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Simulation of instability growth on ICF capsule ablators NICOLAS NIASSE, JEREMY CHITTENDEN, Imperial Coll — It is believed that the ablation-front instabilities are mainly responsible for the hot-spot mix that impacts the performance of ICF capsules. Understanding the formation of these instabilities is therefore a first step towards a better control of the implosion dynamics and the optimization of the fusion yield. Using the Chimera code currently in development at Imperial College, we have performed several spherical wedge simulations of the low and high adiabat ablation phase pre-imposing different single-mode 2D and 3D perturbations on the capsule surface. Synthetic Sc, Fe and V X-ray backlighter images are generated by the Spk code and used to measure the growth of modes 30-160 with initial amplitude $\leq$ 3.4 μm PTV. The growth of imposed 2D perturbations is assessed for both low-foot and high-foot radiation pulse shapes on the National Ignition Facility. Results showing the merger of spike and bubble structures in multi-mode perturbations in both 2D and 3D simulations are explored and preliminary assessments of the difference between 2D and 3D non-linear behaviour is discussed. The sensitivity of shock timing to NLTE changes in opacity is also assessed.

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