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Manipulation of Laser-generated Proton Beam Energy Distribution for (p,n) Neutron Production D.P. HIGGINSON, UCSD, J.M. MCNANEY, D.C. SWIFT, LLNL, T. BARTAL, UCSD, H. CHEN, D.S. HEY, S. LE PAPE, A.J. MACKINNON, LLNL, N. NAKANII, UCSD, H. NAKAMURA, ILE, F.N. BEG, UCSD — Laser-accelerated proton beams have many applications including proton fast ignition, oncology, and neutron production. Neutrons can be created from (p,n) type reaction and in many elements this reaction is at relatively low proton energy (e.g. ^{7}Li(p,n)^{7}Be peaks at ∼0.5 barns at 2-6 MeV). Thus the ability to increase the low energy protons (i.e. decrease the temperature) while keeping the conversion efficiency constant will lead to higher neutron production. In this experiment, the Titan laser (4×10^{19} W/cm^2) was used to accelerate protons from 25 μm thick Cu foils. Laser pulse length (0.7 to 10 ps) and intensity were systematically varied to show a change in the proton energy distribution. These protons then struck various (p,n) converter materials to create neutrons. Experimental results will be discussed. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Drew Higginson
University of California San Diego

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