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Magnetic Pinning in Nb and YBCO Thin Films by Co/Pt Multilayers with Perpendicular Magnetic Anisotropy X.M. CHENG, L.Y. ZHU, C.L. CHIEN, Johns Hopkins University, MARTA Z. CIEPLAK, Z. ADAMUS, A. ABAL'OSHEV, M. BERKOWSKI, Inst. of Physics PAS, Warsaw, Poland —
Magnetic pinning of vortices has the advantage over intrinsic pinning in that the superconducting critical current can be reversibly tuned by the magnetic field (H). Magnetic pinning by Co/Pt multilayers with perpendicular magnetic anisotropy has been studied in two ferromagnetic/superconducting bilayers of Nb and YBCO with different superconducting properties (e.g. penetration depth λ). Magnetic force microscopy reveals similar magnetization (M) reversal process in the two cases, both exhibiting a large density of narrow residual domains but with different domain width w at the final reversal stage. However, the magnetic pinning, revealed by the M-H loop shape in the superconducting state, is different. The Nb film exhibits an enhancement of M with the strongest effect during the final reversal stage, while the YBCO film shows a suppression of M in the vicinity of central M peak and an enhancement of M in large magnetic fields. These different behaviors are related to the different λ/w ratio in the two cases.

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