Abstract Submitted
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Particle-in-cell Simulations on Laser-Plasma Interactions in Shock Ignition[1] R. YAN, C. REN, J. LI, A.V. MAXIMOV, W. THEOBALD, K.S. ANDERSON, R. BETTI, University of Rochester, W.B. MORI, F.S. TSUNG, UCLA — We present a series of 1D and 2D particle-in-cell (PIC) simulations using the full PIC code *OSIRIS* for the shock ignition experiments carried out on the OMEGA facility. The laser intensity is $I = 2 \times 10^{15}/\text{cm}^2$. The density profile used in PIC simulations is provided by the hydro simulation and has the scale length $L = 17\mu$ m at the quarter-critical-density surface. Physical electron-ion collisions are included in our simulations with a benchmarked collision package in *OSIRIS*. The 1D simulation covering a larger density range (0.02-0.4n_{cr}) shows that SRS occurs mostly near the quarter-critical-density surface. The reflected lights due to SRS and SBS are measured in the 1D simulation. The 2D simulations are performed near the quarter-critical-density surface to include the two-plasmon decay (TPD). The 2D simulations show a bursting pattern of plasma waves near the quarter-critical-density surface. TPD modes with large $k_\perp$'s are found dominant in 2D simulations, which generate much more hot electrons than the 1D simulation. The forward electron flux (>50keV) is 10% of the incident laser flux in the 2D simulation by 12ps, which is in good agreement with the experimental measurements.

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