

Abstract Submitted  
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**Dielectric loss measurements using an embedded transmission line resonator**<sup>1</sup> BAHMAN SARABI, M.J.A. STOUTIMORE, MOE KHALIL, SERGIY GLADCHENKO, University of Maryland and Laboratory for Physical Sciences, ALEXANDER KOZEN, GARY RUBLOFF, F.C. WELLSTOOD, J.C. LOBB, University of Maryland, K.D. OSBORN, Laboratory for Physical Sciences — Lossy dielectrics are a major source of decoherence in superconducting qubits. Superconducting linear resonators have proven to be ideally suited for measuring loss in different dielectrics due to their versatility and relative simplicity in design, fabrication, and measurement. We will present data from samples where the low-loss coplanar resonators are fabricated on top of AlO<sub>x</sub> dielectric films grown using atomic layer deposition (ALD). Although the low-power loss can be extracted from this geometry, embedding the dielectric under study between metal films has advantages that we will discuss. In addition, ALD films can be grown conformally and without pinholes to small thicknesses in comparison to conventional PECVD films. This allows us to make lumped-element resonators with a relatively small footprint, which can easily be embedded within the transmission line.

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