

Abstract Submitted
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Tunable coupling between three qubits as a building block for a superconducting quantum computer¹ PETER GROSZKOWSKI, University of Waterloo, AUSTIN FOWLER, University of Melbourne, FELIX MOTZOI, FRANK WILHELM, University of Waterloo — Large scale quantum computers will need to consist of many interacting qubits. In this talk we expand the two flux qubit coupling scheme first devised in [1] and realized in [2] to a three qubit, two coupler scenario. We study L-shaped and line-shaped coupler geometries, and show how the interaction strength between qubits changes in terms of the couplers' dimensions. We explore two cases: the “on state” where the interaction energy between two nearest-neighbor qubits is high, and the “off state” where it is turned off. In both situations we study the undesirable crosstalk with the third qubit. Finally we use the GRAPE algorithm to find efficient pulse sequences for two qubit gates subject to physical constraints on the coupling strength.

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