Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Diagnosing the Extent of Mix in Omega Capsules PAUL BRADLEY, JAMES COBBLE, IAN TREGILLIS, TOM MURPHY, MARK SCHMITT, SCOTT HSU, RAHUL SHAH, NATALIA VINYARD, KIM OBREY, JAMES FINCKE, STEVE BATHA, Los Alamos National Laboratory — We have investigated the role of turbulent mix in directly driven capsule implosions by modeling the February 2012 Defect Induced Mix Experiments on Omega with a two-dimensional Eulerian radiation-hydrodynamic code. The capsules had an outer diameter of 870 microns, were composed of 19 micron thick CH plastic ablators, and filled with 5 atm of deuterium gas. The capsules were imploded using 23 kJ laser energy in 1 ns flat-top pulses using 60 beams in symmetric drive. We use neutron yield and x-ray spectra from a Ti-doped layer buried at 0, 1.4, and 3.0 microns as mix diagnostics. The data show an increase in neutron yield and decrease in Ti line emission as the Ti-doped layer is buried at increasing depths away from the shell-gas interface. The Eulerian code results qualitatively mimic the neutron yield trend. We will also show how the simulated spectral emission compares to the data and discuss the implications for the extent of mix in ICF capsules. Work performed by Los Alamos National Laboratory under contract DE-AC52-06NA25396 for the National Nuclear Security Administration of the U.S. Department of Energy.

Paul Bradley
Los Alamos National Laboratory

Date submitted: 12 Jul 2012 Electronic form version 1.4