Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Characterizing the backaction of the Josephson Bifurcation Amplifier on the Quantronium qubit R. VIJAY, I. SIDDIQI, M. METCALFE, E. BOAKNIN, L. FRUNZIO, M.H. DEVORET, Department of Applied Physics, Yale University — We have constructed a novel amplifier - the Josephson Bifurcation Amplifier (JBA)- for reading out a superconducting quantum bit (Quantronium). The amplifier exploits the non-linearity of the Josephson junction to achieve high speed and single shot operation. The JBA is based on the switching between two dynamical states of an rf-driven Josephson junction biased near a dynamical bifurcation. I will present experimental results which characterize the backaction of the JBA on the qubit during the measurement process. The high speed readout (repetition rate of 5 - 10 MHz) allows us to make successive measurements of the quantum state and study the correlations between them.

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Date submitted: 01 Dec 2004 Electronic form version 1.4