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Trenched TiN superconducting coplanar waveguide resonators for determining interfacial losses ALEXANDER MELVILLE, GREG CALUSINE, WAYNE WOODS, DAVID KIM, XHOVALIN MILOSHI, ARJAN SEVI, JONILYN YODER, WILLIAM OLIVER¹, MIT Lincoln Laboratory — Two-level systems at metal-substrate, metal-air, and substrate-air interfaces are a significant contributor to loss in superconducting resonators probed at the single-photon limit. Electromagnetic simulation tools can be used to determine the relative electric-field participation of these various interfaces for a given resonator geometry. The challenge is to identify a set of geometries that sufficiently alters the relative participation values in order to deconvolve the loss factors of different interfaces from the measured resonator quality factors. In this talk, we summarize measurements of a matrix of titanium nitride resonator geometries with varying etch parameters to perform this extraction, and we use this information to improve resonator quality factors in the single-photon limit. This research was funded in part by the Intelligence Advanced Research Projects Activity (IARPA). The views and conclusions contained herein are those of the authors and should not be interpreted as necessarily representing the official policies or endorsements, either expressed or implied, of IARPA or the US Government.

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