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Statistical Relations for Yield Degradation in Inertial Confinement Fusion K.M. WOO, R. BETTI, D. PATEL, V. GOPALASWAMY, Laboratory for Laser Energetics, U. of Rochester — In inertial confinement fusion (ICF), the yield-over-clean (YOC) is a quantity commonly used to assess the performance of an implosion with respect to the degradation caused by asymmetries. The YOC also determines the Lawson parameter[1] used to identify the onset of ignition and the level of alpha heating in ICF implosions. In this work, we show that the YOC is a unique function of the residual kinetic energy in the compressed shell (with respect to the 1-D case) regardless of the asymmetry spectrum. This result is derived using a simple model of the deceleration phase as well as through an extensive set of 3-D radiation–hydrodynamics simulations using the code *DEC3D*. The latter has been recently upgraded to include a 3-D spherical moving mesh, the *HYPRE* solver for 3-D radiation transport and piecewise-parabolic method for robust shock-capturing hydrodynamic simulations. *DEC3D* is used to build a synthetic single-mode database to study the behavior of yield degradation caused by Rayleigh–Taylor instabilities in the deceleration phase. The relation between YOC and residual kinetic energy is compared with the result in an adiabatic implosion model. The statistical expression of YOC is also applied to the ignition criterion in the presence of multidimensional nonuniformities. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

[1]P. Y. Chang *et al.*, Phys. Rev. Lett. **104**, 135002 (2010).

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