PhD Scholarship - $50,000 per year in Quantum Communications

The opportunity

Quantum communication via low-orbit satellites offers up a paradigm shift in telecommunications. Providing for unparalleled communication security, this emerging technology will also underpin the development of the global quantum internet. This research area was given a large boost recently with the launch of the world's first quantum communications enabled satellite. This new satellite creates entangled photon pairs, beaming them down to Earth for subsequent processing and use in a range of communication scenarios. In this PhD project you will investigate the use of Free-Space Optical (FSO) links to and from Low-Earth Orbit (LEO) satellites to enable quantum communications over very large distances. Distinct from the Discrete Variable (DV) single-photon technology used by the satellite currently in orbit, you will be focused on Continuous Variable (CV) multi-photon laser technology. This latter technology has the potential for better quantum communication performance. Your main goal will be to fully investigate the performance gains that can be achieved in practice using current CV detector technology in the context of LEO satellites.

Only applicants with an Australian citizenship will be considered for this position.

PhD Scholarship

A stipend of $45,000 per annum plus up to $5,000 for travel per annum is available to successful candidates for 3 years.

Project Description

The project combines two key areas: theoretical studies on CV quantum-information transfer through the free space channel, and experimental and/or modelling studies of laser propagation through atmospheric turbulence. This project offers the PhD candidate the opportunity to enter an exciting and emerging technology frontier that is positioned at the interface of advanced quantum physics and satellite-based communications.

This three-year PhD Scholarship is sponsored by the Department of Defence’s DSTG (Defence Science Technology Group) based in Adelaide (see www.dst.defence.gov.au). Although the PhD candidate will be based at UNSW, Sydney he/she should be prepared to spend several weeks per year visiting and collaborating with DSTG researchers. The salary given with this scholarship will be approximately AUD $45,000 per annum and based on the successful award by UNSW of a Domestic Research Scholarship and a $16,000 per annum top-up scholarship supplied by DSTG and UNSW. In addition to a stipend, approximately $5,000 per annum will be made available to the successful candidate for travel to international conferences. UNSW will cover all tuition fees.
Selection Criteria

- The candidate is expected to hold the equivalent of a First-Class Honours degree in Engineering or Physics. The candidate must meet the UNSW admission requirements for the Higher Degree Research [https://selfassessment.research.unsw.edu.au/](https://selfassessment.research.unsw.edu.au/)
- Demonstrated research capability (e.g. through thesis work) in engineering or physics, but not necessarily quantum physics
- Excellent interpersonal, communication and management skills

Application Process

Applications should be submitted online via the apply button by 14th Sept 2020.

The application should consist of a resume, a statement addressing the selection criteria, transcripts, graduation certificates and testamurs of previous tertiary study. Two referees must also be nominated in your resume. All applicants are encouraged to use the HDR SelfAssessment Tool [https://selfassessment.research.unsw.edu.au/](https://selfassessment.research.unsw.edu.au/) to help give an indication of your eligibility and competitiveness for a scholarship (please attach a screenshot of the outcome in your application).

Enquiries

Please contact Professor Robert Malaney, Email [r.malaney@unsw.edu.au](mailto:r.malaney@unsw.edu.au)