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Ohmic Sustainment of Local Helicity Injection Initiated Plasmas on the Pegasus ST[1] C. PIERREN, G.M. BODNER, M.W. BONGARD, S.J. DIEM, R.J. FONCK, M.D. NORNBERG, N.J. RICHNER, C. RODRIGUEZ SANCHEZ, C.E. SCHAEFER, University of Wisconsin-Madison — Local helicity injection (LHI) is being developed on the PEGASUS ST for non-solenoidal tokamak startup. The startup viability of LHI-initiated plasmas will depend upon how readily they efficiently handoff to subsequent heating and current drive (CD) sustainment phases. Final experiments on the PEGASUS ST tested handoff to sustainment using the Ohmic solenoid (OH). LHI-initiated plasmas were found to robustly couple to OH CD, even at high I_p ramp rates >100 MA/s. The relative impurity content during LHI appeared higher than comparable OH-only discharges; however, these impurities appeared to quickly decay to OH-only like levels during the OH phase of handoff scenarios. Magnetic energy was readily conserved across the LHI-OH handoff as evidenced by minimal drops in I_p. The LHI target's $j\,(R)$ profile appears to be MHD favorable as the onset of internal low m, $n = 1$ tearing modes typical of PEGASUS OH discharges was mitigated with LHI startup. Unique high $\beta_T \sim 1$ plasmas at extremely low B_T could not be Ohmically sustained because they suffered from an edge kink instability that was presumably stabilized by the LHI edge current streams. Reconstructions and stability analyses are underway to further explore the MHD stability properties of LHI plasmas.

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