

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Quantum Zeno Effect in Detection of Itinerant Microwave Photons FERDINAND HELMER, Arnold Sommerfeld Center for Theoretical Physics, Physics Department, Center for NanoScience, Ludwig-Maximilians University Munich, Germany, MATTEO MARIANTONI, Walther Meissner Institut, Bayerische Akademie der Wissenschaften, Garching, Germany, ENRIQUE SOLANO, FLORIAN MARQUARDT, Arnold Sommerfeld Center for Theoretical Physics, Physics Department, Center for NanoScience, Ludwig-Maximilians University Munich, Germany — We analyze detection of itinerant photons using a QND measurement. We show that the backaction due to the continuous measurement poses a fundamental limit for the fidelity of detection in such a scheme. We illustrate this using a setup where signal photons have to enter a cavity in order to be detected dispersively. The measurement signal in this approach is the phase shift imparted to an intense beam passing through a second cavity mode. The restrictions on the fidelity are a consequence of the Quantum Zeno effect, and we discuss both analytical results and quantum trajectory simulations of the measurement process. Finally, we briefly mention a possible experimental realisation in the context of superconducting circuit QED.

Florian Marquardt
Arnold Sommerfeld Center for Theoretical Physics, Physics Dept.,
Center for NanoScience, Ludwig-Maximilians University Munich, Germany

Date submitted: 03 Dec 2007

Electronic form version 1.4