

# Advancing scientific insights into quantum systems

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(Phys.org)—A paper published last year by the Centre of Engineered Quantum Systems (EQuS) researchers has been selected for the *New Journal of Physics (NJP)*: Highlights of 2011.

The paper entitled, "Two photon quantum walks in an elliptical direct-wire waveguide array," looks at the evolution of two-photon states in an elliptic array of waveguides.

The paper was deemed by the *NJP* to be seen as advancing scientific insight within the Physics community, and worthy of note in their latest publication.

Paper co-author Matthew Broome from the Centre said this work highlighted the feasibility of emulation of coherent [quantum phenomena](#) in three-dimensional waveguide structures.

"Using integrated optics provides an ideal test-bed for the emulation of quantum systems via continuous-time quantum walks," Mr Broome said.

"We characterise the photonic chip via coherent light tomography and use the results to predict distinct differences between two, two photon inputs. We then compare these with the experimental observations."

Other EQuS Researchers include J Owens, Devon Biggerstaff, M Goggin, A Fedrizzi, Trond Linjordet, Jason Twamley and Andrew White are named authors on the paper which appears in the thirteenth volume

of the publication.

This work support the EQuS research into Synthetic Quantum Systems and Simulation that aims to harness quantum mechanical phenomena to enhance the functionality and power of information and communication technologies.

Photons are indispensable for [quantum communication](#), and work, such as the research being conducted at EQuS, are leading the approach to [quantum information processing](#) and simulation.

The realisation of future technologies in these areas will require miniaturization and integration of high performance components, including single [photon sources](#) and detectors, and photonic [quantum circuits](#) for manipulating and distributing photons.

EQuS is an Australia Research Centre of Excellence that seeks to initiate the Quantum Era in the 21st century by engineering designer [quantum systems](#).

Through focused and visionary research EQuS will deliver new scientific insights and fundamentally new technical capabilities across a range of disciplines.

Impacts of this work will improve the lives of Australians and people all over the world by producing breakthroughs in physics, engineering, chemistry, biology and medicine.

**More information:** [iopscience.iop.org/1367-2630/13/7/075003/](http://iopscience.iop.org/1367-2630/13/7/075003/)

Provided by University of Queensland

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