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Non-linear evolution of localized perturbations in the deceleration-phase of an imploding ICF capsule STEFANO ATZENI, ANGELO SCHIAVI, Dipartimento di Energetica, Universita' di Roma "La Sapienza", Roma, Italy — The Rayleigh-Taylor instability at the interface layer between the hot spot and the dense fuel of an ICF shell can cause hot spot distortion resulting in ignition failure. The linear growth of this instability is reduced by the ablation of the dense shell due to electron conductivity and fusion alpha-particle transport. Here, we present high resolution numerical simulations of the evolution of localized mass perturbations well beyond the linear regime. We track the actual three-dimensional development of the instability by using a 2D code and initializing the perturbations in a narrow cone around the symmetry axis. The effectiveness of ablative stabilization is addressed by switching on and off the energy transport mechanisms in the code. It is found that the growth of the spikes is greatly reduced by the ablation from the hot spot. The effect is larger the smaller the perturbation wavelength. This stabilization mechanism is instead not very effective in limiting the amplification of the bubbles. We also compare the growth of 2D and 3D perturbations, both in the ablative and in the classical case.

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