Abstract Submitted
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New Electron Temperature Measurements During Local Helicity Injection and H-mode Plasmas at the Pegasus Toroidal Experiment[1] D.J. SCHLOSSBERG, G.M. BODNER, R.J. FONCK, J.A. REUSCH, G.R. WINZ, University of Wisconsin-Madison — Extrapolation of non-solenoidal startup via local helicity injection (LHI) to larger devices depends critically on confinement during the injection process. To begin quantifying confinement regimes, the Thomson scattering diagnostic on the Pegasus ST was upgraded to include 12 radial positions and high temperature ($0.1 < T_e < 1$ keV) capability. Previous measurements during high-density, quiescent, Ohmic L-mode discharges yielded well-resolved thermal electron distributions, with central $T_e = 150$ eV. In the low-density LHI startup plasmas shot-to-shot averaging of data improves background measurements and increases signal-to-noise ratio. Initial core measurements during the drive phase of LHI suggest average T_e of several hundred eV for plasmas with $n_e \approx 3\text{x}10^{18}$ m^{-3} and $I_p \approx 0.15$ MA. Experiments are underway to verify these unexpectedly high electron temperatures. If verified, these temperatures may reflect the dominance of high-energy electrons via fueling with LHI current streams with average energy ≈1 keV. Further investigations will explore the dependence of the inferred electron distribution on fueling source, density, and electron injection potential. The upgraded Thomson scattering diagnostic will also be applied to Ohmic H-mode plasmas in Pegasus.

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