Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Verification methods for surface code implementations in superconducting systems[1] EASWAR MAGESAN, JAY M. GAMBETTA, JERRY M. CHOW, SRIKANTH J. SRINIVASAN, ANDREW W. CROSS, DAVID W. ABRAHAM, NICHOLAS A. MASLUK, MATTHIAS STEFFEN, CHRIS LIRAKIS, IBM TJ Watson Research Center — The surface code is a promising error-correction protocol for realizing large-scale quantum computation in superconducting qubit systems. Multi-qubit states and processes have recently been implemented with high enough fidelities in these systems to realize small building blocks of the surface code. We will discuss various metrics and tomographic protocols that can be used to characterize the performance of these building blocks and present recent experimental results that demonstrate high fidelity implementations in superconducting systems. Moving forward, these techniques will be useful for characterizing more complex surface code implementations, as well as more general error-correction strategies.

[1]We acknowledge support from IARPA under contract W911NF-10-1-0324.

Easwar Magesan
IBM TJ Watson Research Center

Date submitted: 15 Nov 2013 Electronic form version 1.4