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Hydrodynamics of laser-driven double-foil collisions studied by orthogonal x-ray imaging[1] Y. AGLITSKIY, N. METZLER, Science Applications International Corporation, M. KARASIK, V. SERLIN, S.P. OBENSCHAIN, A.J. SCHMITT, A.L. VELIKOVICH, J.H. GARDNER , J. WEAVER, J. OH , Plasma Physics Division, Naval Research Laboratory — With this experiment we start the study of the physics of hydrodynamic instability seeding and growth during the deceleration and stagnation phases. Our first targets consisted of two separated parallel plastic foils – flat and rippled. The flat foil was irradiated by the 4 ns Nike KrF laser pulses at 50 TW/cm^2 and accelerated towards the rippled one. Orthogonal imaging, i. e., a simultaneous side-on and face-on radiography of the targets has been used in these experiments. Side-on x-ray radiography and VISAR data yield shock and target velocities before and after the collision. Face-on streaks revealed well-pronounced oscillatory behavior of the single-mode mass perturbations. Both sets of synchronized data were compared with 1D and 2D simulations. Observed velocities, timing and the peak value of areal mass variation are in good agreement with the simulated ones.

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