

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Analysis of simultaneous emission and absorption Ti spectral features observed with the MMI instrument in OMEGA implosions¹ TIRTHA JOSHI, HEATHER JOHNS, DANIEL MAYES, TUNAY DURMAZ, ROBERTO MANCINI, University of Nevada, Reno, RICCARDO TOMMASINI, Lawrence Livermore National laboratory, JACK DELETTREZ, SEAN REGAN, Laboratory for Laser Energetics, TAISUKE NAGAYAMA, Sandia National Laboratories — We discuss the observation and analysis of spectra from titanium-doped OMEGA direct-drive implosions. The targets were spherical plastic shells with a submicron Ti-doped tracer-layer initially located on the inner surface of the shell and filled with deuterium gas. The x-ray signal from the titanium tracer is observed at the collapse of the implosion and recorded with a streaked spectrometer (SSCA) and three identical gated, multi-monochromatic x-ray imager (MMI) instruments that view the implosion along three quasi-orthogonal lines-of-sight. Both streaked and MMI data show simultaneous emission and absorption features due to titanium K-shell line transitions but only the MMI data permits to diagnose the tracer's spatial properties in the core. To this end, MMI data were processed to obtain narrow-band images and spatially-resolved spectra.² Abel inversion of angle-averaged image intensity profiles reveal the spatial distribution of the titanium tracer in the core, while detailed analysis of the space-resolved spectra yields temperature, density and mixing distributions. Results are presented for several shell thicknesses and implosions driven with different laser pulse shapes.

¹Work supported by DOE/NLUF Grant DE-NA0000859, and LLNL.

²T. Nagayama et al., J. App. Phys.109, 093303 (2011).

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Date submitted: 24 Jul 2012

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