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A Simple 3D Printed Plane Wave Explosive Lens Based on Fritz Parameters JOSEPH LICHTHARDT, BRYCE TAPPAN, PATRICK BOWDEN, MILES OLINGER, DANIEL MCDONALD, Los Alamos National Laboratory — The development of additive manufacturing (3D printing) has opened up avenues previously unexplored due to prohibitive cost and/or complexity. Printing of inert parts for use in shock property characterization has reached a new level by allowing high resolution (10's of micron) wave shapers to be designed and employed at varying dimensions; the ability to save time on HE machining, casting, and cost of HE is undeniable. Herein, we report the design of a polyjet-printed wave shaper paired with a cast-cure HE formulation to generate a planar output shock; guided by CTH simulations, the design was iterated to increase planarity. Lens fabrication followed guidelines by J. Fritz, using PMMA Hugoniot data as a substitute for the chemically similar 3D printed acrylates. Front curvature characterization of these minimal explosive mass, small diameter (2.54 cm) charges showed reliable planarity below 100 ns and optimized to ˜28 ns. Following this characterization, the plane wave generators were used to launch flyers at varying materials to investigate shock and particle velocities and chemical reactions. In this fashion, Us-up curves were created and aided follow-on gas-gun experiments. LA-UR-21802

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