

Abstract Submitted
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Low-loss superconducting microwave resonators with NbN films¹

C. SONG, B. XIAO, M. WARE, B.L.T. PLOURDE, Syracuse University — The native oxide that forms on the surface of most superconducting thin films contains a distribution of two-level system (TLS) defects that results in a significant microwave loss channel at low temperatures and powers. One of the key limitations in the quality factor of microwave devices in this regime for superconducting quantum information processing schemes is due to this surface loss mechanism. Thus, nitride superconducting materials are promising candidates due to their lack of a significant surface oxide. We have fabricated coplanar waveguide microwave resonators from reactively sputtered NbN films on sapphire and Si substrates. We characterize the resonators with measurements of the center frequency and quality factor as a function of temperature and power. In the low-temperature and low-power limit, we have observed quality factors for NbN resonators in excess of 200,000.

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