Abstract Submitted
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Time-resolved Spectroscopy of a Sheared Flow Stabilized Z-pinch Plasma[1] ELEANOR FORBES, University of Washington — The ZaP Flow Z-pinch Project investigates the use of sheared-axial flows to stabilize an otherwise unstable plasma configuration. Diagnostics with sub-microsecond resolution are required to obtain accurate time-resolved data since the plasma pulse is approximately 100 μs. Analyzing the Doppler shift of impurity line radiation from the pinch provides a measure of the velocity profile and is a reliable method of determining the plasma sheared flow. The velocity profile is spatially resolved through the use of a 20-chord fiber bundle. The ZaP-HD experiment has used a PI-MAX intensified CCD array to record a single time-resolved spectrum per plasma pulse. Obtaining the evolution of the velocity profile using this method required spectra acquired over hundreds of pulses with identical initial parameters and varying acquisition times. The use of a Kirana 05M ultra-fast framing camera is investigated for recording time-resolved velocity profiles during a single pulse. The Kirana utilizes an ultraviolet intensifier to record 180 frames of UV light at up to 2 million frames per second. An ultraviolet optics system is designed to couple the exit port of an Acton SP-500i spectrometer to the Kirana UV intensifier and focus spectra at the camera detector plane.

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