Abstract Submitted
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Advancing Non-Solenoidal Startup on the Pegasus ST[1] J.A. REUSCH, J.L. BARR, G.M. BODNER, M.W. BONGARD, M.G. BURKE, R.J. FONCK, J.L. PACHICANO, J.M. PERRY, N.J. RICHNER, C. RODRIGUEZ SANCHEZ, D.J. SCHLOSSBERG, University of Wisconsin-Madison — The Pegasus experiment utilizes compact, edge-localized current sources ($A_{inj} \sim 2-4$ cm^2, $I_{inj} \sim 10$ kA, $V_{inj} \sim 1$ kV) for non-solenoidal local helicity injection (LHI) startup. Recent campaigns are comparing two injector geometries that vary the differing relative contributions of DC helicity input and non-solenoidal inductive voltages. A predictive 0-D model that treats the plasma as a resistive element with time-varying inductance and enforces I_p limits from Taylor relaxation was tested with inward growth of the plasma current channel using injectors on the outboard midplane. Strong inductive drive arises from plasma shape evolution and poloidal field (PF) induction. A major unknown in the model is the resistive dissipation, and hence the electron confinement. $T_e(R)$ profile measurements in LHI show centrally-peaked $T_e > 100$ eV while the plasma is coupled to the injectors, suggesting LHI confinement is not strongly stochastic. A second campaign utilizes new injectors in the lower divertor region. This geometry trades subtler relaxation field programming and reduced PF induction for higher HI rates. Present efforts are developing relaxation methods at high B_T, with relaxation at $B_{T,inj} > 0.15$ T achieved to date via higher I_{inj} and PF manipulation. Conceptual design studies of coaxial helicity injection (CHI) and ECH heating systems for Pegasus have been initiated to explore direct comparison of LHI to CHI with and without ECH assist.

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