

Abstract Submitted  
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**Development of a Microwave Resonator for Qubit Read-out**<sup>1</sup> ZAEILL KIM, V. ZARETSKEY, Department of Physics, University of Maryland, K. D. OSBORN, Laboratory for Physical Sciences, F. C. WELLSTOOD, JQI, CNAM, Department of Physics, University of Maryland, B. S. PALMER, Laboratory for Physical Sciences — We have designed and fabricated a “lumped-element” thin-film superconducting Al microwave resonator on sapphire to be used to read out a Cooper-pair box. The resonator consists of a meandering inductor and an interdigitated capacitor coupled to a transmission line. At  $T=30$  mK and on resonance at 5.578 GHz, the transmission through the transmission line decreases by 15 dB and the loaded quality factor is 60,000. We have studied the temperature dependence of our resonator at temperatures as high as 500 mK and compared it to the Mattis-Bardeen theory. Coupling of this resonator to a Cooper-pair box qubit will be discussed.

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Zaeill Kim  
Department of Physics, University of Maryland

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