Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Tomographic reconstruction of the Wigner function of an itinerant microwave field FRANÇOIS MALLET, MANUEL CASTELLANOS-BELTRAN, HSIANG-SHENG KU, JILA, KENT IRWIN, LEILA VALE, NIST, KONRAD LEHNERT, JILA — In an increasing number of experiments, dispersive coupling is successfully used to encode the state of nanomechanical resonators or superconducting qubits onto the state of a microwave field. However most the information is lost due to the poor quantum efficiency of the best commercially available microwave amplifiers. To circumvent this limitation our lab has been developing quantum limited Josephson Parametric Amplifiers (JPAs). In this talk we will present an application of the JPA leading to a dramatic increase of the performance of the Quantum State Tomography. It has enabled us to reconstruct the Wigner function of a squeezed state of the microwave field. We will discuss the achieved degree of squeezing and the quantum efficiency of the state tomography, from the perspective of using these squeezed states as building blocks for quantum information experiments. Indeed these states, which are highly non-classical and are easily generated by JPAs, form EPR like states when combined together and thus are the basis of a complete quantum information processing strategy, known as the continuous variables quantum information.

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Date submitted: 24 Nov 2009 Electronic form version 1.4