Abstract Submitted
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Vortex-sheet modeling of hydrodynamic instabilities on oblique interfaces in the HED regime[1] SAMUEL PELLONE, University of Michigan, CARLOS DI STEFANO, ALEXANDER RASMUS, Los Alamos National Laboratory, CAROLYN KURANZ, ERIC JOHNSEN, University of Michigan, LOS ALAMOS NATIONAL LABORATORY COLLABORATION — Fluid mixing plays an important role in high energy-density systems such as inertial confinement fusion and may be traced back to the growth of hydrodynamic instabilities due to perturbed interfaces separating different species undergoing shear or accelerations. Hydrodynamic instabilities can be understood from the interfacial vorticity generation and its subsequent evolution. Our work is based on previous experimental measurements of the growth of perturbations that are tilted by a certain angle with respect to an incoming shock wave. While previous vorticity-based models investigated the early-time linear regime of perturbation growth on tilted interfaces, where the effect of the Atwood number can often be neglected, we demonstrate the importance of the Atwood number contributions to the evolution of the interface in the transition from early- to late-time. In particular we show that the interface morphology is significantly affected by Atwood-number effects from the asymmetrical growth of the bubble and spike. We use the vortex-sheet paradigm to describe RT growth after the arrival of a rarefaction wave from laser turn-off in the experiments. The low computational cost of the model enables us to show that the non-linear regime occurs sooner for larger tilt angles.

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