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Pulse Designs Varying Hot-Electron Production for Direct-Drive Inertial Confinement Fusion Implosions OMEGA Utilizing the SG5-650 Phase Plates[1] DUC CAO, DHRUMIR PATEL, MICHAEL ROSENBERG, WOLFGANG THEOBALD, CLIFF THOMAS, ALISON CHRISTOPHERSON, CHRISTIAN STOECKL, SEAN REGAN, IGOR IGUMENSHCHEV, RICCARDO BETTI, RADHA BAHUKUTUMBI, VALERI GONCHAROV, Laboratory for Laser Energetics, U. of Rochester — New "SG5-650" phase plates ($R_{95} = 325$ μm) to complement the "SG5-850's" ($R_{95} = 425$ μm) have been fielded on OMEGA. The SG5-650 phase plates allow for the reduction of cross-beam energy transfer (CBET) effects by decreasing the R_{beam}/R_{target}. However, preheating from increased hot-electron production can occur as the net overlapped intensity increases. To experimentally evaluate this trade-off's impact on cryogenic implosion performance, pulse shapes were designed that gave approximately equal 1-D performance but the main drive power history was adjusted to provide different quarter-critical intensity levels and therefore different levels of hot-electron production. Hot-electron production levels were experimentally verified by using the hard x-ray diagnostic when shooting the pulses on warm plastic targets. In a future experiment utilizing the SG5-650 phase plates, an intensity scan will be used to study the effect of preheating on a 0.8x hydro scale of the best-performing implosion that utilized the SG5-850 phase plates.

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