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Matching of the Flux Lattice to Geometrically Frustrated Pinning Arrays[1] J. TRASTOY, R. BERNARD, J. BRIATICO, J.E. VILLEGAS, Unite Mixte de Physique CNRS/Thales, France, J. LESUEUR, LPEM, CNRS-ESPCI, France, C. ULYSSE, G. FAINI, CNRS, LPN, France — We use vortex dynamics on artificial nanoscale energy landscapes as a model to experimentally investigate a problem inspired by "spin ice" systems. In particular, we study the matching of the flux lattice to pinning arrays in which the geometrical frustration is expected to impede a unique stable vortex configuration and to promote metastability. This is done with YBCO films in which the nanoscale vortex energy landscape is fabricated via masked ion irradiation. Surprisingly, we found that minimal changes in the distance between pinning sites lead to the suppression of some of the magneto-resistance matching effects, that is, for certain well-defined vortex densities. This effect strongly depends on the temperature. We argue that this behavior can be explained considering the arrays' geometrical frustration and the thermally activated reconfiguration of the vortex lattice between isoenergetic states.

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