POSITION DESCRIPTION

Quantum Computing: Multi-Qubit Device Physicist

Position Level | B/C
Faculty/Division | Science
Position Number | 00095084
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Position Summary

The Multi-Qubit Physicist works with world-leading atomic electronics and quantum computing teams at Silicon Quantum Computing Pty Limited (SQC) and the Australian Centre of Excellence for Quantum Computation and Communication Technology (CQC²T or Centre) based at UNSW Sydney.

This role initially supports the development of a 10-qubit integrated circuit prototype as the team works to scale from 10-qubit to 100-qubit architectures within the decade. In particular, the Multi-Qubit Physicist develops wiring and microwave electronics used in high-frequency multi-qubit experiments for the detection and control of individual spins in silicon, the controlled coupling between them, and the coherent transport of quantum information.

This position reports to Professor Michelle Simmons and works alongside other staff and students funded by SQC as well as CQC²T. While this role does not have any direct reports, it is expected that they will assist where necessary with the supervision of other team members.

Accountabilities

Level B:

Specific accountabilities for this role include:

- Develop and perform low noise, high frequency measurements of devices in silicon.
- Operate and maintain specialised electronic equipment (oscilloscopes, signal generators, vector signal generators, DACs and ADCs).
- Operate a cryogenic dilution refrigerator.
- Assist with the maintenance of laboratory computer hardware and software infrastructure.
- Make a significant contribution to the field of quantum information.
• Where appropriate, take leadership of research projects.
• Work with a multidisciplinary team of quantum physicists, engineers, technicians, postdoctoral researchers and PhD students to establish optimal setups for performing multi-qubit operations.
• Cooperate with all health and safety policies and procedures of the university and take all reasonable care to ensure that your actions or omissions do not impact on the health and safety of yourself or others.
• Align with and actively demonstrate the UNSW Values in Action: Our Behaviours and the UNSW Code of Conduct.

**Level C:**

In addition to the above:

• Assume a significant role in research projects including, where appropriate, leadership of a research team.
• Supervise a program of study of postgraduate students.

**Skills and Experience**

**Level B:**

• A PhD in physics, electrical engineering and/or experimental physics or equivalent in either a commercial or academic environment.
• Demonstrated experience of low noise cryogenic measurement of solid state qubits.
• Demonstrated experience of setting up or running a cryogenic dilution refrigerator.
• Demonstrated experience with Matlab and in a range of programming languages including a strong proficiency in Python.
• Excellent IT skills, including experience with word processing such as MS-WORD, LaTex or equivalent.
• Excellent verbal and written communication skills and the ability to liaise effectively with all stakeholders.
• Well-organised, attention to detail and ability to meet deadlines.
• Demonstrated ability to think logically, create solutions and make informed decisions.
• Ability and willingness to work in a team where credit is shared.
• Ability to implement equal opportunity and diversity policies and programs.
• Knowledge of health and safety responsibilities and commitment to attending relevant health and safety training.

**Level C:**

In addition to the above

• Demonstrated experience of high frequency (GHz) measurement techniques and microwave engineering.
• Demonstrated experience with using common RF and microwave test equipment (e.g., signal generators, spectrum analysers, network analysers, oscilloscopes).
• Demonstrated internationally significant research in quantum effects in nanostructure devices, mesoscopic physics and quantum transport.
• Demonstrated ability to conduct independent research.
• An excellent research track record in the discipline area as evidenced by conference presentations and publications.
• Demonstrated experience in HDR student supervision.

This Position Description outlines the objectives, desired outcomes, key responsibilities, accountabilities, required skills, experience and desired behaviours required to successfully perform the role.

This template is not intended to limit the scope or accountabilities of the position. Characteristics of the position may be altered in accordance with the changing requirements of the role.