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Effect of a seed magnetic field on two-fluid plasma Richtmyer-Meshkov instability[1] DARYL BOND, VINCENT WHEATLEY, School of Mechanical and Mining Engineering, The University of Queensland, RAVI SAMTANEY, Mechanical Engineering, King Abdullah University of Science and Technology, DALE PULLIN, Graduate Aerospace Laboratories, California Institute of Technology — We investigate the effect of a uniform seed magnetic field on the plasma Richtmyer-Meshkov instability (RMI) using two-fluid simulations. These couple sets of conservation equations for the ions and electrons to the full Maxwell's equations. We consider cases where the seed magnetic field is normal to the interface and where the reference Debye length and Larmor radius range from a tenth to a thousandth of the interface perturbation wavelength. In ideal magnetohydrodynamics (MHD), it has been shown that in the presence of such a seed magnetic field, the growth of the RMI is suppressed by the transport of vorticity from the interface by MHD shocks. Our two-fluid plasma simulations reveal that while the RMI is suppressed in the presence of the seed field, the suppression mechanism varies depending on the plasma length-scales. Two-fluid plasma RMI simulations also reveal a secondary, high-wavenumber, electron-driven interface instability. This is not suppressed by the presence of the seed field.

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