

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Modeling a Shock-Accelerated Fluid - Multiphase Fluid Interface¹ MICHAEL ANDERSON, JOSEPH CONROY, C. RANDALL TRUMAN, PETER VOROBIEFF, The University of New Mexico, SANJAY KUMAR, University of Texas - Brownsville — The hydrocode SHAMRC has been used in the past to study the formation and growth of the Richtmyer Meshkov Instability (RMI). While RMI involves impulsively accelerating two continuous fluids of differing densities, a similar class of instabilities has been recently described for multiphase flow. In this scenario, a shock wave passes through a region seeded with particles which have a non-trivial mass and density much greater than that of the surrounding and embedding fluid, resulting in a higher effective density in the seeded region. As the volume of the particles is small, there is no pressure gradient between the two regions. The simulations described here attempt to model the first order formation and growth phenomenon of this new class of instability by approximating the second phase as a continuous fluid with an averaged density. The strength of the shock and the packing density of the tracer particles are varied to provide a wide range of instability growth rates. Finally, these growth rates are scaled and compared to experimental data.

¹This research is funded by NNSA through DOE Grant DE-PS52-08NA28920 and by DTRA awards HDTRA1-07-1-0036 and HDTRA1-08-1-0053.

Peter Vorobieff
The University of New Mexico

Date submitted: 06 Aug 2010

Electronic form version 1.4