

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Effects of Initial Conditions on the Mixing Transition of Richtmyer-Meshkov Instabilities RICARDO MEJIA-ALVAREZ, BRANDON WILSON, KATHY PRESTRIDGE, Los Alamos National Laboratory, EXTREME FLUIDS TEAM — A Richtmyer-Meshkov instability (RMI) might experience a mixing transition given the necessary Reynolds number and evolution time (Zhou *et al.*, *Phys. Rev. E*, 2003). Some studies over broadband initial conditions suggest that the emergence of a classical Kolmogorov $\kappa^{-5/3}$ inertial range, in an RMI that has experienced a mixing transition, is independent on the initial conditions. Since observations of this kind have not been replicated for single- or multi-mode perturbed interfaces, it is still premature to consider that the emergence of a Kolmogorov inertial range in RMI after the mixing transition is universal. To shed light on this subject, we are conducting high-resolution simultaneous PIV/PLIF measurements on a multi-mode perturbed interface between air and SF₆. Since our data are also intended for code validation, we used statistically stationary initial conditions, measuring the velocity and density fields both instantaneously and in an averaged sense. Based on our experimental data, we estimate a number of relevant turbulence statistics for different stages of the evolution of the shocked interface.

Ricardo Mejia-Alvarez
Los Alamos National Laboratory

Date submitted: 29 Jul 2014

Electronic form version 1.4