Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Measurement of Neutrons Produced by Beam-Target Interactions via a Coaxial Plasma Accelerator SCOTT CAUBLE, Stanford University, FLAVIO POEHLMANN, GREGORY RIEKER, Fluence, LLC, MARK CAPPELLI, Stanford University — This poster presents a method to measure neutron yield from a coaxial plasma accelerator. Stored electrical energies between 1 and 19 kJ are discharged within a few microseconds across the electrodes of the coaxial gun, accelerating deuterium gas samples to plasma beam energies well beyond the keV energy range. The focus of this study is to examine the interaction of the plasma beam with a deuterated target by designing and fabricating a detector to measure neutron yield. Given the strong electromagnetic pulse associated with our accelerator, indirect measurement of neutrons via threshold-dependent nuclear activation serves as both a reliable and definitive indicator of high-energy particles for our application. Upon bombardment with neutrons, discs or stacks of metal foils placed near the deuterated target undergo nuclear activation reactions, yielding gamma-emitting isotopes whose decay is measured by a scintillation detector system. By collecting gamma ray spectra over time and considering nuclear cross sections, the magnitude of the original neutron pulse is inferred.

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Date submitted: 14 Jul 2011 Electronic form version 1.4