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Stroboscopic qubit measurement with injected squeezed light, Part 1: Controlling measurement backaction[1] SYDNEY SCHREPPLER, ANDREW EDDINS, DAVID TOYLI, LEIGH MARTIN, SHAY HACOHEN-GOURGY, Quantum Nanoelectronics Laboratory, Department of Physics, University of California, Berkeley, CA 94720, USA., LUKE GOVIA, HUGO RIBEIRO, AASHISH CLERK, McGill University, Montreal, Quebec, Canada., IRFAN SIDDIQI, Quantum Nanoelectronics Laboratory, Department of Physics, University of California, Berkeley, CA 94720, USA. — As new amplification technologies permit ever faster and quieter measurements of superconducting qubits, further measurement acceleration will require alternative approaches to improve the signal-to-noise ratio achieved in a set acquisition time. Here we demonstrate the enhancement of qubit measurements using the injection of squeezed electromagnetic vacuum. Our platform combines a stroboscopic measurement technique with an interferometric configuration of parametric amplifiers to produce optimally-squeezed phase sensitive readout. In this first of two talks, we present an overview of our measurement setup and demonstrate how squeezing provides additional control over measurement backaction. We emphasize that we can slow measurement-induced dephasing by a factor of two, thereby exhibiting an important capability for future efforts toward higher fidelity multi-qubit gates.

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