Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

A circuit QED controlled-Z "AMP" gate (Adiabatic MultiPole gate) DAVID C. MCKAY, RAVI NAIK, Physics Department and James Franck Institute, University of Chicago, LEV S. BISHOP, JQI and CMTC, University of Maryland, College Park, DAVID I. SCHUSTER, Physics Department and James Franck Institute, University of Chicago — Circuit quantum electrodynamics — superconducting Josephson junction "transmon" qubits coupled via microwave cavities — is a promising route towards scalable quantum computing. Here we report on experiments coupling two transmon qubits through multiple strongly coupled planar superconducting cavities — the multipole cavity QED architecture. This design enables large interactions (mediated by real cavity photons) when the transmons are resonant with the cavities, and low off rates when the qubits are tuned away from the cavity resonance. In this talk we will discuss our gate protocol — the AMP gate — and report on producing a high fidelity Bell state ($|gg\rangle + |ee\rangle$) measured from state and process tomography. We will discuss future plans for scaling this architecture beyond two qubits.

David C. McKay
Physics Department and James Franck Institute, University of Chicago

Date submitted: 15 Nov 2013 Electronic form version 1.4