Abstract Submitted
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Refinement of neutron measurements for a sheared-flow-stabilized Z pinch[1] A. KHAIRI, E.L. CLAVEAU, Z.T. DRAPER, E.G. FORBES, A.D. STEPANOV, T.R. WEBER, U. SHUMLAK, University of Washington, H.S. MCLEAN, D.P. HIGGINSON, J.M. MITRANI, Lawrence Livermore National Laboratory, B.A. NELSON, Y. ZHANG, Zap Energy — The sheared-flow-stabilized Z pinch is a promising concept for stabilization of the Z-pinch configuration from MHD instabilities, allowing for a longer-lived plasma. The fusion Z-pinch experiment (FuZE) scales this concept to fusion conditions, and has demonstrated sustained neutron production for 5-10 μs. Operating with pure deuterium and higher charge voltage resulted in an increase in neutron yield, measured by an arrangement of plastic scintillator detectors. Saturation of the detector signal and subsequent shutoff limits the utility of this diagnostic to provide accurate neutron measurements as the experiment scales to higher voltages and yields. To mitigate detector shutoff, neutral density filters were installed between the scintillator and the photo-multiplier tube to reduce light intensity to the photo-multiplier tube. This also allowed investigation of detector pulse pile-up. A composite signal is formed by combining signals from detectors placed at different radial distances, capturing a longer duration of neutron emission and increasing the dynamic range. Monte Carlo N-Particle (MCNP) code is used to replicate the signals from the detector arrays, and to determine their optimal placement.

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