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Imprinting superconducting vortex trajectories in a magnetic layer[1] JÉRÉMY BRISBOIS, Univ., of Liège, MAYCON MOTTA, Univ., Federal de Sao Carlos, JONATHAN I. AVILA, GORKY SHAW, Univ., of Liège, THIBAUT DEVILLERS, NORA M. DEMPSEY, Univ., Grenoble Alpes - CNRS, SAVITA K. P. VEERAPANDIAN, PIERRE COLSON, BENOIT VANDERHEYDEN, PHILIPPE VANDERBEMDEN, Univ., of Liège, WILSON A. ORTIZ, Univ., Federal de Sao Carlos, NGOC DUY NGUYEN, Univ., of Liège, ROMAN B. G. KRAMER, Univ., Grenoble Alpes - CNRS, ALEJANDRO V. SILHANEK, Univ., of Liège — We experimentally show that the principle of local polarization of a magnetic layer, a well-known method to store information namely in hard drives and credit cards, can be applied for imprinting into a soft magnetic layer of permalloy (Py) the trajectory of vortices moving in a superconducting film (Nb). In full analogy with a magnetic drawing board, vortices act as tiny magnetic scribers leaving a wake of polarized magnetic media in the Py layer. We have used the magneto-optical imaging technique to investigate the mutual interaction between superconducting vortices and ferromagnetic domains. In general, we observe that the flux propagation is delayed at the border of the magnetic layer. Interestingly, in thin Py layers without stripe domains, vortices leave clear imprints of locally polarized magnetic moments along their trajectories. Furthermore, the printings were found to be stable and could still be observed at room temperature, allowing for ex situ observation of the flux penetration in superconductors. We expect our findings to pave the way for further studies for optimizing magnetic recording of superconducting vortex trajectories.

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