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Assessment of Impurity Content and Radiated Power in LHI discharges on the Pegasus ST[1] C. RODRIGUEZ SANCHEZ, G.M. BODNER, R.J. FONCK, M.D. NORNBERG, C. PIERREN, University of Wisconsin-Madison — Local Helicity Injection (LHI) is routinely used in the PEGASUS ST to produce high-performance discharges with $I_p \leq 0.24$ MA, $n_e \approx 10^{19}$ m^{-3} and $T_e \approx 100$ eV. Recent experiments show that the impedance of the plasma is independent of the helicity drive as I_p scales linearly with V_{LHI}. One possible explanation of this behavior would be that Z_{eff} and the plasma resistivity increases with I_p. To examine this possibility an assessment of radiated power and impurity concentration is being done in PEGASUS using a tangential bolometer array, VB spectroscopy and a SPRED VUV spectrometer. Discrete line radiation from N and O are at least 10× higher during LHI than Ohmic. A broadband spectrum at $\lambda \leq 35$ nm is observed during LHI but absent during Ohmic discharges. Radiated power increases rapidly with V_{LHI}, suggesting an increase in Z_{eff} as I_p increases. Initial observations suggest Bremsstrahlung radiation measurements are infeasible during LHI but may be measured during an Ohmic phase in an LHI-Ohmic handoff scenario. To quantify estimates of impurity content, a new multichannel diode bolometer array with full coverage across the plasma is being developed.

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