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High-Resolution Microcalorimeters for X-ray Microanalysis B.L. ZINK, G.C. HILTON, J.N. ULLOM, K.D. IRWIN, Quantum Sensors Project, National Institute of Standards and Technology, Boulder, CO 80305 — Microcalorimeters represent the current state-of-the-art in x-ray detection for high-resolution microanalysis. In this device the energy of x-rays emitted from regions of a sample or circuit excited by an electron beam is determined by measuring the increase in temperature caused by the absorption of an x-ray in the microcalorimeter, normally held at temperatures well below 1 *K* by a compact adiabatic demagnetization refrigerator. The performance of these detectors is ultimately determined by the sensitivity and noise characteristics of the thermometer. The best performance is currently achieved using superconducting transition-edge sensors which can resolve energy differences of better than 1 part in 2000. In this talk I will briefly summarize the current state of x-ray microcalorimetry and discuss recent efforts at NIST to develop next-generation microcalorimeters using SQUID-based magnetization thermometry.

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