Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

A 2D and 3D Code Comparison of Turbulent Mixing in Spherical Implosions[1] MARKUS FLAIG, BEN THORNBER, University of Sydney (Australia), BRIAN GRIEVES, Atomic Weapons Establishment (UK), DAVID YOUNGS, Strathclyde University (UK), ROBIN WILLIAMS, Atomic Weapons Establishment (UK), DAN CLARK, CHRIS WEBER, Lawrence Livermore National Laboratory (US) — Turbulent mixing due to Richtmyer-Meshkov and Rayleigh-Taylor instabilities has proven to be a major obstacle on the way to achieving ignition in inertial confinement fusion (ICF) implosions. Numerical simulations are an important tool for understanding the mixing process, however, the results of such simulations depend on the choice of grid geometry and the numerical scheme used. In order to clarify this issue, we compare the simulation codes FLASH, TURMOIL, HYDRA, MIRANDA and FLAMENCO for the problem of the growth of single- and multi-mode perturbations on the inner interface of a dense imploding shell. We consider two setups: A single-shock setup with a convergence ratio of ∼4, as well as a higher convergence multi-shock setup that mimics a typical NIF mixcap experiment. We employ both singlemode and ICF-like broadband perturbations. We find good agreement between all codes concerning the evolution of the mix layer width, however, the are differences in the small scale mixing. We also develop a Bell-Plesset model that is able to predict the mix layer width and find excellent agreement with the simulation results.

[1]This work was supported by resources provided by the Pawsey Supercomputing Centre with funding from the Australian Government.

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Date submitted: 14 Jul 2016 Electronic form version 1.4