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Proton Conversion Efficiency Measurements Relevant to Fast Ignition T. BARTAL, F.N. BEG, S. CHAWLA, D. HIGGINSON, M.S. WEI, B. WESTOVER, T. YABUUCHI, UCSD, M. FOORD, D. HEY, M.H. KEY, S. LEPAPE, T. MA, A.J. MACKINNON, A.G. MACPHEE, P.K. PATEL, LLNL, K.U. AKLI, R.B. STEPHENS, General Atomics, C.D. CHEN, MIT, R.R. FREEMAN, E. KEMP, D. OFFERMANN, V. OVCHINNIKOV, L. VAN WOERKOM, OSU, Y. TSUI, Univ of Alberta — We report on recent experimental and modeling studies of proton conversion efficiencies at laser intensities ($10^{19} - 10^{20}$ W/cm^2) and pulselengths (0.5 to 5ps) relevant to the Proton Fast Ignition scheme. Experiments were performed on the Titan laser at LLNL using coated targets to investigate the effect of molecular composition on the proton beam flux. Erbium hydride targets provide a proton rich surface layer that minimizes depletion and improves conversion efficiency. The hybrid PIC code LSP (large-scale plasma) is used to self consistently model the processes of electron transport, field generation, and proton acceleration using realistic target parameters (i.e., density, spatial dimensions, and material composition) for these targets. LSP shows enhanced conversion efficiency with high-Z hydride targets due to the dependence of atomic mass on the partition of energy between ion species. *This work was performed under the auspices of the U.S. DOE by LLNL under contracts DEFG02-05ER54834, W-7405-Eng-48 No. DE-FC02-04ER54789 and DE-AC52-07NA27344.

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