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**Numerical investigation of three-dimensional effects in Richtmyer-Meshkov induced mixing processes** NIKOLAUS ADAMS, VOLKER TRITSCHLER, Technische Universität München, Institute of Aerodynamics and Fluid Mechanics — The Richtmyer-Meshkov instability (RMI) occurs when a perturbed interface between two fluids with different densities is impulsively accelerated by a passing shock wave. The misalignment of pressure gradient and density gradient between the fluids upon shock passing causes baroclinic vorticity production. The deposited vorticity drives the primary instability that causes the small initial perturbations at the interface to grow. In two-dimensional simulations of RMI the vortex stretching and tilting term vanishes and vorticity is confined to be perpendicular to the flow. However, for realistic Richtmyer-Meshkov induced mixing processes the vortex stretching term can be essential. The assessment of three-dimensional effects on RMI is the objective of our numerical investigation. We report on simulations of three-dimensional Navier-Stokes simulations of shock-cylinder interaction with re-shock. A SF6-gas cylinder is impacted by a Mach 1.2 shock wave propagating in air. The cylinder surface has an initial sinusoidal single-mode perturbation in the axial direction. The initial surface perturbation triggers an instability and vorticity evolution in all three space dimensions. Three-dimensional effects are further reinforced by the re-shock.

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