



## A hole new spin on quantum computing

PhD Scholarship to study Hole Quantum Dots  
University of New South Wales, Sydney



A generously funded Scientia Scholarship in experimental quantum physics is available at the School of Physics at the University of New South Wales in Sydney, Australia.

Prospective applicants should contact [Alex.Hamilton@unsw.edu.au](mailto:Alex.Hamilton@unsw.edu.au) by 6 July 2018.

The scholarship is fully funded for 4 years (including all university tuition fees, an annual stipend of AUS\$40k (US\$30k), and an additional annual research/travel budget), and is open to applicants from any nationality.

The research project will investigate hole spins in quantum dots. In the past decade intense research has been devoted in trapping electrons trapped in semiconductor quantum dots, initially to study the fundamental properties of artificial atoms, and subsequently to use the spin of the electrons as the basis for quantum information technologies.

To date, almost all research has focussed on the properties of electrons in semiconductor quantum dots. However, very recent theoretical work suggests that using positively charged semiconductor holes, rather than negatively charged electrons, may bring significant advantages – as well revealing much unexplored new physics. This is because of the much stronger spin-orbit interaction that exists in holes than electrons, allowing the hole spins to be manipulated simply by applying an electric field. The PhD candidate will study holes trapped in semiconductor quantum dots, to perform all electrical control of hole spins, and to test if holes can make good quantum bits. Experiments will be conducted at ultra-low temperatures, using ultra-low noise electrical measurement and control techniques.

For further details of the research area see <http://www.phys.unsw.edu.au/qed>

Applicants should have a good academic record (2:1 or 1st class). The Scientia program is for future leaders, so applicants who can demonstrate their excellence and enthusiasm in science or leadership through activities such as research internships, scientific publications, teaching activities, competitive sports, leadership in sports or social clubs, voluntary work, etc., are strongly encouraged.

Details of how to apply are here:

<https://www.2025.unsw.edu.au/apply/scientia-phd-scholarships/hole-spins-quantum-dots-0>

