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Spectroscopic analysis of compressed-shell conditions in OMEGA direct-drive implosions using Ti line absorption H.M. HILL, R.C. MANCINI, Physics Department, University of Nevada, Reno, V.A. SMALYUK, J. DELETREZ, S.P. REGAN, B. YAAKOBI, Laboratory for Laser Energetics, University of Rochester — The determination of temperature and density in the compressed shell of ICF implosions is important for diagnosing the shell at the collapse of the implosion. To this end, we have developed a Ti spectral model to analyze K-shell line absorption spectra produced by Ti-doped tracer layers embedded in the shell that are backlit by continuum radiation emitted in the core. Line absorption is observed in Ti ions from F- to Be-like Ti. Detailed modeling and analysis of these absorption line spectra can yield Ti ionization state, temperature, density, and areal-density in the tracer layer. The model includes collisional-radiative atomic kinetics and detailed Stark-broadened line shapes, as well as the effect of self-emission of the lines. Analysis results including and not including the self-emission effect are presented.

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