Abstract Submitted
for the FWS14 Meeting of
The American Physical Society

Spatial distribution of Ti-tracer in OMEGA implosions T. JOSHI, R. MANCINI, D. MAYES, University of Nevada, Reno, T. NAGAYAMA, Sandia National Laboratories, R. TOMMASINI, Lawrence Livermore National Laboratory, J. DELETTREZ, S. REGAN, Laboratory for Laser Energetics, University of Rochester, S. HSU, J. COBBLE, J. BAUMGAERTEL, P. BRADLEY, Los Alamos National Laboratory — We discuss the observation and analysis of implosion core spectrally-resolved image data from Ti-doped, deuterium-filled OMEGA direct-drive implosions. The targets were spherical plastic shells of varying thicknesses and gas pressures with a thin Ti-doped tracer layer at the fuel-shell interface. The spectral features from the tracer are primarily observed at the collapse of the implosion and recorded with three identical gated, multi-monochromatic x-ray imager (MMI) instruments fielded along quasi-orthogonal lines-of-sight. The gated data show simultaneous emission and absorption features associated with Ti K-shell line transitions. The spectrally-resolved images recorded with MMI were processed to obtain narrow-band images[1] and spatially-resolved spectra characteristics of annular regions on the image[2] Detailed spectroscopic analysis of the spatially-resolved line spectra yields electron temperature and density of the plasma in the core. An Abel inversion of the image's intensity profiles and a complementary analysis method of the spatially-resolved Ti x-ray lines reveal the spatial distribution of the Ti in the core, and provide information on the symmetry and hydrodynamic stability of the implosion.

[1]T. Nagayama, et. al, J. App. Phys. 109, 093303, (2011).
[2]T. Nagayama, et al, Phys. Plasmas 19, 082705, (2012)

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Date submitted: 09 Oct 2014 Electronic form version 1.4