Abstract Submitted
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Density Fluctuation and Transport Studies for the Lithium Tokamak eXperiment[1] E.M. GRANSTEDT, R. MAJESKI, R. KAITA, G.W. HAMMETT, PPPL, C.E. THOMAS, Third Dimension Technologies — Tokamak fusion energy confinement is generally limited by turbulent transport due to temperature-gradient-driven instabilities; however, a low-recycling plasma boundary may permit high edge temperatures to be realized, resulting in a flattened temperature profile and eliminating the drive mechanism for ITG and ETG turbulence. LTX is uniquely suited to study this regime, where the remaining transport is expected to be neoclassical or driven by density gradients. To extrapolate performance to larger devices, the contributions of both mechanisms to the transport must be understood. Characterization of the transport in the low-recycling regime requires measurement of density fluctuation spectra. The statistical nature of density fluctuations in LTX will be investigated with a digital holography diagnostic currently under development. This diagnostic uses a 9.1 μm CO_2 laser and an IR quantum well FPA camera to measure line-integrated plasma density fluctuations with up to 0.3 mm resolution perpendicular to the line-of-sight, exposures $\gtrsim$1 μs, and frame rates $\lesssim$48 kHz. Measurement predictions for this diagnostic through linear and nonlinear gyrokinetic simulations using the GYRO code are also presented.

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