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Bubble Acceleration in the Three-Dimensional Ablative Rayleigh–Taylor Instability
R. YAN, R. BETTI, Laboratory for Laser Energetics and Fusion Science Center, U. of Rochester — In inertial confinement fusion, the growth of the Rayleigh–Taylor instability (RTI) at the ablation front causes a severe degradation in implosion performance by reducing the hot-spot pressure, temperature, and density. During the linear phase, the RTI growth is mitigated by mass ablation. However, during the nonlinear phase, mass ablation can be destabilizing. The ablative RTI is investigated in 3-D geometry using our newly developed code *ART3D*. It is found that mass ablation causes an accumulation of vorticity inside the bubble in the nonlinear regime. The vorticity-acceleration mechanism drives the bubble velocity faster than in the classical RTI for a 2-D geometry.[1] *ART3D* simulations indicate that the 3-D bubble velocity increases monotonically to values faster than in 2-D without reaching an asymptotic speed in deuterium and tritium shells. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944 and the Office of Fusion Energy Sciences Number DE-FG02-04ER54786.

[1]R. Betti and J. Sanz, Phys. Rev. Lett. **97**, 205002 (2006).

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