Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Dispersive qubit measurement using an on-chip parametric amplifier: theory BENJAMIN LEVITAN, SAEED KHAN, McGill University, ANDREW EDDINS, DAVID TOYLI, IRFAN SIDDIQI, University of California, Berkeley, AASHISH CLERK, McGill University — Superconducting circuits directly integrating qubits and parametric amplifiers are a promising avenue for scalable measurement in circuit QED architectures. In such devices, the qubit is not protected against the amplified fluctuations of the paramp; understanding the backaction characteristics is thus crucial. We dicuss recent theory work examining measurement-induced dephasing in a system where a flux-pumped paramp is directly coupled to a qubit, both in the limit of weak and strong dispersive coupling. We show that by careful design choices, the measurement-induced dephasing can be near quantum-limited despite the lack of circulators or explicitly directional amplifiers to protect the qubit. This work is supported by ARO.

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Date submitted: 14 Nov 2014 Electronic form version 1.4