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Dynamics of driven vortices in type-II superconductors in the presence of strong point or columnar pinning centers[1] THANANART KLONGCHEONGSAN, Department of Physics, Virginia Tech, Blacksburg, VA 24061-0435, THOMAS J. BULLARD, National Air and Space Intelligence Center, Wright-Patterson AFB, OH 45433-5648, UWE C. TAUBER, Department of Physics, Virginia Tech, Blacksburg, VA 24061-0435 — We investigate the nonequilibrium steady state of driven magnetic flux lines in type-II superconductors subject to strong point or columnar pinning centers. We employ a three-dimensional elastic line model and Metropolis Monte Carlo simulations. We characterize the system by means of the force-velocity / current-voltage curve, static structure factor, mean vortex gyration radius, number of double-kink and half-loop excitations, and velocity / voltage noise features. We use different annealing methods to minimize numerical artifacts originating from long-lived metastable states. We compare the results for the above quantities for randomly distributed point and columnar defects.

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