Mixing in thick-walled and pulse-shaped directly driven ICF capsule implosions.

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The mult-fluid interpenetration mix model of Scannapieco and Cheng (Phys. Lett A, 2002) has been applied to X-ray driven inertial confinement fusion capsules (ICF) (Wilson \textit{et al.}, Phys. Plasmas, 2003), to double shell ICF capsules (Wilson \textit{et al.} 2004a), and to directly driven capsules with a 20 \( \mu \)m wall thickness using a 1ns square laser pulse with both symmetric (Wilson \textit{et al.}, 2004b) and asymmetric illumination (Christensen \textit{et al.}, 2004). In general it was found that using atomic mixing the single mixing parameter could fit almost all the data with a value of 0.05 \( \pm \)0.02. In this paper the model is tested against data from a wider range of directly driven capsules with wall thicknesses up to 40 \( \mu \)m, and with square, moderate (PS26) and extreme (low adiabat) pulse shapes (Marshall \textit{et al.}, 2000a,b, 2004). In addition to yield, burn temperature, and burn history, model simulations are post-processed to compare with X-ray image profiles, secondary neutron yields, and shell rho-r measurements.

References

Wilson, D. C. \textit{et al.} 2004a, Mixing in double shell capsules, proceedings of IFSA 2003, to be published by the American Nuclear Society.