Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Long-lived, radiation-suppressed superconducting quantum bit in a planar geometry MARTIN SANDBERG, MICHAEL VISSERS, national institute of standards and technology, THOMAS OHKI, Raytheon BBN technologies, JIANSONG GOA, JOSE AUMENTADO, national institute of standards and technology, MARTIN WEIDES, Karlsruhe institute of technology, Germany, DAVID PAPPAS, national institute of standards and technology — We present a superconducting qubit design that is fabricated in a 2D geometry over a super-conducting ground plane to enhance the lifetime. The qubit is coupled to a microstrip resonator for readout. The circuit is fabricated on a silicon substrate using low loss, stoichiometric titanium nitride for capacitor pads and small, shadow-evaporated aluminum/aluminum-oxide junctions. We observe qubit relaxation and coherence times (T_1 and T_2) of 11.7 $\pm$ 0.2 μs and 8.7 $\pm$ 0.3 μs, respectively. Calculations show that the proximity of the superconducting plane suppresses the otherwise high radiation loss of the qubit. A significant increase in T_1 is projected for a reduced qubit-to-superconducting plane separation.

Martin Sandberg
national institute of standards and technology

Date submitted: 08 Nov 2012 Electronic form version 1.4