Magnetic microscopy with small scale Hall probes (invited) (abstract)

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The use of small scale Hall probes in the study of nanometer scale magnetic structures and high temperature superconductors is discussed. Micron sized Hall probes are a powerful means of studying local magnetic properties and are complementary to other local magnetometry methods such as those based on magnetic force microscopy and superconducting quantum interference device techniques. In addition to presenting an overview of our recent studies on nanofabricated magnetic samples\(^1\) and ring shaped superconductors,\(^2\) we discuss the factors that determine the spatial and field resolution of this technique. Among the important issues considered are the Hall response to inhomogeneous magnetic fields and the noise characteristics of sensor materials. A variety of materials have been studied including two-dimensional GaAs/GaAlAs heterostructures, three-dimensional InGaAs, and Bi semimetal thin films. Finally, our progress toward the realization of a variable temperatures scanning Hall probe microscope will be reported. © 1997 American Institute of Physics. [S0021-8979(97)89608-9]

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\(^1\) A. D. Kent et al., J. Appl. Phys. 76, 6656 (1994).