

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Vortex Confinement in Planar S/F Hybrid Structures¹ S. MOORE, Physics Department, Temple University, Philadelphia, PA 19122 USA, V. NOVOSAD, V.G. YEFREMENKO, Materials Science Division, Argonne National Laboratory, Argonne, IL 60439 USA, G. KARAPETROV, Physics Department, Drexel University, Philadelphia, PA 19104 USA, M. IAVARONE, Physics Department, Temple University, Philadelphia, PA 19122 USA — We have investigated the effect of periodic stray fields of the ferromagnet on the vortex dynamics in superconductor/ferromagnet (S/F) systems. Magnetization measurements were performed using SQUID magnetometry for Permalloy/Niobium (Py/Nb) samples of varying Py domain widths and Nb thicknesses. The hysteresis loops show an increase of the critical current for some values of magnetic domain width and superconductor thickness in some portion of the H-T phase diagram. However, below a threshold temperature sudden jumps in magnetization are observed during a slow sweep of the external magnetic field, which indicate the occurrence of vortex avalanches. These avalanches have been confirmed by scanning probe microscopy and they can cause a collapse of the critical state below a threshold temperature. Static and dynamics of these systems will be discussed.

¹This work was supported by US DOE Grant No. DE-FG02-10ER46710 and UChicago Argonne, LLC, Operator of Argonne National Laboratory. Argonne, a U.S. Department of Energy Office of Science Laboratory, is operated under Contract No. DE-AC02-06CH11357.

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Date submitted: 19 Dec 2011

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