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The growth of Richtmyer-Meshkov instability in magnetized plasma TAKAYOSHI SANO, KATSUNOBU NISHIHARA, Osaka University, CHIHIRO MATSUOKA, Ehime University, TSUYOSHI INOUE, Aoyama Gakuin University — The Richtmyer-Meshkov instability (RMI) is of crucial importance in a variety of applications including astrophysical phenomena and laboratory experiments. The RMI occurs when an incident shock strikes a corrugated contact discontinuity separating two fluids with different densities. Inclusion of a magnetic field brings two important consequences into the RMI, which are the amplification of an ambient field and the suppression of the unstable motions. We demonstrated that the magnetic field can be amplified by the stretching motions at the interface associated with the RMI. We also investigated numerically the critical strength of a magnetic field required for the suppression of the RMI by using a two-dimensional single-mode analysis. For the cases of MHD parallel shocks, the RMI can be stabilized as a result of the extraction of vorticity from the interface. A useful formula describing a critical condition for MHD RMI has been introduced, and which is successfully confirmed by the direct numerical simulations. The critical field strength is found to be largely depending on the Mach number of the incident shock. If the shock is strong enough, even low-β plasmas can be subject to the growth of the RMI.

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