

Abstract Submitted
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Directional, energetic neutron generation via high-intensity laser/plasma interactions at CUOS ANTHONY RAYMOND, ANATOLY MAKSIMCHUK, VLADIMIR CHVYKOV, FRANKLIN DOLLAR, LOUISE WILLINGALE, VICTOR YANOVSKY, FAN YU, CALVIN ZULICK, KARL KRUSHEL-NICK, CUOS, University of Michigan, Ann Arbor, MI 48109, JACK DAVIS, GEORGE PETROV, Plasma Physics Division, NRL, Washington, DC 20375 — Pitcher-catcher arrangements were used for directional, energetic neutron (n) production by the interaction of a beam of deuterons (d's) with catcher materials via $7\text{Li}(p,n)$, $d(d,n)$, and $7\text{Li}(d,n)$. The experiments were conducted at CUOS in Ann Arbor on the T-cubed and Hercules lasers. The utilized method of d-beam production involved depositing D₂O onto various cryogenically cooled thin foils, which at optimal parameters produced via high-intensity laser/plasma interactions d-yields substantially greater than that observed in previous experiments [1] involving instead a pitcher target of deuterated-polystyrene (CD) coated 13 μm Mylar, as the latter method was shown to be impaired by hydrocarbon contamination. We present results in which the more recent d-production technique is utilized, which for d-d reactions yielded on the T-cubed system n's up to nearly 2.5 MeV and on the Hercules system up to nearly 12 MeV, with forward yields on the order of 10E5 n/sr ($\sim 10\times$ higher than that previously achieved using either a CD coated pitcher or a bulk target of deuterated polyethylene). The Office of Naval Research provided funding for this work.

[1] L. Willingale et al., Phys. Plasmas 18, 083106 (2011).

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