Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Superconducting coplanar waveguide resonators for electron spin resonance applications[1] A.J. SIGILLITO, R.M. JOCK, A.M. TYRYSHKIN, Princeton University, H. MALISSA, The University of Utah, S.A. LYON, Princeton University — Superconducting coplanar waveguide (CPW) resonators are a promising alternative to conventional volume resonators for electron spin resonance (ESR) experiments where the sample volume and thus the number of spins is small. However, the magnetic fields required for ESR could present a problem for Nb superconducting resonators, which can be driven normal. Very thin Nb films (50 nm) and careful alignment of the resonators parallel to the magnetic field avoid driving the Nb normal, but flux trapping can still be an issue. Trapped flux reduces the resonator Q-factor, can lead to resonant frequency instability, and can lead to magnetic field inhomogeneities. At temperatures of 1.9 K and in a magnetic field 0.32 T, we have tested X-band resonators fabricated directly on the surface of a silicon sample. Q-factors in excess of 15,000 have been obtained. A thin layer of GE varnish applied directly to the resonator has been used to glue a sapphire wafer to its surface, and we still find Q-factors of 16,000 or more in the 0.32 T field. ESR applications of these resonators will be discussed.

[1]Supported in part by the ARO.

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Date submitted: 27 Dec 2012 Electronic form version 1.4