

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Introduction of a DC Bias into a High-Q Superconducting Microwave Cavity FEI CHEN, JULIANG LI, M.P. BLENCOWE, A.J. RIMBERG, Dartmouth College, ADAM SIROIS, University of Colorado, Boulder, RAYMOND SIMMONDS, National Institute of Standards and Technology, Boulder — The circuit quantum electrodynamics (QED) architecture has been demonstrated to allow study of cavity QED physics in a high-Q on-chip microwave cavity[1]. Here we develop a technique to apply a DC current or voltage bias to nanostructures embedded in the microwave cavity without significantly degrading the Q at high frequencies. Experimental results show good agreement with theoretical predictions. New highly non-linear fully quantum mechanical devices can be developed by embedding Josephson junction devices such as single electron transistors (SETs) in the high-Q microwave cavity. The interplay between the SET and the microwave cavity offers an interesting system for studying nonlinear quantum dynamics and the quantum-to-classical transition. Recent experimental results will be discussed.

[1] A. Wallraff et al, Nature, 431, 162 (2004).

Fei Chen
Dartmouth College

Date submitted: 29 Dec 2010

Electronic form version 1.4