Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

High Resolution Diagnostics for Simultaneous Measurements of Velocity and Density in Shock-Driven Instabilities RICARDO MEJIA-ALVAREZ, SRIDHAR BALASUBRAMANIAN, GREG ORLICZ, KATHY PRESTRIDGE, Los Alamos National Laboratory — The interaction between a shock wave and the interface between two fluids of different density might induce macroscopic mixing of the fluids. It is generally accepted that baroclinic vorticity, resulting from misalignments between the density gradient across the interface and the pressure gradient of the shock wave, impels this macroscopic mixing. So far, the Extreme Fluids Team at Los Alamos National Laboratory has conducted the only detailed studies of the structure of the developing instability. These studies encompass simultaneous measurements of velocity and density via combined Particle Image Velocimetry (PIV) and Planar Laser Induced Fluorescence (PLIF). Using this approach, the above mentioned Team has conducted extensive studies over a varicose curtain of heavy gas (SF_6). Since a curtain implies two succeeding interfaces, a new Vertical Shock Tube (VST) was developed for simultaneous characterization of velocity and density fields of single-interface shock-driven flows. This talk is intended to present some of the results obtained for double-interface shock driven flows, as well as describing the characteristics, challenges, and range of possibilities of the laser diagnostics incorporated in the VST.

Ricardo Mejia-Alvarez
Los Alamos National Laboratory

Date submitted: 18 Nov 2011 Electronic form version 1.4