Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Neutron Source from Laser Plasma Acceleration XUEJING JIAO, JOSEPH SHAW, EDDIE MCCARY, MIKE DOWNER, BJORN HEGELICH, Univ of Texas, Austin — Laser driven electron beams and ion beams were utilized to produce neutron sources via different mechanism. On the Texas Petawatt laser, deuterized plastic, gold and DLC foil targets of varying thickness were shot with $150J, 150fs$ laser pulses at a peak intensity of $2\times10^{21}W/cm^2$. Ions were accelerated by either target normal sheath acceleration or Breakout Afterburner acceleration. Neutrons were produced via the ^{9}Be(d,n) and ^{9}Be(p,n) reactions when accelerated ions impinged on a Beryllium converter as well as by deuteron breakup reactions. We observed 2×10^{10} neutron per shot in average, corresponding to $5\times10^{18}n/s$. The efficiencies for different targets are comparable. In another experiment, $38fs, 0.3J$ UT^3 laser pulse interacted with mixed gas target. Electrons with energy 40MeV were produced via laser wakefield acceleration. Neutron flux of 2×10^6 per shot was generated through bremsstrahlung and subsequent photoneutron reactions on a Copper converter.

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Date submitted: 14 Jul 2016 Electronic form version 1.4