Abstract Submitted
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Optimal combination of ion-loss and turbulent mixing models in numerical simulations of ICF capsule implosions[1] N.M. HOFFMAN, K. MOLVIG, B.J. ALBRIGHT, E.M. NELSON, E.S. DODD, LANL, G.B. ZIMMERMAN, LLNL — In a diverse set of direct-drive capsule implosions at OMEGA [T. R. Boehly et al., Opt. Commun. 133, 495 (1997)], the three observable quantities DT neutron yield, average burn-rate-weighted ion temperature, and time of peak neutron production ("bang time") can be well explained by numerical simulations that include models for two particular yield-reducing processes: (1) the preferential escape of fast ions ("Knudsen-layer reactivity") during the hottest part of the compression around stagnation and (2) turbulent mixing [K. Molvig et al., submitted to PRL]. We report here an attempt to determine generally and quantitatively the roles of these two processes in such implosions, by seeking a global optimum in the explanatory capability of the simulations as the controlling length scales of the two processes are varied. Such a study cannot be taken as proof of the correctness of the models or of the relative importance of the processes, owing to the integrated and approximate nature of simulation codes, but can lead to improved predictive capability with reduced uncertainty.

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Nelson Hoffman
LANL

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