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Effects of Heat Transport and Quasi-particle Relaxation on Dynamics of Vortices in Superconductors[1] MASARU KATO, Osaka Prefecture Univ., OSAMU SATO, Osaka Prefecture Univ. College of Technology — We study dynamics of vortices in superconductors using the molecular dynamics simulation. Motion of vortices causes a heat generation and also decreases amplitude of the superconducting order parameter on their trail because of quasi-particle relaxation time. We incorporate these effects into the Molecular dynamics methods. In a superconducting corbino-disk, where vortices move along concentric circles, vortex motion is more rapid around the center of the disk than that around the edge. Therefore the heat generation is not uniform and there appears heat transport from the center to the edge. In such case, our simulation shows that vortices move toward the edge of the disk. Also vortices show some dynamical spiral structures depend on the pinning impurity sites and heat resistance between the superconductor and a substrate. We show details of these motions and analyze the effects of the heat transport to the vortex dynamics.

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Masaru Kato
Osaka Prefecture Univ

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