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**Effect of pressure field fluctuations on the nonlinear evolution of Richtmyer-Meshkov coherent structure**[1] AKLANT BHOWMICK, SNEZHANA ABARZHI, Carnegie Mellon University — We consider the effect of pressure fluctuations on the evolution of Richtmyer-Meshkov (RM) flows. The pressure fluctuations are induced by non-uniformities in the fluid bulk and are modeled as a time dependent acceleration with the power-law exponent (-2). We consider a large scale periodic coherent structure of bubbles and spikes in a two-dimensional RM flow, and obtain asymptotic solutions describing nonlinear dynamics of the structure using group theory analysis. We show that regular asymptotic solutions describing the bubble dynamics form a one-dimensional family. The family can be parameterized by the curvature of the bubble front. The stability of the family solutions is analyzed. The physically significant solution in the family is interpreted as the stable solution with the maximum velocity. The associated flow fields in the vicinity of the bubble tip indicate the formation of vortices and the presence of shear at the interface, which may lead to cascading of energy of smaller scales. The fluids move intensively near the interface, and there is effectively no motion away from the interface. Dependence of the asymptotic dynamics to pressure fluctuations is studied both qualitatively and quantitatively, including the limiting cases of strong and weak fluctuations.

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