Abstract Submitted
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Diagnostic Development for Spatio-Temporal Resolution of a Sheared Flow Stabilized Z-Pinch[1] ELEANOR FORBES, URI SHUMLAK, ELLIOT CLAVEAU, BRIAN NELSON, ANTON STEPANOV, TOBIN WEBER, YUE ZHANG, University of Washington — The ZaP-HD Flow Z-Pinch Experiment investigates using a tri-axial electrode configuration to increase the current in a sheared flow stabilized Z-pinch. The ZaP machine produces a 50 cm-long flowing hydrogen pinch with a radially sheared axial velocity profile that is stable for up to 60 s. Conditions within the pinch exceed densities of 2e17 cm^{-3} and temperatures of 800 eV. A suite of diagnostics is used to measure plasma properties including magnetic field probes, digital holographic interferometry (DHI), and ion-Doppler spectroscopy (IDS). Both the DHI and IDS systems have been expanded to more fully characterize the pinch properties. Initially, the IDS system collected one radially resolved temperature measurement at a single axial location for each plasma pulse. The spectrometer has been coupled to an ultra-fast framing camera to record up to 100 spectra per pulse. This provides the complete evolution of plasma ion temperature over the pinch lifetime. In addition, DHI was limited to a single two-dimensional electron density profile per plasma pulse. The system is being expanded to include a second, perpendicular view of the pinch at the same axial location. These data will be used to reconstruct the three-dimensional electron density along 1.5 cm of the pinch axis.

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