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Nonlinear motion of non-uniform current-vortex sheets in MHD Richtmyer-Meshkov instability[1] CHIHIRO MATSUOKA, Department of Physics, Ehime University, KATSUNOBU NISHIHARA, TAKAYOSHI SANO, Institute of Laser Engineering, Osaka University — When a supernova explosion occurs, materials that composed the star scatter in a high speed with a strong shock wave. These scattered materials, called "supernova remnants" (SNR), expand into the space and finally become a source in order to create new solar systems. It is known that SNR have a strong magnetic field compared to the surrounding interstellar medium; however, there exist few models to explain this extraordinary magnetic amplification mechanism in SNR. Here, we consider the Richtmyer-Meshkov instability in magnetohydrodynamic flows (MHD-RMI) and construct a model in order to describe the magnetic amplification in SNR. Due to the existence of the density jump, the tangential component of the magnetic field between the interface is different; therefore, the interface in MHD-RMI becomes a (non-uniform) current-vortex sheet. In this study, we investigate motion of this current-vortex sheet using the vortex blob method. We show that the current induced on a vortex sheet leads to a strong amplification of the magnetic field when the Lorenz force term is sufficiently small, and present various interfacial profiles depending on the magnitude of the Atwood number and Lorenz force.

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