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TLS-like temperature and power dependence for loss in superconducting coplanar resonators S. GLADCHENKO, M.J.A. STOUTIMORE, M. KHALIL, K. D. OSBORN, Laboratory for Physical Sciences, MD, USA — Loss in 2D superconducting coplanar resonators and qubits is often limited by two-level systems thought to be on the metal and substrate surfaces. While these TLSs are thought to be similar to those found in amorphous dielectrics, their nature is generally different. In most experiments, loss in coplanar resonators shows power and temperature dependence which disagrees with TLS theory. Here we will show new data from high-quality Al on sapphire coplanar resonators which is in qualitative agreement with TLS theory, and discuss the quantitative differences to TLS theory. The data on surface TLS behavior will be compared to resonator measurements of ALD-grown thin films.

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