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Current Drive Scaling of Local Helicity Injection in the Pegasus Toroidal Experiment[1] G.M. BODNER, M.W. BONGARD, R.J. FONCK, J.A. REUSCH, N.J. RICHNER, University of Wisconsin-Madison — Local Helicity Injection (LHI) is a non-solenoidal startup technique that utilizes electron current injectors at the plasma edge to initiate a tokamak-like discharge. In order to determine the scalability of LHI to MA-class facilities, it is necessary to identify the key parameters that dictate LHI performance. Injection on the high-field-side (HFS) allows for the creation of discharges driven purely by helicity injection. Ohmic and stochastic confinement scalings predict a favorable non-linear relationship between I_p and drive voltage V_{LHI}. Recent experiments have indicated a linear current drive scaling suggesting a constant impedance. This scaling has been observed over different levels of B_T and MHD activity. Thomson measurements at low B_T indicate hollow T_e profiles that increase in $\langle T_e \rangle$ and decrease in $\langle \eta \rangle$ as the input power is increased. Despite this decrease in $\langle \eta \rangle$, the current drive scaling remains linear. At higher levels of B_T, peaked T_e profiles ($T_{e,0} \sim 100$ eV) and higher I_p are observed for the same amount of V_{LHI}. These results have been compared to the first Thomson documentation of Ohmic discharges in PEGASUS which feature $T_e \leq 250$ eV. Calculation of neoclassical resistivity and plasma impedance from equilibrium reconstructions and Thomson data suggest this scaling result may be attributed to an increase in Z_{eff}.

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