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Abstract Submitted
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Measurements of the Time Evolution of Ion Temperature Profiles on the FuZE Fusion Z-Pinch Experiment[1] A.D. STEPANOV, U. SHUMLAK, B.A. NELSON, E.L. CLAVEAU, E.G. FORBES, R.P. GOLINGO, T.R. WEBER, Y. ZHANG, University of Washington, H.S. MCLEAN, D.P. HIGGINSON, A. SCHMIDT, K.K. TUMMEL, LLNL — FuZE investigates the scaling of sheared-flow stabilized Z-pinches to fusion-relevant densities and temperatures. Long-lived (>20 μs) pinches with an embedded axial flow and stabilizing velocity shear are formed by radial compression of a flowing plasma produced in a coaxial plasma accelerator. In the near term, we plan to operate with trace amounts of deuterium to produce a small but detectable flux of D-D neutrons. This flux can be estimated if the ion temperature and density profiles are known. Density profiles are obtained from interferometry. Ion Doppler spectroscopy measures the line-integrated ion temperature along 20 chords spaced 1.2 mm apart in the plasma based on Doppler broadening of impurity lines. The time evolution of T_i profiles is measured by varying the time at which the spectrum is acquired over a series of repeatable plasma pulses. Based on experimental ion temperature and density profiles, we calculate the expected neutron flux. This estimate can be compared to the measured neutron flux to ascertain whether the neutrons are of thermonuclear origin.

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