Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Study of Pre-Plasma Effects on Fast Electron Generation and Transport Using the 1.5kJ, 10ps OMEGA EP Laser[1] J. PEEBLES, C. MCGUFFEY, L.C. JARROTT, A. SOROKOVIKOVA, S. KRASHENINNIKOV, F.N. BEG, UCSD, M.S. WEI, R.B. STEPHENS, GA, C. CHEN, H.S. MCLEAN, P.K. PATEL, LLNL, UCSD TEAM, GA TEAM, LLNL TEAM — The efficient coupling of high intensity laser energy to fast electrons and their subsequent transport is of great interest to fast ignition inertial confinement fusion. Recent 10-ps experiments performed on the OMEGA EP laser show significantly different dynamics of fast electrons depending on pre-pulse level [1]. Here we present the detailed analysis of bremsstrahlung data used to understand the fast electron energy deposition in the target. The fast electron transport is modeled with the Monte-Carlo code package ITS 3.0 and with the hybrid-PIC code Zuma, which includes particle induced fields. We show increase in electron temperature and conversion efficiency and decrease in divergence when pre-pulse is reduced. We also show that fields play a role in electron transport with 10-ps pulses.

[1] M.S. Wei, "Investigation of the Dependence of Fast-Electron Generation and Transport on Laser Pulse-Length and Preplasma," SSAP Symposium (2013)

[1]This work performed under the auspices of the US DOE under contracts DE-NA0000870 (NLUF), DE-NA0001858.

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Date submitted: 11 Jul 2013 Electronic form version 1.4