Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Designs towards improved coherence times in superconducting qubits ANTONIO CORCOLES, JERRY CHOW, JAY GAMBETTA, CHAD RIGETTI, JIM ROZEN, GEORGE KEEFE, MARY BETH ROTHWELL, STEFANO POLETTO, MARK KETCHEN, MATTHIAS STEFFEN, IBM TJ Watson Research Center — Coherence times for superconducting qubits in a planar geometry have increased drastically over the past 10 years with improvements exceeding a factor of 1000. However, recently these appeared to have reached a plateau around 1-2 microseconds, the limits of which were not well understood. Here, we present experimental data showing that one limit is due to infra-red radiation, confirming observations from other groups. We observe increased coherence times after appropriate IR shielding. Further improvements are shown to be possible by increasing the feature size of the interdigitated shunting capacitor, strongly indicating that surface losses at the metal/substrate interface are limiting qubit coherence times. In our experiments we kept the ratio of line width to gap size constant, but increased the overall feature size. We will discuss this and other similar design approaches towards better coherence in superconducting qubits.

Antonio Corcoles
IBM TJ Watson Research Center

Date submitted: 14 Nov 2011 Electronic form version 1.4