Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Quantitative Flow Field Measurements of Astrophysical Relevance on the Blast-Driven Instability (RMI RTI)[1] SAMUEL PETTER, BENJAMIN MUSCI, GOKUL PATHIKONDA, DEVESH RANJAN, Georgia Institute of Technology — The presented work focuses on the implementation of Particle Image Velocimetry (PIV) to study the Blast-Driven Instability (BDI) in cylindrical geometry at the Georgia Tech Shock Tube and Advanced Mixing Laboratory. The facility uses detonators to generate a blast wave that accelerates the flow through a diverging test-chamber. The blast wave then interacts with a gaseous, membraneless, interface of differing density, causing the occurrence of the combined Richtmyer-Meshkov (RMI) and Rayleigh-Taylor Instabilities (RTI); the two instabilities comprising the BDI. Previous validation of the facility was completed using high speed Mie Scattering and demonstrated faithful reproduction of the BDI phenomena. This validation garnered information about the qualitative development of the instability and identified aspects of improvement within the facility, both of which will be covered in this presentation. Preliminary PIV results are shown to corroborate the earlier Mie Scattering findings as well as predictions made by Taylor-Sedov theory derived from experimental pressure data.

[1]DOE Early-Career Award, and DOE NNSA SSGF

Benjamin Musci
Georgia Institute of Technology

Date submitted: 19 Sep 2019 Electronic form version 1.4