Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Steady-state response of coupled non-linear superconducting quantum oscillators** MATTHEW ELLIOTT, ERAN GINOSSAR, Advanced Technology Institute, University of Surrey — Analytic solutions of non-linear, dissipative quantum systems can provide access to parameter regimes where numerical simulation is unfeasible. In particular, they are useful when these systems are driven at high powers but influenced by quantum fluctuations. We find exact solutions of a Fokker-Planck equation from which we derive the response characteristics of coupled linear and non-linear oscillators under the influence of both coherent and parametric driving. By working in an experimentally feasible parameter regime for superconducting quantum circuits, we model a realistic driven cavity-transmon system and obtain the steady-state frequency response of both cavity and transmon at a range of drive powers, comparing our results with recent experimental data. We show that this method can also be extended to investigate the behaviour of a resonator with a quartic non-linearity which is driven coherently and parametrically, revealing the structure of bifurcations in the steady-state solutions.

Matthew Elliott
Advanced Technology Institute, University of Surrey

Date submitted: 06 Nov 2015 Electronic form version 1.4