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Experimental investigation of a twice-shocked spherical gas inhomogeneity NICHOLAS HAEHN, CHRIS WEBER, JASON OAKLEY, MARK ANDERSON, RICCARDO BONAZZA, University of Wisconsin - Madison — Results are presented from a series of experiments and simulations studying the behavior of a spherical gas inhomogeneity impulsively accelerated by an incident and a reflected shock wave. Two Atwood numbers are studied using soap film to create argon and sulfur-hexafluoride bubbles impacted by a planar shock wave of strength M= 1.33. The experiments are performed in a 9.2-m-long vertical shock tube with a square internal cross-section, 25.4 cm per side. The bubbles are released from an injector that is pneumatically retracted into the side of the shock tube. For the scenario involving an Argon bubble free falling in ambient nitrogen (A = 0.176), the reshock occurs during the tail end of the bubble's compression regime after it has already shown slight growth and vortex core development. For the SF6 bubble free falling in ambient nitrogen (A = 0.681), the reshock occurs later in the bubble's developmental stage. The flow is visualized with planar Mie scattering and temporal evolutions are analyzed for the spatial dimensions, growth rates and vorticity estimates. PIV analysis is performed for several instances using the soap film as tracer particles. These trends are compared to simulations performed with the Eulerian AMR hydrodynamics code *Raptor* from LLNL.

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