from the Optical Society. He is a Fellow of the Australian Institute of Physics (1987) and a Fellow of the Optical Society (1993).

Date & time

Thu 15 Dec 2016, 11am–12pm

**Location**



600Iphat Building

Room:

RSPE Link Seminar Room

Audience

Members of RSPE welcome

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