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Direct experimental visualization of magnetic flux guidance in artificially patterned $YBa_2Cu_3O_{7-x}$ thin films. V.V. YURCHENKO, Department of Physics, University of Oslo, Norway, R. WOERDENWEBER, Research Centre of Juelich, Germany, J.I. VESTGAARDEN, YU.M. GALPERIN, D.V. SHANTSEV, T.H. JOHANSEN, Department of Physics, University of Oslo, Norway — Development of new 'fluxonic' devices, based on controlled motion of magnetic vortices, requires understanding of the principles of magnetic flux distribution and its dynamics in patterned superconductors. We investigated $YBa_2Cu_3O_{7-x}$ thin films equipped with various arrangements of antidots (holes of 1 μm radius) by means of real-time magneto-optical imaging. We demosntrate that 1D antidot arrays facilitate propagation of magnetic flux: each antidot concentrates the flux and tends to pass it on to the next antidot. Some flux from the antidot enters the superconductor creating a characteristic parabolic pattern. At high fields a whole line of antidots represents a cascade of parabolas with the centres in the holes. Flux 'channels' and 'reservoirs' were created in a superconducting strip by combining antidots of different size. We demonstrate that transfer of magnetic flux between two 'reservoirs' lying parallel to the edge of the strip can be realized without applying additional transverse currents. At alternating magnetic field dynamics of the flux can be localized inside the 'reservoirs'.

Vitaliy V. Yurchenko
Department of Physics, University of Oslo, Norway

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