Abstract Submitted
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Growth-rate of Richtmyer-Meshkov instability for small and large amplitude initial perturbation[1] NORA SWISHER, ARUN PANDIAN, ZACHARY DELL, Carnegie Mellon University, ROBERT STELLINGWERF, Stellingwerf Consulting, SNEZHANA ABARZHI, Carnegie Mellon University — We study the effect of the amplitude of the initial perturbation on Richtmyer-Meshkov instability (RMI) by means of Smooth Particle Hydrodynamics simulations and by the rigorous theory and the newly developed empirical model. A broad parameter regime is analyzed. Initially, the interface has a single-mode sinusoidal perturbation with the amplitude varying from 0% to 100% of its wavelength. An empirical model is developed to describe the non-monotone dependence of the RMI growth-rate on the initial amplitude. The initial growth rate of the interface has a peak value. The position of the peak depends only weakly on the Mach and Atwood numbers, whereas the peak value depends strongly on Atwood number and weakly on Mach number. The ratio of initial growth rate to background velocity is related to the energy partitioning between the interface and the bulk. We find an upper bound of the ratio of the interfacial energy to the bulk energy, and identified its scaling with the Atwood number. This peak value of the energy ratio indicates that RM interfacial growth can be controlled by initial conditions.

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