Abstract Submitted
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On the Advantages of Fast Ignition with Ultra-High Intensity Lasers[1] J. TONGE, J. MAY, W.B. MORI, UCLA, F. FIUZA, R.A. FONSECA, L.O. SILVA, Instituto Superior Técnico, C. REN, University of Rochester — One of the critical design constraints for fast ignition targets is the need to have a small cross section for the hot spot at the target core while delivering enough power to the hot spot with hot electrons of the proper energy range, $\sim$ 1-3 MeV, to couple to the core. We use two-dimensional Particle-In-Cell simulations of isolated targets to investigate the feasibility of using 1μm ignition lasers with ultra-high intensities, up to 8x10^{20}W/cm^2, for fast ignition. The self-consistent absorption of energy from an ultra-high intensity laser by overdense plasma and the subsequent energy transport through the collisionless overdense plasma, $\nu_{ei} < \omega_p$, of a 50μm radius isolated target, is explored in detail. At these ultra-high intensities, we find that most of the energy transport is in a hot bulk and not in the super-hot tail of the electron distribution. Electrons in a relatively low energy range, below 3MeV, transport 90% of the heat flux through 50μm of 100n_c plasma to the target core.

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