Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Observation of a dissipative phase transition in a one-dimensional circuit QED lattice[1] MATTIAS FITZPATRICK, NEEREJA SUNDARESAN, Princeton University, ANDY C.Y. LI, JENS KOCH, Northwestern University, ANDREW HOUCK, Princeton University — The building blocks of circuit QED provide a useful toolbox for the study of nonequilibrium and highly nonlinear behavior. Here, we present results from a one-dimensional chain of 72 microwave cavities, each coupled to a superconducting qubit, where we coherently drive the system into a nonequilibrium steady state. We find experimental evidence for a dissipative phase transition in the system in which the steady state changes dramatically as the mean photon number is increased. Near the boundary between the two observed phases, the system demonstrates bistability, with characteristic switching times as long as 60 ms — far longer than any of the intrinsic rates known for the system. This experiment demonstrates the power of circuit QED systems for the studying nonequilibrium condensed matter physics and paves the way for future experiments exploring nonequilibrium physics with many-body quantum optics.

[1]This work was supported by the Army research Offic through grant W911NF-15-1-0397 and the National Science Foundation through Grants No. DMR-0953475 and No. PHY-1055993. NS was supported by an NDSEG fellowship

Mattias Fitzpatrick
Princeton University

Date submitted: 10 Nov 2016 Electronic form version 1.4