Abstract Submitted
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Z-pinch equilibrium and instability analysis with digital holographic interferometry[1] M.P. ROSS, U. SHUMLAK, B.A. NELSON, R.P. GOLINGO, M.C. HUGHES, E.L. CLAVEAU, J.R. WEED, E.G. FORBES, S.A. DOTY, B. KIM, University of Washington — The ZaP-HD Flow Z-Pinch project generates flow shear stabilized Z-pinches, providing a platform to explore how such plasmas could scale to HEDP and fusion reactor conditions. To scale up the plasma's density and temperature, it must be compressed to a smaller size making measurements more difficult. Digital holographic interferometry (DHI) employing a pulsed Nd:YAG laser and consumer DSLR camera can spatially resolve the plasma's electron density. The Fresnel reconstruction method allows expedient numerical data reconstruction.[2] Obtaining electron density radial profiles relies on applying an Abel inversion to convert measured line-integrated density, and the inversion process provides an independent measure of plasma symmetry. Entire Z-pinch equilibria (n, P, T, and B profiles) can be computed by applying physical models to the density data. Tracking the time evolution of pressure and density can reveal the presence of non-adiabatic heating mechanisms. Imaging the size scales of instabilities enables relative measures of viscosity at different positions and times. Error estimation of measured density profiles is presented along with observed asymmetric instabilities.

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[2]Kreis, T. *Handbook of holographic interferometry.*

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