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Second Harmonic Technique for Thermal Conductivity Measurement in a Pulsed Magnetic Field YOKO SUZUKI, JONATHAN B. BETTS, ALBERT MIGLIORI, National High Magnetic Field Laboratory, Los Alamos National Laboratory — We describe a second-harmonic technique to be used eventually to probe the thermal conductivity of LSCO with superconductivity suppressed by high magnetic fields. The technique is suitable for the high-noise environment of pulsed magnets. Unlike the 3ω technique, a heater and a thermometer are mounted separately. Therefore, the 2ω signal is the dominant signal in the thermometer output. The frequencies are chosen so that the thermal penetration depth is smaller than the sample thickness. The thermometer response time and thermal impedance associated with material interfaces are carefully tested and compared to calculation. The calculations are based on exact solutions of the full bulk heat transport equations and produce results different from the lumped-constant approximations often used in ac calorimetry. Work performed under the auspices of the National High Magnetic Field Laboratory.

Yoko Suzuki
National High Magnetic Field Laboratory, Los Alamos National Laboratory

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