Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Fundamental Studies on the Use of Laser-Driven Proton Beams for Fast Ignition[1] C. MCGUFFEY, J. KIM, F. N. BEG, UCSD, M.S. WEI, General Atomics, S.N. CHEN, J. FUCHS, LULI, France, P.M. NILSON, W. THEOBALD, LLE, U Rochester, H. HABARA, K. TANAKA, U Osaka, T. YABUUCHI, UO/RIKEN, M.E. FOORD, P.K. PATEL, H. S. MCLEAN, LLNL, M. ROTH, TU Darmstadt, P. MCKENNA, U Strathclyde — A short-pulse-laser-driven intense proton beam remains a candidate for Fast Ignition heater due to its focusability and high current. However, the proton current density necessary for FI in practice has never been produced in the laboratory and there are many physics issues that should be addressed using current and near-term facilities. For example, the extraction of sufficient proton charge from the short-pulse laser target could be evaluated with the multi-kilojoule NIF ARC laser. Transport of the beam through matter, such as a cone tip, and deposition in the fuel must be considered carefully as it will isochorically heat any material it enters and produce a rapidly-evolving, warm dense matter state with uncertain transport and stopping properties. Here we share experimental measurements of the proton spectra after passing through metal cones and foils taken with the kilojoule-class, multi-picosecond OMEGA EP and LFEX lasers. We also present complementary PIC simulations of beam generation and transport to and in the foils. Upcoming experiments to further evaluate proton beam performance in proton FI will also be outlined.

[1]This work was supported by the DOE/NNSA NLUF program, Contract DE-NA0002034 and by the AFOSR under Contract FA9550-14-1-0346.

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Date submitted: 24 Jul 2015 Electronic form version 1.4