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Magnetic resonance elastography detected with a SQUID in microtesla magnetic fields NATHAN KELSO, MICHAEL MÖßLE, WHITTIER MYERS, JOHN CLARKE, UC Berkeley Dept. of Physics and LBNL Materials Sciences Division, KRISTIE KOSKI, UC Berkeley Dept. of Chemistry, JEFFREY REIMER, UC Berkeley Dept. of Chemical Engineering — We have used a SQUID-based microtesla magnetic resonance imaging (MRI) system to perform magnetic resonance elastography (MRE) experiments in a measurement field of 132 microtesla. Magnetic resonance elastography is based on MRI and measures three-dimensional displacement and strain fields in a sample. With appropriate data processing this allows for a quantitative map of the physical response of a material to an applied deformation. In the past, MRE experiments using conventional (1.5 tesla and above) MRI systems have demonstrated that MRE may be used as a non-invasive method for measuring stiffness of human tissues, which may aid in the detection and diagnosis of breast cancer and other cancers. Our MRE experiment consists of applying a small axial deformation to a cylindrical sample of 0.5% agarose gel. For samples approximately 30 mm in height, we were able to measure displacements on the order of 500 micrometers. Supported by USDOE.

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