

Abstract Submitted
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Time-dependent Ginzburg-Landau equations and vortex dynamics simulations on GPUs IVAN SADOVSKYY, ANDREAS GLATZ, Argonne National Laboratory, 9700 S Cass Ave, Lemont, IL 60439 — Most energy applications of superconductivity, such as electric power transmission over superconducting cables or powerful magnets, require low energy dissipation in high-temperature superconductors. Restricting the mobility of the vortices carrying magnetic field in the superconducting material by pinning them with admixed inclusions or confining their motion geometrically can minimize dissipation. We present modern simulation results of the time-dependent Ginzburg-Landau equation for large-scale mesoscopic superconductors, like narrow superconducting strips and nano-patterned superconductors. In particular, we discuss the case of nano-scale extended pinning inclusions, whose geometry has a non-trivial influence on the current-voltage characteristics. The required large-scale simulations were made possible with recent GPU computing techniques.

Ivan Sadovskyy
Argonne National Laboratory, 9700 S Cass Ave, Lemont, IL 60439

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