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Re-examining the effect of low and intermediate mode number perturbations on Ignition Metrics Scaling Laws[1] ELAD MALKA, Nuclear Research Center-Negev, Israel, DOV SHVARTS, University of Michigan, Nuclear Research Center-Negev, Israel — We re-examine the way 2/3D effects on scaling laws for ignition metrics, such as the generalized Lawson Criterion (GLC) and the Ignition Threshold Factor (ITF). These scaling laws were derived for 1D symmetrical case and 2/3D perturbations [Hann et al. PoP 2010; Lindl et al., PoP 2014; Betti et al., PoP 2010]. The main cause for the difference between the 1D and the 2/3D scaling laws in those works, is heat conduction losses from the hot-spot bubbles to the cold shell [Kishony and Shvarts, PoP 2001]. This "dry out" of the bubbles is the dominant mechanism for intermediate mode number perturbations ($6<l<40$) and can be described as an effective 1D implosion. However, for low mode number perturbations ($l\leq 6$), heat conduction loss does not fully "dry out" the bubbles and an additional mechanism- residual kinetic energy (RKE) [Kirtcher PoP 2014; Gu et al., PoP 2014] does reduce the hydrodynamic coupling efficiency from the imploding cold shell to the hot spot. These two effects do not have an effective 1D analogue and therefore needs a more complicated model. A consistent extension of the ignition metrics for $l\leq 6$, accounting for both energy loss mechanisms, will be presented and compared with previous models and results.

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