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Contactless Thermal Diffusivity Measurements for Pulsed Magnetic Fields T. COFFEY, C.H. MIELKE, F.R. DRYMIOTIS, D. KIM, K.-H. KIM, Seoul National University, A. MIGLIORI, P. RUMINER, NHMFL-LANL COLLABORATION — Most calorimetric techniques require long time constants. and are limited to DC magnets. We are developing calorimetric measurements on short time scales for pulsed field experiments. Specific heat (C) measurements have been performed in high fields (60 T) by Jaime et al. (Nature, 405 (2000) 160); however, these measurements have been limited to a unique long-pulse magnet. Recently, Kim et al.(to be submitted) have successfully measured thermal conductivity (κ) in a short pulse magnet; however, the $3-\omega$ technique utilized by Kim et al. requires a time consuming deposition processes. In an effort to bring simple-to-use high field calorimetric measurements to the larger condensed-matter community, we are adapting existing contact-less conductivity techniques to measure the thermal diffusivity ($\frac{C}{\kappa}$) in pulsed magnetic fields. An amplitude modulated rf heater excites surface currents in a sample, which in turn drives small oscillatory variations in the surface temperature and are detected via changes in the sample's skin depth. The amplitude of the surface temperature variations depend upon the thermal diffusivity and the frequency at which the rf heater is modulated. By varying the modulation frequency of the rf heater, the thermal diffusivity can be deduced. As a first step toward performing these measurements in pulsed fields, initial measurements in a dc magnet will be presented.

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