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Impact of Pre-Plasma on Fast Electron Generation and Transport from Short Pulse High Intensity Lasers J. PEEBLES, C. MCGUFFEY, C. KRAULAND, L.C. JARROTT, A. SOROKOVIKOVA, B. QIAO, S. KRASHENINNIKOV, F.N. BEG, Univ of California - San Diego, M.S. WEI, General Atomics, J. PARK, A. LINK, H. CHEN, H.S. MCLEAN, Lawrence Livermore National Laboratory, C. WAGNER, V. MINELLO, E. MCCARY, A. MEADOWS, M. SPINKS, E. GAUL, G. DYER, B.M. HEGELICH, M. MARTINEZ, M. DONOVAN, T. DITMIRE, University of Texas - Austin — We present the results and analysis from recent short pulse laser matter experiments using the Texas Petawatt Laser to study the impact of pre-plasma on fast electron generation and transport. The experimental setup consisted of 3 separate beam elements: a main, high intensity, short pulse beam for the interaction, a secondary pulse of equal intensity interacting with a separate thin foil target to generate protons for side-on proton imaging and a third, low intensity, wider beam to generate a varied scale length pre-plasma. The main target consisted of a multilayer planar Al foil with a buried Cu fluor layer. The electron beam was characterized with multiple diagnostics, including several bremsstrahlung spectrometers, magnetic electron spectrometers and Cu-Kα imaging. The protons from the secondary target were used to image the fields on the front of the target in the region of laser plasma interaction. Features seen in the interaction region by these protons will be presented along with characteristics of the generated electron beam. This work performed under the auspices of the US DOE under contracts DE-FOA-0000583 (FES, NNSA).

Jonathan Peebles
Univ of California - San Diego

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