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Flux line dynamics following current quenches in disordered type-II superconductors1[1] HARSHWARDHAN CHATURVEDI, Department of Physics & CSMBP, Virginia Tech, Blacksburg, Virginia 24061-0435, United States, HIBA ASSI, Physics and Engineering Department, Washington and Lee University, Lexington, Virginia 24450, United States, ULRICH DOBRAMYSL, Wellcome Trust / CRUK Gurdon Institute, University of Cambridge, Tennis Court Rd, Cambridge CB2 1QN, United Kingdom, MICHEL PLEIMLING, UWE TÄUBER, Department of Physics & CSMBP, Virginia Tech, Blacksburg, Virginia 24061-0435, United States
— We describe the disordered vortex system in type-II superconductors with an elastic line model, whose dynamics we investigate numerically by means of Langevin Molecular Dynamics. We study the effects of sudden changes of the driving current on the time evolution of the mean flux line gyration radius and the associated transverse displacement correlation functions. Within the moving regime, we obtain fast exponential relaxation to a new non-equilibrium stationary state. Upon quenching from the moving into the pinned glassy regime, we observe algebraically slow relaxation, with breaking of time translation invariance and indications of aging scaling behavior. Furthermore, we are studying the relaxation of flux lines after quenching the driving current from the moving into the critical depinning regime besides looking at flux-line dynamics in the presence of planar disorder or twin boundaries in the superconducting sample.

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