Abstract Submitted
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Enhanced electron acceleration from intense multi-picosecond laser pulses interacting with focusing cone targets[1] G. COCHRAN, S. WILKS, A. KEMP, Lawrence Livermore Natl Lab, J. KIM, University of California San Diego, S. KERR, J. WILLIAMS, D. MARISCAL, A. LINK, H. CHEN, A. MACPHEE, A. MACKINNON, T. MA, Lawrence Livermore Natl Lab — NIF's Advanced Radiography Capability (ARC) laser has been used to create a high flux short-pulse driven proton source via target normal sheath acceleration (TNSA). A maximum proton energy of five times over that predicted by conventional scalings has been observed at quasirelativistic laser intensities ($\sim 10^{18}$ W/cm^2), indicative of super-ponderomotive electron acceleration. Laser coupling into relativistic electrons is further enhanced by the use of a focusing compound parabolic concentrator (CPC) cone on the target front surface, which serves to geometrically focus incident rays and confine the expanding plasma during the pulse interaction. Correspondingly, electron spectra observed from targets with a CPC cone show increased slope temperatures over flat targets. To investigate the CPC cone's effect on the laser plasma interaction, 2D PIC simulations are presented studying the absorption of the incident laser on the cone walls. PIC simulations of the focused laser interacting with the confined plasma at the cone tip and the resultant hot electron generation will also be discussed.

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