Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Interactions of Blast Waves with Perturbed Interfaces MARC HENRY DE FRAHAN, ERIC JOHNSEN, Univ of Michigan - Ann Arbor — Richtmyer-Meshkov and Rayleigh-Taylor instabilities induce hydrodynamic mixing in many important physical systems such as inertial confinement fusion, supernova collapse, and scramjet combustion. Blast waves interacting with perturbed interfaces are prevelant in such applications and dictate the mixing dynamics. This study increases our understanding of blast-driven hydrodynamic instabilities by providing models for the time-dependent perturbation growth and vorticity production mechanisms. The strength and length of the blast wave determine the different growth regimes and the importance of the Richtmyer-Meshkov or Rayleigh-Taylor growth. Our analysis is based on simulations of a 2D planar blast wave, modeled by a shock (instantaneous acceleration) followed by a rarefaction (time-dependent deceleration), interacting with a sinusoidal perturbation at an interface between two fluids. A high-order accurate Discontinuous Galerkin method is used to solve the multifluid Euler equations.

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Date submitted: 29 Jul 2015 Electronic form version 1.4