The ZaP Flow Z-pinch experiment\textsuperscript{1} at the University of Washington investigates the effect of sheared flows on MHD stability. Axially flowing Z-pinch plasmas are produced that are 100 cm long with a 1 cm radius. The plasma remains quiescent for many radial Alfvén times and axial flow times. The quiescent periods are characterized by low magnetic mode activity measured at several locations along the plasma column and by stationary visible plasma emission. Profiles of the plasma’s axial flow are measured with a multi-chord ion Doppler spectrometer. A sheared flow profile is observed to be coincident with the quiescent period. The flow profile is well understood and consistent with classical plasma viscosity. Plasma lifetime appears to only be limited by plasma supply and current waveform. Equilibrium is determined by the following diagnostic measurements: interferometry for density; spectroscopy for ion temperature, plasma flow, and density\textsuperscript{2}; Thomson scattering for electron temperature; Zeeman splitting for internal magnetic field measurements\textsuperscript{3}; and fast framing photography for global structure. A radial heat conduction analysis is performed to calculate equilibrium profiles from the experimental data by assuming Braginskii thermal conductivities and radial force balance. The profiles are corroborated by additional experimental measurements. To confirm the importance of shear flow stabilization, the effect of wall stabilization is investigated by removing large portions of the surrounding conducting wall. The configuration is also computationally modeled to demonstrate no wall effects contributing to observed stability of the Z-pinch plasma.


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