

Abstract Submitted  
for the APR10 Meeting of  
The American Physical Society

**Fabricating Flux Qubits With Electron Beam Lithography** ERIK CROWE, A.J. PRZYBYSZ, H. KWON, B.K. COOPER, R. BUDOYO, K. MITRA, C.J. LOBB, J.R. ANDERSON, A. DRAGT, F.C. WELLSTOOD, University of Maryland, Joint Quantum Institute, V. ZARETSKI, Z. KIM, B. PALMER, Laboratory for Physical Sciences, UMD QUANTUM COMPUTING TEAM, LPS COOPER PAIR BOX QC COLLABORATION — We will present work on fabricating an Al/AlO<sub>x</sub>/Al flux qubit on a sapphire substrate. The device consists of a rectangle SQUID loop with an area of 5 μm x 10 μm, where one third of the loop area has been sectioned off by a line with four sub-micron Josephson tunnel junctions. Two thirds of the loop forms a SQUID with two larger area junctions. The area of each of its large junctions is 0.4 (μm)<sup>2</sup> with a desired critical current of 1-10 μA. Three of the other four sub-micron junctions have an area of 0.056 (μm)<sup>2</sup>, where as the fourth junction has an area of 0.028 (μm)<sup>2</sup>. Device fabrication on an insulating substrate (sapphire) requires some unconventional electron-beam lithography fabrication techniques. We will discuss the design, the fabrication process and our progress towards measuring the properties of the device at millikelvin temperatures.

Erik Crowe  
University of Maryland, Joint Quantum Institute

Date submitted: 26 Oct 2009

Electronic form version 1.4