

Abstract Submitted
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Ar/SF₆ plasma functionalization of superconducting TiN resonators for favorable Q factors EVGENIYA LOCK, Naval Research Laboratory, PENG XU, TIM KOHLER, YANIV ROSEN, ARUNA RAMANAYAKA, KEVIN OSBORN, Laboratory of Physical Sciences, NAVAL RESEARCH LABORATORY TEAM, LABORATORY OF PHYSICAL SCIENCES TEAM — Charged tunneling defects at the vacuum-dielectric interfaces are known to be deleterious to quantum bits in superconducting quantum computing. These tunneling defects are believed to be charged atoms or groups of atoms which cause qubit decoherence through shared electric-field modes. In this work we study the performance of titanium nitride resonators on silicon substrates. In particular, we investigate the effects of plasma functionalization in Ar/SF₆ environment on the resonators' intrinsic quality factors. We correlate the change in Q factors with the structural modification of the sidewall below the edge of the TiN. We also report on the related chemical and morphological modifications of the Si-vacuum surface.

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