Abstract Submitted
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A combined phase contrast imaging-interferometer system for the detection of multiscale density fluctuations on DIII-D[1] E.M. DAVIS, J.C. ROST, M. PORKOLAB, A. MARINONI, MIT, M.A. VAN ZEELAND, GA — A combined phase contrast imaging (PCI) and heterodyne interferometer system has been implemented on DIII-D, extending the physics capabilities of the pre-existing PCI and acting as a prototypical fluctuation diagnostic for next-step devices. The combined PCI-interferometer uses a single 10.6 μm laser beam, two interference schemes, and two detectors to measure $\int \tilde{n}_e dl$ over a large spatiotemporal bandwidth (10 kHz $< f <$2 MHz and $0 \leq k \leq 20$ cm^{-1}), allowing simultaneous measurement of ion- and electron-scale instabilities. Further, time-correlating our interferometer's measurements with those of DIII-D's pre-existing, toroidally separated ($\Delta\zeta = 45°$) interferometer will allow novel studies of low-n Alfvén eigenmodes. The combined diagnostic's small port requirements and minimal access restrictions make it well-suited to the harsh neutron environments and limited port space expected in next-step devices. Measurements from sound wave calibrations and DIII-D operations will be presented.

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