Abstract Submitted
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Direct tune-up of entangling gates generated by a cross resonance drive[1] SARAH SHELDON, CHRISTOPHER J. WOOD, EASWAR MAGESAN, DAVID C. MCKAY, JERRY M. CHOW, JAY M. GAMBETTA, IBM T.J. Watson Research Center — The cross-resonance (CR) gate, is one of the leading two-qubit gates for quantum circuits with superconducting qubits. Through continuing study of the cross resonance (CR) Hamiltonian, we have developed a better understanding of the CR gate errors. Certain unitary errors put strict limitations on how close the CR gate can be to a CNOT with single qubit π-rotations. A more accurate gate can be constructed, however, through the use of SU(2) gates on both the control and target qubits. By including single-qubit Z-rotations in the composite gate, we also eliminate the need for an echo in the CR gate, making the total gatetime shorter and increasing the gate fidelity. This talk will discuss the theoretical limits to fidelity imposed by known errors and describe the direct tune up of a CNOT gate using cross resonance.

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Sarah Sheldon
IBM T.J. Watson Research Center

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