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Simulation and Optimization of Backlit Images of Cryogenic Implosions on OMEGA R. EPSTEIN, V.A. SMALYUK, W. THEOBALD, F.J. MARSHALL, J.A. DELETTREZ, V.N. GONCHAROV, S.X. HU, P.W. MCKENTY, P.B. RADHA, Laboratory for Laser Energetics, U. of Rochester — Cryogenic implosions on OMEGA are to be imaged using short-pulse, K-shell emission-line backlighters driven by the OMEGA EP laser. Backlighter composition is chosen so that the emission-line energies occur where the opacity profiles of the imploded cores will provide a measurable range of optical depth near the time of peak compression. At the same time, the specific intensity of the backlight must be optimized to overcome the core self-emission. The OMEGA EP short-pulse capability provides a backlight exposure time short enough to discern the overall shell integrity and convergence, as well as the shell structure resulting from the low-order hydrodynamic effects of drive nonuniformity caused by target offset and ice-layer nonuniformity. Simulation results are compared with backlight spectra and backlit implosion images obtained from the first experiments of this kind on the OMEGA EP system. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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