Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

The Quantum-Classical Correspondence for a Self-Oscillating Cavity-Embedded Cooper Pair Transistor System[1] ERIND BRAHIMI, FEI CHEN, JULIANG LI, JOEL STETTENHEIM, Dartmouth College, ANDREW ARMOUR, University of Nottingham, ALEX RIMBERG, MILES BLENCOWE, Dartmouth College — We provide a theoretical model for our recent experiment involving a dc voltage biased Cooper pair transistor (CPT) that strongly drives a high quality factor microwave cavity via the ac Josephson effect. Depending on the tunable dc voltage bias, the model shows that the CPT can generate a range of non-trivial cavity quantum states involving large average microwave photon number. Using a Floquet basis approach to solving for the quantum dynamics and a Wigner function representation of the system state, we compare some of the model photon state predictions with experiment. The good agreement validates the low noise, dc biased cavity-CPT system for exploring the quantum-classical correspondence in strongly nonlinear, macroscopic systems.

[1]This work is supported by the NSF and the Carl Zeiss Foundation

Miles Blencowe
Dartmouth College

Date submitted: 09 Nov 2012 Electronic form version 1.4