Abstract Submitted
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Shock-induced perturbation evolution in planar laser targets[1] Y. AGLITSKIY, SAIC, McLean, VA, M. KARASIK, A.L. VELIKOVICH, V. SERLIN, J.L. WEAVER, T.J. KESSLER, A.J. SCHMITT, S.P. OBENSCHAIN, Plasma Physics Division, NRL, N. METZLER, J. OH, RSI, Lanham, MD — Experimental studies of hydrodynamic perturbation evolution triggered by a laser-driven shock wave in a planar target done on the KrF Nike laser facility are reported. The targets were made of solid plastic and/or plastic foam with single mode sinusoidal perturbation on the front or back surface or plastic/foam interface. Two specific cases are discussed. When a planar solid plastic target rippled at the front side is irradiated with a 350 ps long laser pulse, ablative Richtmyer-Meshkov (RM) oscillation of its areal mass modulation amplitude is detected while the laser is on, followed by observed strong oscillations of the areal mass in the unsupported shock flow after the laser pulse ends. When the target is rippled at the rear side, the nature of the perturbation evolution after the shock breakout is determined by the strength of the laser-driven shock wave. At pressure below 1 Mbar shock interaction with rear-surface ripples produces planar collimated jets manifesting the development of a classical RM instability in a weakly compressible shocked fluid. At shock pressure $\sim$ 8 Mbar sufficient for vaporizing the shocked target material we observed instead the strong areal mass oscillations characteristic of a rippled centered rarefaction wave.

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