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Overview and Recent Results from the ZaP Flow Z-Pinch[1]
U. SHUMLAK, B. NELSON, C. ADAMS, J. BULLER, D. DEN HARTOG, R. GOLINGO, S. JACKSON, A. JENNINGS, A. MADSON, J. NEWMAN, D. PALM, J. PASKO, J. PROCTOR, D. SCHMULAND, T. SHREVE, Aerospace and Energetics Research Program, University of Washington — The ZaP Flow Z-Pinch Experiment at the University of Washington investigates sheared flow stabilization in an otherwise unstable configuration. An axially flowing Z-pinch is generated with a coaxial accelerator coupled to a pinch assembly chamber. Magnetic probes measure the fluctuation levels of the azimuthal modes m = 1, 2, and 3. The plasma is magnetically confined for an extended quiescent period where the mode activity is significantly reduced. Multichord Doppler shift measurements of impurity lines show a large, sheared flow during the quiescent period and low shear profiles during periods of high mode activity. The plasma has a sheared axial flow that exceeds the theoretical threshold for stability during the quiescent period and is lower than the threshold during periods of high mode activity. The Z-pinch plasmas are globally stable for approximately 2000 growth times. The end of the quiescent period corresponds to a drop in plasma density and a decrease in plasma acceleration. Recent experimental results suggest a means to extend the experiment to quasi steady state operation.

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