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Neutron production from interactions of high-intensity ultra-short pulse laser with a planar deuterated polyethylene target[1] GEORGE PETROV, JACK DAVIS, Naval Research Laboratory — The neutron production from D(d,n)-^{3}He nuclear fusion reactions was studied with a two-dimensional electromagnetic particle-in-cell method combined with a three-dimensional Monte Carlo ion beam-target deposition model. The precursor for nuclear fusion reactions is high-energy (MeV) deuterons generated from a double-layer or uniform deuterated polyethylene target in the ultra-relativistic regime for peak laser intensities between 10^{19} and 10^{21} W/cm^2. The angular scattering of neutrons is found to be non-isotropic having a significant component in the forward (laser propagation) direction. A neutron yield of 10^5 - 10^7 neutrons per Joule laser energy is inferred from simulations.

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