Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Progress towards a metastable superconducting qubit[1] ANDREW KERMAN, WILLIAM OLIVER, VLADIMIR BOLKHOVSKY, MARK GOUKER, MIT Lincoln Laboratory — We will report on progress towards the demonstration of a metastable RF SQUID (MRFS) qubit, which has the potential to exhibit excited-state lifetimes many orders of magnitude longer than present-day superconducting qubits, while retaining long enough coherence times to allow gate error rates as low as $\sim 10^{-5}$. These properties result from the two main characteristics of the MRFS qubit: (i) its two lowest levels are essentially macroscopically distinct persistent-current states, which can be strongly decoupled from high-frequency electromagnetic fluctuations (in contrast to most superconducting qubits whose levels are approximately those of a nonlinear LC oscillator and are thus strongly coupled); and (ii) its extremely large inductance makes it only weakly sensitive to low-frequency magnetic flux noise.

[1]This work is sponsored under Air Force Contract Number FA8721-05-C-0002. Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the United States Government.

Andrew Kerman
MIT Lincoln Laboratory

Date submitted: 10 Nov 2011 Electronic form version 1.4