Abstract Submitted
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Two-fluid plasma Richtmyer-Meshkov instability[1] VINCENT WHEATLEY, DARYL BOND, School of Mechanical and Mining Engineering, The University of Queensland, DALE PULLIN, Graduate Aerospace Laboratories, California Institute of Technology, RAVI SAMTANEY, Mechanical Engineering, King Abdullah University of Science and Technology — The Richtmyer-Meshkov instability of a shock accelerated perturbed density interface is computationally investigated in the context of ideal two-fluid plasmas. This is accomplished by numerically solving separate sets of conservation equations for the ions and electrons, coupled to the full Maxwell's equations. We focus on cases without an imposed magnetic field and with Debye lengths ranging from a thousandth to a tenth of the interface perturbation wavelength. For all cases investigated, the behavior of the flow is substantially different from that predicted by the Euler or ideal magnetohydrodynamics equations. Electric fields generated by charge separation cause interface oscillations, particularly in the electrons, that drive a secondary high-wavenumber instability. Consequently, the density interface is substantially more unstable than predicted by the Euler equations for all cases investigated. Self-generated magnetic fields are predicted within our simulations, but their orientation is such that they do not dampen the Richtmyer-Meshkov instability.

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