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SQUID-based magnetic thermometry for fundamental physics and applications below 1 **K** R. SULTAN, R. RAHMAN, F. BASET, B. L. ZINK, University of Denver — One approach to sensitive thermometry below 1 K is to measure the temperature-dependent magnetization of a paramagnet using a SQUID. Devices based on bulk materials (such as cerium manganese nitrate) and superconducting transformers provide some of the most sensitive thermometers available for dilution-refrigerator temperatures. Microcalorimeter x-ray or γ-ray detectors can be made using the same concept, with a small erbium-doped gold paramagnet (again prepared using bulk techniques) measured with a thin-film dc SQUID magnetometer. In this talk we describe our recent work toward a SQUID-based magnetic thermometer fabricated entirely using thin-film techniques. This thermometer has potential applications not only for high spectral-resolution x-ray detectors, but also for fundamental measurements of thermal transport in thin-films and nanostructures. We will discuss optimization of a low-noise dc SQUID and its coupling to the sensor, the choice of a paramagnetic thin-film, and the performance of the thermometer for various applications.

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