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Control of Z-pinch plasma properties through the initial neutral gas distribution in the FuZE Fusion Z-pinch Experiment[1] E.L. CLAVEAU, U. SHUMLAK, B.A. NELSON, E.G. FORBES, R.P. GOLINGO, University of Washington, H.S. MCLEAN, Lawrence Livermore National Laboratory, A.D. STEPANOV, T.R. WEBER, Y. ZHANG, University of Washington — The FuZE project investigates scaling the sheared flow stabilized (SFS) Z-pinch to fusion conditions. FuZE will generate a 1 mm radius Z-pinch with a 300 kA plasma current. Sheared flow Z-pinches are formed by a coaxial accelerator operating in a deflagration mode. The ionization front can be controlled by the neutral gas injection. Fast-acting valves located inside the inner electrode and at 8 locations on the outer electrode provide spatial and temporal control of the gas distribution. Line-integrated plasma density inside the coaxial accelerator are obtained by an interferometry system. Magnetic field topology is measured by an array of 94 surface-mounted magnetic field probes embedded in the outer copper electrode. Coaxial accelerator current measurements obtained through the magnetic field probes and density are compared with the downstream Z-pinch properties, such as stability, temperature, and density with the goal of understanding the relation between neutral gas injection and Z-pinch plasma parameters and behavior.

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