Abstract Submitted
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An experimental investigation of blast driven turbulence BENJAMIN MUSCI, DEVESH RANJAN, Georgia Inst of Tech — In the Georgia Tech Shock and Advanced Mixing Lab, a facility is being built to study blast driven turbulence. Motivated by the discrepancies observed between actual and modeled supernovae, this facility aims to resolve the important spatial scales in the extensive mixing of the outer layers. These outer layers will be modeled by subjecting two-three gases of varying density to a blast wave generated by Exploding Bridge Wires. The blast wave's interaction with perturbations at the gaseous, membraneless, interfaces will induce the Richtmeyer-Meshkov or Rayleigh Taylor Instability, depending on the acceleration history and perturbation amplitude. Through the use of simultaneous Particle Image Velocimetry, and Planar Laser Induced Fluorescence, this project aims to determine the effect of interface initial conditions on turbulence. A 2D Diverging Wedge and 3D Diverging Conical Tube are being built to enable repeatable blast-wave production, continuous optical viewing of the flow, reproducible multi-layer interface creation, and the collection of simultaneous density-velocity measurements to directly measure turbulent quantities. The preliminary analysis informing the design of this facility, the construction progress, and updates on newly realized design constraints are presented.

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