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Vortex pinning in superconducting/ferromagnetic bilayer with tunable domain width MARTA Z. CIEPLAK, Inst. of Physics, PAS, Warsaw, Poland, L. Y. ZHU, C. L. CHIEN, Johns Hopkins University — We have used magnetoresistance to determine the activation energy of flux pinning in superconducting/ferromagnetic bilayer, consisting of superconducting Nb and ferromagnetic Co/Pt multilayer with perpendicular magnetic anisotropy, separated by a Si buffer layer. Using a novel demagnetization procedure we can acquire randomly oriented stripe domain pattern with a well-defined average domain width L. We show that depending on the value of L, the temperature, and the magnetic field, the activation energy for flux pinning may be either enhanced or suppressed by the interaction between the vortices and the magnetic moment of the domains. Despite the randomness of the domain structure, the activation energy shows maxima at some magnetic fields, indicating commensurability effects. Our results are consistent with the formation of L-dependent arrangements of vortices, such as the triangular vortex lattice for small L, and the single-vortex or double-vortex chain structures at larger L. Our work provides a comprehensive picture of the flux pinning in the superconducting/ferromagnetic bilayer.

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