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Superconducting Nanowire Resonators for Coupling to Spin Qubits at High Magnetic Fields NODAR SAMKHARADZE, PASQUALE SCARLINO, ALESSANDRO BRUNO, LEONARDO DI CARLO, LIEVEN VANDERSYPEN, Delft University of Technology — High quality factor superconducting microwave resonators are a powerful tool for quantum information processing, as they provide a promising interface between different solid state quantum systems. One of the challenges in coupling of superconducting resonators with spin systems is the typically poor performance of these resonators in high magnetic fields. We present a novel design of microwave resonators based on NbTiN nanowires, which retain intrinsic quality factors above 10^5 while subjected to in-plane magnetic fields up to 1.2T. Moreover, due to their high characteristic impedance, these nanowire resonators are expected to develop 10 times higher vacuum fluctuation voltages than the standard coplanar waveguide resonators, making them well suited for spin-orbit interaction mediated strong coupling to spin qubits.

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