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The Coupling of Local Helicity Injection to Ohmic Current Drive on the Pegasus ST[1] C. PIERREN, G.M. BODNER, M.W. BONGARD, R.J. FONCK, N.J. RICHNER, C. RODRIGUEZ SANCHEZ, C.E. SCHAEFER, University of Wisconsin-Madison — Ohmic (OH) operations on Pegasus have been restored to provide comparison of MHD activity in OH and local helicity injection (LHI) driven discharges and to provide tests of handoff from LHI to OH current drive. Temperatures of 250 eV and densities of 2×10^{19} m^{-3} were measured with Thomson scattering in OH H-mode plasmas. LHI discharges at similar density and B_T show $T_e \sim 150$ eV and are comparable to OH L-mode plasmas. Insertable radial arrays of magnetic pick-up loops and 3D Hall sensors observe typical $n = 1$ internal tearing mode MHD activity and a large reduction in broadband MHD fluctuations relative to LHI plasmas. The magnetic and kinetic boundaries coincide in OH plasmas, in contrast to LHI plasmas, where the kinetic boundary appears to occur several cm inside the magnetic edge. This evidence suggests the presence of a a dual-zone confinement structure during LHI, with an inner tokamak-like plasma and an outer force-free current layer. Spectroscopic measurements of OH plasmas show a reduction in impurity content compared to LHI. LHI-initiated plasmas driven predominantly by helicity injection and non-solenoidal induction have been successfully coupled to pure OH sustainment at $I_p \sim 100$ kA. Remaining OH studies are concentrating on optimizing LHI-OH handoff through variations in $J(R), T_e, B_T, n_e$, etc.

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