Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Design of a dc SQUID Phase Qubit with Controlled Coupling to the Microwave Signal[1] R.P. BUDOYO, A.J. PRZYBYSZ, B.K. COOPER, H. KWON, Z. KIM, B. CHENG, A.J. DRAGT, J.R. ANDERSON, C.J. LOBB, F.C. WELLSTOOD, University of Maryland, College Park, M. KHALIL, S. GLADCHENKO, M. STOUTIMORE, B.S. PALMER, K.D. OSBORN, Laboratory for Physical Sciences — We have designed an Al/AlO_x/Al dc SQUID phase qubit on a sapphire substrate with a qubit junction area of 0.3 μm^2 to minimize loss associated with two-level systems in the junction oxide barrier. The qubit junction is shunted with a 1.5 pF interdigitated capacitor, and is isolated from the bias leads by an LC filter and an inductive isolation network using a larger Josephson junction. A previous device we built with similar parameters had its relaxation time T_1 limited by coupling to the microwave line. To reduce this coupling, we adopted a transmission line design and verified the coupling strength using microwave simulations. The new design will also allow us to measure the coupling to the SQUID by throughput measurements. We will discuss our design, the microwave simulations, our estimates for the overall coherence time due to losses and noise from various sources, and our progress towards testing the device.

[1]Acknowledgement: DOD, JQI, and CNAM

R. P. Budoyo
University of Maryland, College Park

Date submitted: 30 Dec 2010 Electronic form version 1.4