

Abstract Submitted
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High- and low-symmetric coherent structures and dimensional crossover in Richtmyer-Meshkov flows¹ AKLANT BHOWMICK, SNEZHANA ABARZHI, Carnegie Mellon University — We study the three-to-two dimensional crossover for the nonlinear structures appearing in the nonlinear regime of Richtmyer Meshkov instability (RMI). This large-scale coherent structure is an array of bubbles and spikes that is periodic in the plane normal to the direction of an initial shock (impulsive acceleration) [1]. The flow is assumed to be anisotropic in the plane with the symmetry group $p2mm$. For the bubbles, there is a two-parameter family of regular asymptotic solutions. Stability of these solutions is studied. The transitions to the flows with the group $p4mm$ and pm as well as properties of the dimensional crossover are analyzed. We find that 3D bubbles in RMI tend to conserve a near-symmetric-shape, and cannot be transformed into 2D bubbles continuously. We discuss the mechanism of secondary instabilities in anisotropic RM flows and the discontinuity of the dimensional crossover, as well as their dependence of the density ratio.

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