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Interferometric plasma density measurements on the Fusion Z-pinch Experiment FuZE[1] TOBIN WEBER, URI SHUMLAK, BRIAN NELSON, ELLIOT CLAVEAU, ELEANOR FORBES, ANTON STEPANOV, YUE ZHANG, University of Washington, HARRY MCLEAN, DREW HIGGINSON, JAMES MITRANI, ANDREA SCHMIDT, KURT TUMMEL, Lawrence Livermore National Laboratory, UNIVERSITY OF WASHINGTON COLLABORATION, LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATION — The Fusion Z-Pinch Experiment (FuZE) is a sheared flow stabilized (SFS) Z-pinch experiment investigating the scaling of SFS Z-pinch plasmas towards fusion conditions. Sustained neutron production has been measured from cylindrical plasmas[1]. As the fusion yield increases, efforts are underway to understand the pinch dynamics. This will require measurements of the plasma density. Density measurements are possible with 2 unique interferometers: A digital holographic interferometer (DHI) and a He-Ne interferometer. The DHI uses a Nd:YAG laser with a digital camera to produce holograms from the plasma assembly region. Digital holograms are numerically reconstructed to obtain the chord-integrated electron density of the compressed plasma. Radial density profiles are reconstructed from these chord-integrated electron density data. The He-Ne Interferometer is a multi-chord (8), heterodyne, quadrature, Mach-Zehnder interferometer. Each chord produces a line-integrated electron density measurement through the plasma. Chord-integrated density and radial density plasma data are presented from FuZE. [1] Y. Zhang et al., PRL 122, 135001 (2019).

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