Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Imaging non-Gaussian output fields produced by Josephson parametric amplifiers: theory[1] SAMUEL BOUTIN, Département de Physique, Université de Sherbrooke, DAVID M. TOYLI, ADITYA V. VENKATRAMANI, ANDREW EDDINS, Quantum Nanoelectronics Laboratory, UC Berkeley, NICOLAS DIDIER, Department of Physics, McGill University and Département de Physique Université de Sherbrooke, AASHISH A. CLERK, Department of Physics, McGill University, IRFAN SIDDIQI, Quantum Nanoelectronics Laboratory, UC Berkeley, ALEXANDRE BLAIS, Département de Physique, Université de Sherbrooke
— Josephson parametric amplifiers (JPA) have facilitated significant improvements in the readout fidelity of superconducting qubits [1]. Understanding and detailed characterization of current designs is necessary in order to improve the current generation of quantum-limited amplifiers with the goal of obtaining larger gain, bandwidth and dynamic range. In this talk, we theoretically explore the impact of terms going beyond the standard "stiff-pump" approximation in the description of JPAs. In particular we consider the impact of usually neglected nonlinear corrections on the properties of the JPA. Using the maximum entropy principle [2], we show how to reconstruct the filtered output state of a JPA. This reconstruction allows us to quantify the non-gaussianity of the output field and the noise properties of the JPA.

[1] Jeffrey, E. et al., PRL **112**, 190504 (2014)
[2] Buzek, V. et al., PRA **54**, 804 (1996)

[1]This work is supported by ARO, NSERC, FRQNT and CIFAR.

Samuel Boutin
Département de Physique, Université de Sherbrooke

Date submitted: 14 Nov 2014 Electronic form version 1.4