Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

High-repetition neutron generation from ultrashort laser pulse irradiation of electrohydrodynamically dispensed deuterated microdroplets[1] NICHOLAS PESKOSKY, JOHN NEES, ALEXANDER GEORGE ROY THOMAS, KARL KRUSHELNICK, Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, Michigan 48109 — We report initial findings of laser-driven fusion neutron yield from the interaction of regeneratively amplified several-mJ, 35 fs laser pulses at 1/2 kHz with spatio-temporally resolved microdroplets from a novel electrohydrodynamic jet nozzle. Femtoliter-scale deuterated droplet targets are produced via pulsed high-voltage electrostatic extraction from a 50μm I.D./120μm O.D. stainless steel capillary. High intensity laser pulses (of order 10^{19} W/cm^2) are focused under vacuum and collide with the microdroplets to create energetic deuterons via the Target Normal Sheath Acceleration (TNSA) mechanism. 2.45 MeV neutron pulses are generated via the **d**$(d,n)^3$**He** fusion half-reaction. Neutron flux is measured via zero gamma sensitivity calibrated bubble detectors while neutron spectrum is quantified with plastic scintillators in a pulse-shape discrimination neutron time-of-flight (ToF) setup. To our knowledge, this experiment is the first to demonstrate micron-scale monodisperse droplet generation in vacuum utilizing pulsed electrohydrodynamic jetting.

[1]This material is based upon the work supported by the Air Force Office of Scientific Research under Award No. FA9550-16-1-0121.

Nicholas Peskosky
University of Michigan

Date submitted: 10 Jul 2019 Electronic form version 1.4