Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

A scanning SQUID microscope for imaging high-frequency magnetic fields C. P. VLAHACOS, CNAM, Department of Electrical and Computer Engineering, University of Maryland College Park and the Laboratory of Physical Sciences, F. C. WELLSTOOD, Center for Nanophysics and Advanced Materials and Joint Quantum Institute, Physics Department, University of Maryland College Park, J. MATTHEWS, Physical Optics Corporation — We have developed a large-bandwidth scanning SQUID microscope in order to spatially image high frequency magnetic fields. By using a hysteretic Nb dc-SQUID and a pulsed sampling technique, rather than a non-hysteretic SQUID and a flux-locked loop, we have overcome the bandwidth limitations of existing scanning SQUID microscopes, which typically only image below about 1 MHz. The microscope allows for non-contact time-varying magnetic field images to be taken of room temperature samples with time steps down to 50 ps and spatial resolution ultimately limited by the size of the SQUID to about 10 μm. Towards this end, results will be presented on the design, development, and operation of a cryo-cooled 4.2 K scanning SQUID microscope with a bandwidth of dc to 3 GHz and a sensitivity of about 52.4 nT per sample.

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Date submitted: 21 Nov 2008 Electronic form version 1.4