Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Adaptive Mesh Refinement in Calculations of the Rayleigh-Taylor Instability DAVID FYFE, GOPAL PATNAIL, DOUG SCHWER, C. RICHARD DEVORE, Naval Research Laboratory, KEVIN OLSON, Drexel University — This paper describes our initial efforts to use of the package PARAMESH to create an Adaptive Mesh Refinement (AMR) version of NRL's FASTRAD3D code. AMR allows dynamic mesh refinement near unstable interfaces without necessitating refinement globally. In spherical coordinates, AMR alleviates the numerical stability requirements associated with the origin. PARAMESH was designed to create an MPI-based AMR code from a block structured serial code such as FASTRAD3D. FASTRAD3D is a compressible hydrodynamics code containing the physical effects relevant for the simulation of high-temperature plasmas including inertial confinement fusion (ICF) Rayleigh-Taylor unstable direct drive laser targets. Here we present some initial calculations of the Rayleigh-Taylor instability in Cartesian coordinates. Our first calculations will be gravitationally induced. Our second set of calculations will involve laser driven planar targets. For the moment we ignore radiation effects. We will include classical flux-limited Spitzer thermal conduction and inverse bremmstrahlung laser energy absorption in the latter calculations.

David Fyfe
Naval Research Laboratory

Date submitted: 19 Jul 2008 Electronic form version 1.4