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Flux line non-equilibrium relaxation kinetics following current quenches in disordered type-II superconductors[1] HARSHWARDHAN CHATURVEDI, HIBA ASSI, Department of Physics, Virginia Tech, ULRICH DOBRAMYSL, The Gurdon Institute, University of Cambridge, U.K., MICHEL PLEIMLING, UWE TÄUBER, Department of Physics, Virginia Tech — We investigate the relaxation dynamics of magnetic vortex lines in disordered type-II superconductors following rapid changes in the external driving current by means of Langevin molecular dynamics simulations for an elastic line model. A system of driven interacting flux lines in a sample with randomly distributed point pinning centers is initially relaxed to a moving non-equilibrium steady state. The current is then instantaneously decreased, such that the final stationary state resides either still in the moving regime, or in the pinned Bragg glass phase. The ensuing non-equilibrium relaxation kinetics of the vortices is studied in detail by measuring the mean flux line gyration radius and the two-time transverse height autocorrelation function. The latter allows us to investigate the physical aging properties for quenches from the moving into the glassy phase, and to compare with non-equilibrium relaxation features obtained with different initial configurations.

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