Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

**Experimental Study of a Disordered Jaynes-Cummings Lattice** MATTIAS FITZPATRICK, DEVIN UNDERWOOD, DARIUS SADRI, Princeton University, JENS KOCH, Northwestern University, ANDREW HOUCK, Princeton University — Circuit quantum electrodynamics (cQED) is an exciting testbed for simulation of open quantum systems. Effective photon-photon interactions can be mediated by a superconducting qubit strongly coupled to a microwave transmission line cavity. Many-body quantum simulators can be realized using Jaynes-Cummings lattices, where a competition is induced between onsite interactions and hopping between sites. In this experiment, we present measurements of a Kagome lattice consisting of 49 microwave cavity resonators and 49 transmon qubits. We fabricate each qubit with random area superconducting quantum interference devices (SQUIDs) to create qubits with different sensitivity to magnetic field. This allows us to simultaneously tune all of the qubits randomly with the application of a single external magnetic field, enabling a systematic study of the effects of disorder. We will present preliminary experimental results from this Kagome lattice as well as future directions of quantum simulation using Jaynes-Cummings lattices.

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Date submitted: 14 Nov 2014 Electronic form version 1.4