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Relaxation dynamics of magnetic flux lines subject to correlated disorder[1] ULRICH DOBRAMYSL, HIBA ASSI, MICHEL PLEIMLING, UWE C. TÄUBER, Department of Physics, Virginia Tech — Technological applications of type-II superconductors in magnetic fields require a careful investigation and characterization of the stationary and transient properties of vortex matter. Naturally occurring disorder and artificially introduced crystal defects acting as pinning sites, together with repulsive vortex-vortex interactions lead to rich and complex physics. We study the out-of-equilibrium relaxation of a system of vortex lines, subject to columnar pinning sites, and characterize the transient behavior via two-time quantities. To this end, we model these vortex lines as interacting elastic lines and employ a Langevin molecular dynamics algorithm to simulate the dynamics of the discretized system. In particular, we compare the flux line relaxation in the presence of correlated, columnar pinning sites to previously obtained data on randomly-placed pinning sites. By varying the flux line length, we investigate the differences in the relaxation between point-like vortices and extended vortex lines.

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