Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Modeling of Multi-Interface, Diverging, Hydrodynamic Experiments for the National Ignition Facility[1] M.J. GROSSKOPF, R.P. DRAKE, C.C. KURANZ, University of Michigan, A.R. MILES, J.F. HANSEN, Lawrence Livermore National Laboratory, T. PLEWA, Florida State University, N. HEARN, University of Chicago, D. ARNETT, University of Arizona, J.C. WHEELER, University of Texas — The National Ignition Facility (NIF) will soon provide experiments with far more than ten times the energy than has been previously available on laser facilities. In the context of supernova-relevant hydrodynamics, this will enable experiments in which hydrodynamic instabilities develop from multiple, coupled interfaces in a diverging explosion. This presentation discusses the design of such blast-wave-driven explosions in which the relative masses of the layers are scaled to those within the star. It reports scaling simulations with CALE to model the global dynamics of such an experiment. The simulations probed the instability growth and multi-interface interactions in mass-scaled systems to assess the diagnosability and experimental value of different designs using a variety of materials. Initial conditions in the simulation near the irradiated surface have been shown to lead to spurious structure on the shock; therefore, a series of simulations to understand this structure is also discussed.

[1]This research was sponsored by LLNL through contract LLNL B56128 and by the NNSA through DOE Research Grant DE-FG52-04NA00064.

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Date submitted: 21 Jul 2008 Electronic form version 1.4