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Effect of Laser Pulse Length on Fast Electron Generation and Transport[1] M.S. WEI, J. JAQUEZ, R.B. STEPHENS, General Atomics, A. SOROKOVIKOVA, R. MISHRA, L.C. JARROTT, H. SAWADA, F.N. BEG, University of California San Diego, W. THEOBALD, C. MILEHAM, Laboratory for Laser Energetics, H. CHEN, P. PATEL, H. MCLEAN, Lawrence Livermore National Laboratory, Y. SENTOKU, University of Nevada, Reno — Experiments have been performed to determine the pulse length effects on fast electron generation using the OMEGA EP laser with multilayer foil targets consisting of an Al substrate with a Cu tracer layer buried $\sim$100 μm beneath. Pulse lengths of 0.7, 3 and 10 ps were used with a constant intensity of $I_{peak} \sim 10^{19}$ W/cm^2. Fast electrons were measured via Cu K-shell and bremsstrahlung radiation. We observed electron beams evolving from a single beam in sub-ps interaction into multiple widely spread filaments ($\sim$100 μm between each filament) in the 10 ps case. Electron beam size decreased with increasing pulse length suggesting collimation by strong resistive B-fields that grow with time inside the solid target. Bremsstrahlung data suggesting an increase in electron temperature and conversion efficiency in the 10 ps case, was possibly due to presence of a longer preplasma. Experiments are being modeled with 2D collisional PIC simulations and results will be discussed.

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