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**Nonlinear Excitation of the Ablative Rayleigh–Taylor Instability for All Wave Numbers** H. ZHANG, R. BETTI, V. GOPALASWAMY, H. ALUIE, Laboratory for Laser Energetics, U. of Rochester, R. YAN, Dept. of Modern Mechanics, U. of Science and Technology of China — Small-scale modes of the ablative Rayleigh–Taylor instability (ARTI) are often neglected because they are linearly stable when their wavelength is shorter than a linear cutoff. Using 2-D and 3-D numerical simulations, it is shown that linearly stable modes of any wavelength can be destabilized. This instability regime requires finite amplitude initial perturbations. Compared to 2-D, linearly stable ARTI modes are more easily destabilized in 3-D and the penetrating bubbles have a higher density because of enhanced vorticity. It is shown that for conditions found in laser fusion targets, short-wavelength ARTI modes are more efficient at driving mixing of ablated material throughout the target since the nonlinear bubble density increases with the wave number and small-scale bubbles carry a larger mass flux of mixed material. This work was supported by the Office of Fusion Energy Sciences Nos. DE-FG02-04ER54789, DE-SC0014318, the Department of Energy National Nuclear Security Administration under Award No. DE-NA0001944, the Ministerio de Ciencia e Innovacion of Spain (Grant No. ENE2011-28489), and the NANL LDRD program through project number 20150568ER.

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