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Electron Temperature Evolution During Local Helicity Injection on the Pegasus Toroidal Experiment[1] D.J. SCHLOSSBERG, J.L. BARR, 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 temperature (T_e) evolution during local helicity injection (LHI) is critical for scaling up this non-solenoidal startup technique to MA-class devices. The first comprehensive T_e measurements during LHI reveal centrally-peaked profiles with $T_e > 100$ eV for plasma current $I_p > 120$ kA, toroidal field ~ 0.15 T, and electron density $n_e \sim 10^{19}$ m^{-3}. T_e rises and is sustained from just after magnetic relaxation through the plasma decoupling from edge-localized injectors. Results are presented for two injector edge locations: outboard midplane and inboard divertor. Outboard midplane injection couples LHI with inductive drive from poloidal field ramps and radial compression during inward plasma growth. Comparisons of T_e at different LHI-to-inductive drive ratios show some profile flattening for higher LHI drive fraction. The latter, constant-shape discharges were necessarily lower performance, with $I_p \sim 50$ kA and reduced $T_{e,max}$. Inboard divertor injection achieves higher I_p using minimal inductive drive and thus isolates effects of LHI drive on T_e. Initial results in this configuration show T_e rising rapidly at the injector location as the discharge grows, settling to a roughly flat profile ~ 100 eV. Thus far, both scenarios provide relatively stable discharges with moderate n_e and high-T_e, suitable for coupling to auxiliary current drive. Detailed studies of confinement dynamics and discharge optimization are planned for the near future.

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