Abstract Submitted
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Small-amplitude theory of the perturbation evolution caused by isolated surface defects in laser-driven targets.[1] A. L. VELIKOVICH, A. J. SCHMITT, J. W. BATES, C. ZULICK, Y. AGLITSKIY, M. KARASIK, Plasma Physics Division, NRL, Washington, DC, J. G. WOUCHUK, F. COBOS CAMPOS, Universidad de Castilla-La Mancha, Spain — Rayleigh-Taylor perturbation growth in laser fusion capsules can be triggered by isolated target non-uniformities, such as fill tubes, mounting stalks, tents, etc. Recently, the first experimental study of the perturbation evolution caused by isolated non-uniformities, straight grooves machined on planar plastic targets, has been carried out on the Nike KrF laser at NRL. Detailed analysis and numerical simulation of these experiments are in progress. We present a linear theory of the perturbation development caused by isolated small-amplitude indentations on planar laser targets. Advancing the earlier theory, we demonstrate how the shock-front, ablation-front, rear-target-surface, and areal-mass/opacity perturbations develop in time when the source of the initial perturbation is localized in space. If the initial shock-front perturbation is an azimuthally-symmetric Gaussian indentation, later, as the perturbed shock front flattens, its central part lags, and the shock front perturbation acquires a rotationally-symmetric ring shape. For an initial straight Gaussian groove, the shock front perturbation shape evolves into a shelf with a flat bottom and peaked edges. When a locally perturbed shock front breaks out at the flat rear surface of the target, a collimated jet is produced.

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