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The effect of membraneless initial conditions on the growth of Richtmyer-Meshkov instability. MOHAMMAD MANSOOR, SEAN DALTON, ADAM MARTINEZ, TIFFANY DESJARDINS, JOHN CHARONKO, KATHY PRESTRIDGE, Los Alamos National Laboratory, EXTREME FLUIDS TEAM — The Richtmyer-Meshkov Instability (RMI) is described by the baroclinic generation of vorticity at a density stratified interface when impulsively accelerated. Here, we experimentally investigate the late-time RMI growth of sinuous perturbations of an air/sulfur hexafluoride interface subjected to a Mach 1.2 planar shock wave within the vertical shock tube (VST) facility at Los Alamos National Laboratory. Interface perturbations are established using a novel membraneless technique where cross-flowing Air and SF6 separated by oscillating splitter plate enter the shock tube with an undulating structure. It is found that late-time perturbation growth behavior depends significantly on initial perturbation wavelength and peak-to-valley amplitude as prescribed by the frequency and sweeping angles of the "oscillating plate". The results are compared with past nonlinear models for various scaled initial amplitudes (ka_0) and used to propose an empirical rational function that captures the asymptotic behavior of perturbation growth for both low and high scaled initial amplitudes.

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