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Efficient Measurement of Superconducting Resonators STEVEN SENDELBACH, MICAH STOUTIMORE, JOSH STRONG, OFER NAAMAN, Northrop Grumman, BROOKS CAMPBELL, JOHN MARTINIS, UC Santa Barbara — S-parameter measurements of high-Q superconducting resonators at single-photon drive powers often require significant averaging with associated long acquisition time. We have developed a procedure for optimizing the frequency sweep-plan of the measurement, and found that an appropriate choice of frequencies has a significant impact on its efficiency. An optimized sweep-plan design offers up to a factor of two reduction in the variance of extracted parameters, in comparison to a linear sweep-plan having the same total acquisition time. We experimentally compare the performance of the optimized and linear sweeps in measurements of high-Q aluminum CPW resonators.

Steven Sendelbach
Northrop Grumman

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