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**Study of Pre-Plasma Effects on Fast Electron Generation and Transport using the Split Pulse Titan Laser** J. PEEBLES, C.M. KRAULAND, C. MCGUFFEY, A. SOROKOVIKOVA, R. HUA, University of California, San Diego, M.S. WEI, General Atomics, S. KERR, C. CURRY, University of Alberta, H. SIO, Lawrence Livermore National Laboratory, P. FORESTIER-COLLEONI, J. SANTOS, Université de Bordeaux, H.S. MCLEAN, Lawrence Livermore National Laboratory, S. KRASHENINNIKOV, F.N. BEG, University of California, San Diego
— Relativistic laser plasma interactions (LPI) could facilitate interesting and useful applications, such as table top particle acceleration and high energy K-alpha and gamma ray sources. In recent experiments it has been shown that the presence of an underdense, pre-formed plasma at the target surface has a significant heating effect. PIC simulations have shown that an electrostatic potential well forms on the target surface in this pre-plasma, which traps electrons and allows them to be excited to very high energy. Here we present results from an experiment conducted on the high intensity Titan laser at the Jupiter Laser Facility to further examine the role of pre-plasma in electron heating. We utilized the split beam, short pulse capability of the Titan system to generate and diagnose an interaction via proton radiography. The region was altered with a controlled pre-plasma generated by a wide focus, long pulse beam with variable energy. These experiments show that in the presence of pre-plasma, a hotter secondary population of electrons was generated. This work performed under the auspices of the US DOE Office of Sciences Program under contracts DE-NA0001858

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