Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

SQUID-detected microtesla MRI: a new modality for tumor detection? MICHAEL MÖßLE, SARAH BUSCH, MICHAEL HATRIDGE, WHITTIER MYERS, ALEXANDER PINES, JOHN CLARKE, UC Berkeley and LBNL, LARS SCHMITT, JEFF SIMKO, UC San Francisco — We are investigating the use of low-field magnetic resonance imaging with enhanced longitudinal-relaxation-time (T_1)-weighted contrast to detect tumors. Our technique involves prepolarizing the sample in a magnetic field up to 0.3 T and detecting the nuclear magnetic resonance (NMR) signal at microtesla fields using a superconducting quantum interference device. This technique enables us to obtain T_1 dispersion curves and T_1-weighted contrast images in fields from 1.4 μT to 0.3 T. We have shown that for materials such as agarose gel the T_1-weighted contrast is greatly enhanced in microtesla fields. To investigate the use of this enhancement for tumor imaging we measured the T_1 relaxation times of healthy and cancerous tissue specimens, maintained at 4 $^\circ$C, shortly after their surgical removal. To minimize artifacts we measured normal and cancerous tissues simultaneously and separated their NMR signals by applying a magnetic field gradient. We present T_1 dispersion curves for several sets of samples, and discuss the applicability of this technique to *in vivo* imaging. Work supported by USDOE.

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Date submitted: 30 Nov 2005 Electronic form version 1.4