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Effect of pressure fluctuations on Richtmyer-Meshkov coherent structures[1] AKLANT K. BHOWMICK, SNEZHANA ABARZHI, Carnegie Mellon University — We investigate the formation and evolution of Richtmyer Meshkov bubbles after the passage of a shock wave across a two fluid interface in the presence of pressure fluctuations. The fluids are ideal and incompressible and the pressure fluctuations are scale invariant in space and time, and are modeled by a power law time dependent acceleration field with exponent -2. Solutions indicate sensitivity to pressure fluctuations. In the linear regime, the growth of curvature and bubble velocity is linear. The growth rate is dominated by the initial velocity for weak pressure fluctuations, and by the acceleration term for strong pressure fluctuations. In the non-linear regime, the bubble curvature is constant and the solutions form a one parameter family (parametrized by the bubble curvature). The solutions are shown to be convergent and asymptotically stable. The physical solution (stable fastest growing) is a flat bubble for small pressure fluctuations and a curved bubble for large pressure fluctuations. The velocity field (in the frame of references accounting for the background motion) involves intense motion of the fluids in a vicinity of the interface, effectively no motion of the fluids away from the interfaces, and formation of vortical structures at the interface.

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