Abstract Submitted
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Investigating the density structure of the ZaP-HD Flow Z-Pinch with digital holographic interferometry[1] MICHAEL ROSS, URI SHUMLAK, BRIAN NELSON, RAYMOND GOLINGO, MICHAL HUGHES, ELEANOR FORBES, MATT PALIWODA, University of Washington — The ZaP-HD Flow Z-Pinch experiment investigates how flow shear stabilized Z-pinches scale to higher densities and temperatures. Determining how such plasmas scale up may reveal their utility as test beds for HEDP physics. Scaling towards HEDP conditions requires compressing the plasma to a smaller size with increased plasma current. Measuring the internal structure of a smaller, hotter plasma requires high-resolution diagnostics. To measure electron density profiles, the ZaP-HD team uses holographic interferometry with 30 micron resolution. A new Nd:YAG laser is employed in concert with a consumer digital camera to record holograms, which are numerically reconstructed to obtain the phase shift caused by the interaction of the laser with the plasma. The numerical reconstruction provides a two-dimensional map of chord-integrated electron density, which can be inverted to radial profiles under the assumption of axisymmetry. Measurements of Z-pinch density structure are presented.

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