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V_{eff} Scaling of T_e and n_e Measurements During Local Helicity Injection on the Pegasus Toroidal Experiment[1] G.M. BODNER, M.W. BONGARD, R.J. FONCK, J.M. PERRY, J.A. REUSCH, C. RODRIGUEZ SANCHEZ, University of Wisconsin-Madison — Understanding the electron confinement of local helicity injection (LHI) is critical in order to evaluate its scalability as a startup technique to MA-class devices. Electron confinement in the Pegasus Toroidal Experiment is investigated using multi-point Thomson scattering (TS). The Pegasus TS system utilizes a set of high-throughput transmission gratings and intensified CCDs to measure T_e and n_e profiles. Previous TS measurements indicated peaked T_e profiles ~ 120 eV in outboard injector discharges characterized by strong inductive drive and low LHI drive. Injectors designed to have dominant non-inductive drive have recently been installed in the divertor region of Pegasus to understand the relationship between effective drive voltage, V_{eff}, and plasma performance. At low V_{eff} and reduced plasma current, $I_p \sim 60$ kA, TS measurements reveal a flat T_e profile ~ 50 eV, with a peaked n_e profile $\sim 1 \times 10^{19}$ m^{-3}, resulting in a slightly peaked p_e profile. As current drive is increased, the T_e profiles become hollow with a core $T_e \sim 50$ eV and an edge $T_e \sim 120$–150 eV. These hollow profiles appear after the start of the I_p flattop and are sustained until the discharge terminates. The n_e profiles drop in magnitude to $< 1 \times 10^{19}$ m^{-3} but remain somewhat peaked. Initial results suggest a weak scaling between input power and core T_e. Additional studies are planned to identify the mechanisms behind the anomalous profile features.

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