Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Measurements of coherence times on a transmon qubit with superconducting bandgap engineering LUYAN SUN, Department of Physics and Applied Physics, Yale University, LEONARDO DICARLO, LUIGI FRUNZIO, GIANLUIGI CATELANI, LEONID GLAZMAN, MICHEL DEVORET, ROBERT SCHOELKOPF, Department of Physics and Applied Physics, Yale University — A practical quantum computer requires qubits to have long enough coherence times to perform many quantum gates. For a superconducting transmon qubit, non-equilibrium quasiparticles are one possible source for decoherence. Although the origin of these non-equilibrium quasiparticles remains unclear, the poisoning effect of quasiparticles is expected to be reduced by lowering the quasiparticle density near the tunnel junctions of the qubits. Potential approaches to reducing the quasiparticle density include using a higher-gap superconductor and fabricating quasiparticle traps near the tunnel junctions. We will present preliminary data of the coherence times measured on a transmon qubit fabricated by engineered Al bandgap profiles and compare them with those obtained on regular transmon qubits.

Luyan Sun
Department of Physics and Applied Physics, Yale University

Date submitted: 20 Nov 2009 Electronic form version 1.4