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Shock Waves in Converging Geometries JUSTIN BROWN, GURUSWAMI RAVICHANDRAN, Division of Engineering and Applied Science, California Institute of Technology — Plate impact experiments are a powerful tool in equation of state development, but are inherently limited by the range of velocities accessible to the gun. In an effort to dramatically increase the range of pressures which can be studied with available impact velocities, a new experimental technique is being developed. The possibility of using a confined converging target to focus shockwaves and produce a large amplitude pressure pulse is examined. When the planar shock resulting from impact enters the converging target the impedance mismatch at the boundary of the confinement produces reflected shock waves with a radial component of velocity. Once the reflected shocks converge at the center of target, a high pressure shock forms, and with proper target design this pressure pulse will overtake the initial planar shockwave. The use of radial density gradings on the impactor and a target buffer can be used to further facilitate shock focusing by creating a mismatch in shock velocities. If the shock velocity is graded such that it is lowest towards the center of the buffer, continuity conditions force the shock wave to converge prior to even entering the target. Numerical simulations indicate a significant increase in pressure as the shock converges and show promise for the proposed concept. Experimental results on aluminum for validating the concept will be presented and discussed.

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