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Generating a TNSA Tritium Beam ARNOLD SCHWEMMLEIN, UDO SCHROEDER, University of Rochester, CHAD FORREST, WALTER SHMAYDA, SEAN REGAN, CHRISTIAN STOECKL, Laboratory for Laser Energetics — In a novel experiment, a tritium beam was generated via the target normal sheath acceleration (TNSA) mechanism using tritiated titanium targets. Commercial 25-μm-thick Ti foil was cut into 500 500-μm^2 squares and exposed for 2 h to ˜1 atm. of 99.97% pure tritium gas at 200C. These targets were irradiated with an on-target intensity of 2 10^{18} W/cm^2 with the high-energy (1250-kJ), short-pulse (10-ps) OMEGA EP laser. Using a Thomson parabola velocity analyzer, the energy spectrum of the beam was found to exponentially decrease with a high-energy cutoff at ˜10 MeV. The total beam yield was determined to be ˜10^{12} tritons per pulse, comparable to other TNSA experiments with protons. In a second experiment, the tritium beam was directed onto a secondary deuterated-polyethylene target, which produced 10^8 neutrons from DT fusion nuclear reactions. Future applications of the tritium beam will be discussed. This work was supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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