Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

High-fidelity two qubit gate via single flux quantum pulses[1]
MAXIM VAVILOV, ZHENYI QI, ROBERT MCDERMOTT, University of Wisconsin - Madison — We analyze two-qubit gates controlled by trains of single flux quantum (SFQ) pulses. The SFQ pulses are applied to one of two weakly coupled superconducting qubits. We analyze a controlled Z gate realized by a resonant transition from state $|11\rangle$ to a higher energy state outside of the qubit computational space and returning back to $|11\rangle$. We evaluate the fidelity of this two-qubit gate and find that the fidelity can be above 99% for gate times under 100 ns. For systems with fixed coupling between qubits, the fidelity of single qubit gates can also exceed 99%, and can be even higher if tunable coupling is used. We also discuss alternative routes for two-qubit gates utilizing single flux pulses.

[1]Supported by ARO under contract W911NF-15-1-0248

Maxim Vavilov
University of Wisconsin - Madison

Date submitted: 11 Nov 2016 Electronic form version 1.4