Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Evidence for thermonuclear neutron production on a sheared-flow stabilized (SFS) Z-pinch*.[1] JAMES M MITRANI, Lawrence Livermore Natl Lab, DREW H HIGGINSON, CHRISTOPHER M COOPER, KURT K TUMMEL, ANDREA E SCHMIDT, HARRY S MCLEAN, LLNL, ZACK T DRAPER, ELLIOT L CLAVEAU, ELEANOR G FORBES, BRIAN A NELSON, CHRISTOPHER PROVENCHER, ANTON D STEPANOV, TOBIN R WEBER, YUE ZHANG, URI SHUMLAK, UW, JONATHAN MORRELL, LEE A BERNSTEIN, UC Berkeley — The Fusion Z-pinch Experiment (FuZE) produces quasi-steady-state neutron emission with yields ranging from 1e4–1e7 for durations ranging from 2–8 us. Spatially-resolved neutron energy spectra are largely isotropic, consistent with thermonuclear fusion. FuZE is a sheared-flow stabilized (SFS) Z-pinch device that establishes a radially-sheared, axial plasma flow to limit growth of MHD instabilities, allowing the pinch to persist for thousands of radial Alfven transit times. In this work we present detailed yield and energy spectra results. Multiple detectors are used to determine the axial extent (34 cm) of the neutron producing region. Neutron energy spectra are determined by reconstructing the energy spectra of recoil protons in fast plastic scintillators. Initial analysis indicates emission is spatially isotropic with an upper limit of 50keV for any axial beam-target reactions. These results are encouraging for scaling of SFS Z-pinches toward reactor conditions. *For USDOE ARPA-E by UW and LLNL under Contract DE-AC52-07NA27344.

[1]Evidence for thermonuclear neutron production on a sheared-flow stabilized (SFS) Z-pinch

James Mitrani
Lawrence Livermore Natl Lab

Date submitted: 03 Jul 2019 Electronic form version 1.4