

Abstract Submitted
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Design of a digital holographic interferometer for the ZaP Flow Z-Pinch MICHAEL ROSS, URI SHUMLAK, BRIAN NELSON, RAYMOND GOLINGO, MICHAL HUGHES, SEAN KNECHT, MATT PALIWODA, University of Washington — The ZaP Flow Z-Pinch experiment investigates how flow shear stabilizes MHD modes. An upgrade to a high energy-density plasma experiment would allow exploration of flow shear's effectiveness in this operating regime. The experiment's upgrade would include the addition of a digital holographic interferometer to measure electron density with fine spatial resolution. The design uses a pulsed Korad ruby laser with a consumer digital camera to generate and record holograms, which are then numerically reconstructed to obtain the phase shift caused by the interaction of the laser beam with the plasma. The numerical reconstruction provides a two-dimensional map of chord-integrated electron density without employing labor-intensive physical reconstruction techniques. The interferometer's accuracy has been validated with comparisons to measurements from an existing four-chord HeNe interferometer. The new diagnostic will allow the ZaP team to search for structures such as plasma shocks that were not previously resolvable. It would also be able to resolve the density profile of the smaller, high-energy pinch.

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