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Laser Produced Neutrons and Isotope Activation at the Nevada Terawatt Facility[1] ZEPHYR MCCORMICK, OLEKSANDR CHALYY, TIMOTHY DARLING, BENJAMIN HAMMEL, JEREMY IRATCABAL, ERIK MCKEE, PIOTR WIEWOR, AARON COVINGTON, University of Nevada, Reno - Physics Department — Preliminary feasibility studies of pulsed-power based neutron and isotope production is underway at the Nevada Terawatt Facility. Both the Leopard Laser and Zebra Z-pinch systems have been utilized for neutron and isotope production studies. Preliminary experiments on Leopard have successfully produced $\sim 10^6$ neutrons per laser shot using 5 μm Au foil targets with 6 mm of LiF as a converter material. Alternate materials for both thin foil targets and converters are being investigated, along with modifications to laser targets, in an effort to improve neutron and isotope yields from NTF systems Preliminary experiments on Zebra Z-pinch have successfully produced radioactive isotopes that decay via the $\beta+$ pathway. It is believe that the parent isotopes originate in the shot hardware (Type 304 SST) used to support deuterium treated Pd wire loads. The radioactive decay of the daughter isotopes is measured using a standard nuclear coincidence detection technique. Follow on experiments are being designed to increase yields in laser and Z-pinch shots and further explore the mechanisms governing isotope production in Z-pinch shots.

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