

# Novel Two-Qubit Couplers for Superconducting Qubits

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## Novel Two-Qubit Couplers for Superconducting Qubits

Project ID: 2228cd1392 (You will need this ID for your application)

Research Theme: [Quantum Technologies](#)

UCL Lead department: [London Centre for Nanotechnology \(LCN\)](#)

[Department Website](#)

Lead Supervisor: [Paul Warburton](#)

Project Summary:

Quantum annealers using superconducting qubits are one of the leading platforms for demonstrating quantum speedup in the context of solving optimisation problems. But at present the types of two-qubit interactions which are used in quantum annealers limit the range of solvable optimisation problems to those which can also be efficiently classically solved. The implementation of new types of two-qubit interaction could allow quantum annealers to solve problems which are fundamentally out of reach of the classical competition.

In this project we will design, fabricate and experimentally measure the properties of novel couplers which are predicted to enable a tuneable capacitive interaction between pairs of superconducting flux qubits. Design will exploit existing software tools developed within Paul Warburton's group [1,2]. Fabrication will take place at cleanrooms at both the London Centre for Nanotechnology (UCL) and Superfab (Royal Holloway College). Measurements will be undertaken at 10 mK in an existing dilution refrigerator set-up with low-noise radio-frequency characterisation tools.

The ideal candidate will be an experimentalist with an MSc, MEng or MSci degree (or equivalent) in physics or electrical engineering.

[1] Consani and Warburton, New J. Phys. 22 053040 (2020) [2][Paul Warburton](#)

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