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Dimensional crossover in Richtmyer-Meshkov flows[1] KATSUNOBU NISHIHARA, Osaka University, AKLANT BHOWMICK, SNEZHANA ABARZHI, Carnegie Mellon University — We analyze nonlinear dynamics of large scale coherent structures in Richtmyer-Meshkov flows. Group theoretic analysis is applied with a detailed consideration of p2mm (3D rectangular), p4mm (3D square) and pm1 (2D). Symmetry dictates that asymptotic solutions form a 2 parameter family for rectangular flows and a 1 parameter family for 3D square and 2D flows. For 3D square and 2D symmetry, asymptotic solutions are obtained for the 1st and 2nd order of approximation and the fastest growth rate occurs at zero bubble curvatures. Fourier amplitudes exponentially decay with increase in order showing that solutions are convergent. Both 2D and 3D square solutions are stable with respect to symmetry conserving perturbations. Isotropic 3D square solutions are universally stable, while 2D solutions are unstable to anisotropic perturbations. Furthermore, the 3D and 2D solutions cannot be continuously transformed from one form to another and the dimensional crossover is discontinuous.

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Snezhana Abarzhi
Carnegie Mellon University

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