

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Measurement induced heat bath and decay rates in circuit QED.

MAXIME BOISSONNEAULT, Universite de Sherbrooke, JAY GAMBETTA, IQC, University of Waterloo, ALEXANDRE BLAIS, Universite de Sherbrooke, YALE CIRCUIT QED TEAM — In circuit QED, a superconducting qubit is fabricated inside a high quality superconducting coplanar resonator. This system allows for strong interaction of the artificial atom with the photon field [1]. In the dispersive regime, where the detuning between the qubit and the resonator frequency is large with respect to their coupling, the physics of this system is understood in terms of Lamb and Stark shifts. However, as the coupling strength or the number of photons in the resonator increases, this description breaks down. In this talk, we will explain that, when taking into account higher order corrections to the dispersive approximation, measurement photons act as a heat bath inducing incoherent relaxation and excitation of the qubit. We will discuss how this can decrease achievable signal-to-noise ratio and may reduce the QND aspect of the measurement. [1] A. Wallraff, et al., Nature 431, 162 (2004)

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Date submitted: 27 Nov 2007

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