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Bubble Acceleration in the Ablative Rayleigh–Taylor Instability
J. SANZ, R. BETTI, Fusion Science Center, Laboratory for Laser Energetics, U. of Rochester — The deeply nonlinear evolution of the single-mode Rayleigh–Taylor instability (RTI) at the ablation front of an accelerated target is investigated in the parameter range typical of direct-drive inertial confinement fusion implosions. A new phase of the nonlinear bubble evolution is discovered. After the linear growth phase and a short constant-velocity phase, it is found that the bubble is accelerated to velocities well above the classical value. This acceleration is driven by the vorticity accumulation inside the bubble resulting from the mass ablation and vorticity convection off the ablation front. While the ablative growth rates are slower than their classical values in the linear regime, the ablative RTI grows faster than the classical RTI in the deeply nonlinear regime for DT ablators. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement Nos. DE-FC02-04ER54789 and DE-FC52-92SF19460.

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