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Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Producing High-Performance, Stable, Sheared-Flow Z-Pinches in the FuZE project.[1] R. P. GOLINGO, U, SHUMLAK, B.A. NELSON, E.L. CLAVEAU, E.G. FORBES, A.D. STEPANOV, T.R. WEBER, Y. ZHANG, University of Washington, H.S. MCLEAN, K.K. TUMMEL, D.P. HIGGINSON, A.E. SCHMIDT, Lawrence Livermore National Laboratory, UNIVERSITY OF WASHINGTON (UW) COLLABORATION, LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL) COLLABORATION — The Fusion Z-Pinch Experiment (FuZE) has made significant strides towards generating high-performance, stable Z-pinch plasmas with goals of $n_e = 10^{18}$ cm^{-3} and T=1 keV. The Z-pinch plasmas are stabilized with a sheared axial flow that is driven by a coaxial accelerator. The new FuZE device has been constructed and reproduces the major scientific achievements the ZaP project at the University of Washington; $n_e = 10^{16}$ cm^{-3},T= 100 eV, r<1 cm, and $t_{stable} > 20$ μs. These parameters are measured with an array of magnetic field probes, spectroscopy, and fast framing cameras. The plasma parameters are achieved using a small fraction of the maximum energy storage and gas injection capability of the FuZE device. Higher density, $n_e = 5\text{x}10^{17}$ cm^{-3}, and temperature, T= 500 eV, Z-pinch plasmas are formed by increasing the pinch current. At the higher voltages and currents, the ionization rates in the accelerator increase. By modifying the neutral gas profile in the accelerator, the plasma flow from the accelerator is maintained, driving the flow shear. Formation and sustainment of the sheared-flow Z-pinch plasma will be discussed. Experimental data demonstrating high performance plasmas in a stable Z-pinches will be shown.

[1]This work is supported by an award from US ARPA-E.

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Date submitted: 14 Jul 2017 Electronic form version 1.4