Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Experimental Results on the First Short Pulse Laser Driven Neutron Source Powerful Enough For Applications In Radiography NEVZAT GULER, Los Alamos National Laboratory — Short pulse laser driven neutron source can be a compact and relatively cheap way to produce neutrons with energies in excess of 10 MeV. It is based on short pulse laser driven ions interacting with a converter material to produce neutrons via separation or breakup mechanisms. Previous research on the short pulse laser driven ion acceleration has mainly concentrated on surface acceleration mechanisms, which typically yield isotropic emission of neutrons from the converter. Recent experiments performed with a high contrast laser at TRIDENT facility at LANL demonstrated laser driven ion acceleration mechanism based on the concept of relativistic transparency. This produced an intense beam of high energy (up to 80 MeV) deuterons directed into a Be converter to produce a forward peaked neutron flux with a record yield, on the order of 4.4×10^9 n/sr. The produced neutron beam had a pulse duration less than a nanosecond and an energy range between 2-80 MeV, peaking around 12 MeV. The neutrons in the energy range of 2.5 to 15 MeV were selected by the gated neutron imager to radiograph tungsten blocks of different thicknesses. We will present the results from the two acceleration mechanisms and the first short pulse laser generated neutron radiograph.

Nevzat Guler
Los Alamos National Laboratory

Date submitted: 21 Sep 2012 Electronic form version 1.4