

Abstract Submitted
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Domain Wall and Reverse Domain Superconductivity in Superconducting/Ferromagnet Hybrid Structures¹ S. MOORE, J. FEDOR, Physics Department, Temple University, Philadelphia, PA 19122, V. NOVOSAD, Materials Science Division, Argonne National Laboratory, Argonne, IL 60439, S. CIO-CYS, G. KARAPETROV, Physics Department, Drexel University, Philadelphia, PA 19104, M. IAVARONE, Physics Department, Temple University, Philadelphia, PA 19122 — We have investigated the effect of inhomogeneous stray fields of a ferromagnet on the nucleation of the superconducting order parameter in superconductor/ferromagnet (S/F) systems magnetically coupled. Low-temperature scanning tunneling microscopy and spectroscopy measurements were performed on a Pb/[Co/Pd] system, which has a nontrivial H-T phase diagram under externally applied magnetic fields. Conductance maps and tunneling spectroscopy of these systems show clear indications of domain wall and reverse domain superconductivity. Close to the transition temperature (T_c) and in zero applied field, we visualized the emergence of superconductivity in regions above the separation between adjacent magnetic domains on length scales of the order of the coherence length. We also find an increase in T_c for certain values of applied field above magnetic domains of the opposite polarity.

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