P-FKP32: Angle-dependence of the Hall effect in Hg-Ba-Ca-Cu-O thin films

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Superconducting compounds of the family Hg-Ba-Ca-Cu-O have evoked intensive research efforts since the current record-holder for the highest critical temperature of a superconductor belongs to this class of materials. Thin films of the compound with two adjacent copper-oxide layers and a critical temperature of about 120 K were prepared by a two-step process that starts with the pulsed-laser deposition of precursor films and subsequent annealing in mercury-vapour atmosphere. Hg-Ba-Ca-Cu-O is a quasi-two-dimensional material with high anisotropy, and, like some other high-temperature superconductors, exhibits a specific anomaly of the Hall effect, a double-sign change of the Hall coefficient close to the superconducting transition. We have investigated this phenomenon by measurements of the Hall effect at different angles between the magnetic field direction and the crystallographic c axis. The results are discussed in terms of various contributions to the Hall effect by normal-state carriers, superconducting fluctuations, and dissipative vortex motion.