Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Generation of multi-qubit entanglement in a superconducting quantum circuit by parallelized parity measurements[1] STEFANO POLETTO[2], DIEGO RISTE', MENG-ZI HUANG[3], ALESSANDRO BRUNO, VISA VESTERINEN[4], OLLI-PENTTI SAIRA[5], LEONARDO DICARLO, QuTech and Kavli Institute of Nanoscience — We present the generation of multi-qubit entanglement using parallelized ancilla-based parity measurements in a five qubit superconducting processor. Two-qubit Bell states and three-qubit GHZ-type states are generated by single and double two-qubit parity measurements on superposition states, respectively, and characterized by both witnessing and state tomography. The protocol for generation of GHZ-type states can be used as the encoding step in the three-qubit bit-flip quantum error correction code, and made deterministic by digital feedback control. We assess its performance by state tomography of the six encoded cardinal states, and compare to the traditional method of encoding by gates.

[1]We acknowledge funding from NWO, FOM and EU FP7 project ScaleQIT
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Date submitted: 14 Nov 2014 Electronic form version 1.4