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Stabilization of a vortex-antivortex lattice created by a magnetic-field pulse V.N. GLADILIN, TQC, University of Antwerp and INPAC-University of Leuven, Belgium, J. TEMPERE, J.T. DEVREESE, TQC, University of Antwerp, Belgium, V.V. MOSHCHALKOV, INPAC-University of Leuven, Belgium — Using the time-dependent Ginzburg-Landau approach, we theoretically investigate the formation and evolution of vortex-antivortex patterns, which are created in a thin superconducting film by a single pulse of an inhomogeneous magnetic field. The field pulse is induced by a periodic square array of current loops, where the current direction is either the same for all the loops or changes from one loop to another in the checkerboard order. In an ideally homogeneous superconductor film, the vortices and antivortices, generated by an applied magnetic field pulse, fully recombine within a relatively short time interval after switching off the current in the loops. We demonstrate that in the presence of- even relatively weak- pinning centers the vortex-antivortex distributions, induced by a short magnetic-field pulse, can eventually evolve into vortex-antivortex lattices, which remain stable for an arbitrarily long time. This work was supported by the Methusalem Funding of the Flemish Government, the NES-ESF program, the Belgian IAP, the Fund for Scientific Research-Flanders (FWO- Vlaanderen).

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