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Laser plasma instabilities and hot electron generation from multi-kilojoule shock ignition relevant high-intensity IR and UV lasers[1] S. ZHANG, J. LI, F. N. BEG, Univ of California - San Diego, C. M. KRAULAND, S. MULLER, N. ALEXANDER, General Atomics, C. REN, W. THEOBALD, D. TURNBULL, D. HABERBERGER, R. BETTI, E. M. CAMPBELL, LLE, Univ of Rochester, D. BATANI, J. SANTOS, P. NICOLAI, CELIA, Univ of Bordeaux, M. S. WEI, General Atomics — As an alternative ignition scheme, shock ignition uses a strong convergent shock driven by a high-intensity laser (~10^{16} W/cm^2) on a pre-compressed fuel to achieve ignition. Moderately energetic hot electrons (<100 keV) generated from the laser plasma instabilities (LPI) can strengthen the ignition shock by depositing energy at the compressed outer shell increasing ablation pressure. In our previous experiments on OMEGA-EP, 90 keV collimated hot electrons were observed from a 100 ps, 2.5 kJ IR laser interacting with SI long scale length hot plasmas (L_n ~200 − 500 m, T_e >1 keV, produced by low-intensity UV beams). To further characterize hot electron generation and investigate the related LPIs, we have extended the experiments with high-intensity, multi-kJ IR and UV lasers (both at normal incidence, up to 210^{16} W/cm^2). Two IR beams in co-propagation extend the pulse duration to 200 ps, closer to required ignition pulse duration. The scattered light is spectrally resolved to identify the LPI. Angular filter refractometer images from 4ω probe show the details of the laser propagation and interaction. The divergence, energy, and temperature of the hot electrons are diagnosed by measuring the bremsstrahlung and Cu Kα emission. Details of the experimental results will be presented.

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