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Doubly-shocked Richtmyer-Meshkov Instability VARAD KARKHANIS, PRAVEEN RAMAPRABHU, University of North Carolina at Charlotte — We report on detailed numerical simulations of a doubly-shocked Richtmyer-Meshkov Instability where two successive incident shock waves interact with a sinusoidally perturbed material interface. The problem is relevant to Inertial Confinement Fusion, type IA supernovae, and the design of mix experiments where multiple incident shocks have been proposed to potentially achieve freeze-out. In our simulations, the timing of the second incident shock was varied to realize a finite-amplitude initialization of the RM instability. The simulations were performed at two Atwood numbers, A = 0.15 and A = -0.99, where the latter condition is relevant to ejecta formation. For A = -0.99, the shock-interface interactions result in two successive phase inversions corresponding to the passage of the shocks from heavy to light media in each instance. We have investigated initial interface perturbations of different forms including sinusoidal, triangular and sawtooth waveforms and compare the growth rates from each interaction with linear and nonlinear models [1,2].

[1] Guy Dimonte and P. Ramaprabhu, Phys. Fluids 22, 014104 (2010).
[2] Guy Dimonte, Guillermo Terrones, F.J. Cherne and P. Ramaprabhu, J. Appl. Phys. 113, 024905 (2013).

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