Abstract Submitted
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Density Characteristics of a Sheared-Flow Z-Pinch S.L. JACKSON, U. SHUMLAK, B.A. NELSON, R.P. GOLINGO, E.A. CRAWFORD, T.L. SHREVE, J.B. PASKO, University of Washington — The ZaP Flow Z-Pinch experiment investigates the effects of sheared flow on gross plasma stability. The sheared-flow Z-pinches produced are characterized by a quiescent period, during which the Z-pinch exhibits low magnetic mode activity, high electron density on axis, and other characteristics of stability. Measurements made with a holographic interferometer are inverted using an Abel inversion and combined with measurements from a multi-chord He-Ne interferometer to track the time evolution of the radial electron density profile. A Z-pinch with a radius of 1 cm and an electron number density profile peaked at 10^{17} cm^{-3} is observed during the quiescent period. The electron density drops as the quiescent period ends. These results are in agreement with the time evolution of the density profile from MACH2 simulations. The density profile is used to estimate temperature and current density profiles for the Z-pinch. Experimental parameters such as capacitor bank energy and neutral gas injection are adjusted to investigate their influence on the density and behavior of the Z-pinch. Results of these investigations show that lower capacitor bank energy and injection of more neutral gas into the experiment lead to a longer quiescent period.

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