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Development of a digital holographic interferometer for the ZaP-HD Flow Z-Pinch MICHAEL ROSS, URI SHUMLAK, BRIAN NELSON, RAY GOLINGO, CHRIS BOWERS, SHAWN DOTY, MICHAL HUGHES, SEAN KNECHT, MATT PALIWODA, HARRISON STANKEY, SYDNEY SWOFFORD, University of Washington — The ZaP Flow Z-Pinch project investigates flow shear stabilization of MHD modes. The current experiment is being upgraded to a higher energy-density operating regime that will provide a platform to explore how shear stabilized Z-pinches could scale to HEDP and even fusion reactor conditions. The experiment's upgrade includes developing a digital holographic interferometer to measure electron density with fine spatial resolution. The holographic interferometer uses a pulsed 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. The interferometer's accuracy is being validated with comparisons to measurements from an existing four-chord HeNe interferometer. The new diagnostic will allow the ZaP team to search for plasma structures such as shocks that were previously unresolvable. It will also be able to resolve the density profile of the smaller, higher energy-density pinch plasma.

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