Abstract Submitted
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Measurement of superconducting single-crystal Al resonators on Si and sapphire substrates J.E. ROBINSON, J. HACKLEY, Z.K. KEANE, C.J.K. RICHARDSON, B.S. PALMER, Laboratory for Physical Sciences, College Park, MD — Al made via molecular beam epitaxy offers improvements to existing superconducting qubit architectures due to decreased loss at the interface between the Al and the substrate [1]. We have studied this loss by measuring the quality factors of a variety of superconducting quarter-wave resonators fabricated under different conditions from single-crystal aluminum on both silicon and sapphire substrates. The resonators, which have resonant frequencies between 4.5 and 6 GHz, were measured at a temperature of 25 mK and from an average stored photon number n$\sim$1 up to 10^6. At low photon numbers, we consistently observe Q>200k on both substrates. We will discuss potential limitations on the measured loss and steps taken to mitigate them.

[1] A. Megrant, et al., App. Phys. Lett., **100**, 113510 (2012).

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