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Spectroscopic analysis of temperature, density and mixing spatial profiles in OMEGA implosion cores L.A. WELSER, R.C. MANCINI, University of Nevada, Reno, R. TOMMASINI, J.A. KOCH, Lawrence Livermore National Laboratory, J. DELETTREZ, S.P. REGAN, V. SMALYUK, Laboratory for Laser Energetics — The spectroscopic analysis of simultaneous X-ray narrow-band images and X-ray line spectra recorded in argon-doped deuterium-filled ICF implosion experiments can yield information about the temperature, density and mixing spatial profiles in the compressed core. We discuss analysis results from indirect- and direct-drive implosion experiments at OMEGA where X-ray images and line spectra were simultaneously recorded. The images were recorded with several, identical multi-monochromatic imaging instruments that recorded data along quasi-orthogonal lines of sight. The analysis method considers data based on the argon Lyα, Heβ, and Lyβ spectral features and their associated Li- and He-like satellite structure. Extracted profiles are compared with gradients from hydrodynamic simulations of the implosion, and results from a passive mixing model. This work is supported by DOE-NLUF Grant DE-FG03-03SF22696, and LLNL.

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