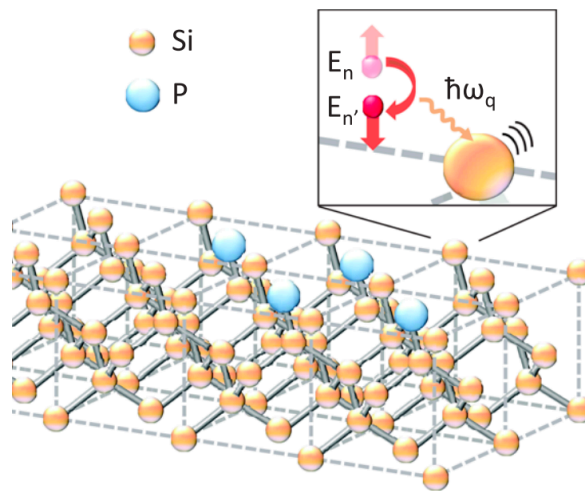


PhD Fellowships in Quantum Science and Engineering at the University of New South Wales, Sydney, Australia

Group Leader: Dr. Rajib Rahman, Associate Professor of Physics, UNSW.

Affiliation: School of Physics, Centre for Quantum Computer and Communication Technologies.

Relevant areas: Quantum Computing, Solid-state Physics, Quantum Physics, Quantum Material Science, Computational science. Students with backgrounds in Physics, Electrical Engineering or computational science are preferred.



Description of research: We develop theoretical and computational techniques for engineering solid-state quantum computers. We work closely with world-leading experimental groups to understand their experimental measurements and to guide them in designing quantum systems. Our work involves multi-scale modeling and simulation of quantum materials and devices ranging from atomistic to effective mass methods and from first principles to empirical methods for electronic structure and quantum transport simulations. We are interested to study couplings of electrons with phonons, photons, and other electrons and quasi-particles, and utilize such interactions to design quantum computing platforms. In the context of silicon qubits, our work has helped in the demonstration of single and two qubit gates with quantum dots and dopants, and in the optimization of spin lifetimes and exchange couplings. Beyond quantum computing, we are also interested in low-energy electronics as a replacement of CMOS for future electronics, and are interested in emerging materials with exotic properties that can be harnessed in functional electronic and optoelectronic devices. Our work has been documented in a variety of journals including those of Nature and Science groups, physical review letters, nanoletters and IEEE journals [1-11].

Expectations: The student will be expected to learn and develop in-house modeling tools and techniques in the group, as well as external simulation tools. The student is expected to collaborate with experimental groups at UNSW and elsewhere, and work efficiently as team members, report results and discuss with the group leader regularly.

Application process: The interested students need to apply to UNSW and meet all the admission requirements. Applicants with strong academic records (> 90% marks) are sought. Tuition fee waivers, stipends, and living allowances will be provided as part of the fellowships. Please send your curriculum vita to Prof. Rahman at rajib.rahman@unsw.edu.au. To start in Term 1 (Feb, 2020), students must apply by Sep 20, 2019. Term 2 (June) and Term 3 (Sept) of 2020 have application deadlines in March and May respectively. Relevant websites: <https://research.unsw.edu.au/key-dates>, <https://research.unsw.edu.au/submit-application>.

Desired Skills:

- Outstanding academic record (Marks > 90%).
- Prior research experience (publication) is recommended but not required.
- Background in solid-state physics or solid-state electronics. Basic undergrad-level understanding of quantum mechanics.
- Coding background in an object-oriented programming language preferably C++.
- Knowledge of scientific computing platforms and code compilation desired.
- Experience with scripting languages such as python or Matlab.
- Strong communication skills for presenting and writing up research work.
- Ability to work in a team and collaborate with external groups.

Website: <https://scholar.google.com/citations?user=fib3rlsAAAAJ&hl=en>
<https://www.physics.unsw.edu.au/staff/rajib-rahman>

Old page: <https://sites.google.com/view/rajib-rahman/home>

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