Abstract Submitted
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Parameter scaling toward high-energy density in a quasi-steady flow Z-pinch[1] M.C. HUGHES, U. SHUMLAK, B.A. NELSON, R.P. GOLINGO, E.L. CLAVEAU, S.A. DOTY, E.G. FORBES, B. KIM, M.P. ROSS, University of Washington — Sheared axial flows are utilized by the ZaP Flow Z-Pinch Experiment to stabilize MHD instabilities. The pinches formed are 50 cm long with radii ranging from 0.3 to 1.0 cm. The plasma is generated in a coaxial acceleration region, similar to a Marshall gun, which provides a steady supply of plasma for approximately 100 us. The power to the plasma is partially decoupled between the acceleration and pinch assembly regions through the use of separate power supplies. Adiabatic scaling of the Bennett relation gives targets for future devices to reach high-energy density conditions or fusion reactors. The applicability of an adiabatic assumption is explored and work is done experimentally to clarify the plasma compression process, which may be more generally polytropic. The device is capable of a much larger parameter space than previous machine iterations, allowing flexibility in the initial conditions of the compression process to preserve stability.

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