Abstract Submitted
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Improved Density Control in the Pegasus Toroidal Experiment using Internal Fueling[1] K.E. THOME, M.W. BONGARD, J.A. COLE, R.J. FONCK, A.J. REDD, G.R. WINZ, University of Wisconsin-Madison — Routine density control up to and exceeding the Greenwald limit is critical to key Pegasus operational scenarios, including non-solenoidal startup plasmas created using single-point helicity injection and high β Ohmic plasmas. Confinement scalings suggest it is possible to achieve very high β plasmas in Pegasus by lowering the toroidal field and increasing n_e/n_g. In the past, Pegasus achieved $\beta \sim 20\%$ in high recycling Ohmic plasmas without running into any operational boundaries.[2] However, recent Ohmic experiments have demonstrated that Pegasus currently operates in an extremely low-recycling regime with $R < 0.8$ and $Z_{eff} \sim 1$ using improved vacuum conditioning techniques, such as Ti gettering and cryogenic pumping. Hence, it is difficult to achieve $n_e/n_g > 0.3$ with these improved wall conditions. Presently, gas is injected using low-field side (LFS) modified PV-10 valves. To attain high n_e/n_g operation and coincidentally separate core plasma and local current source fueling two new gas fueling capabilities are under development. A centerstack capillary injection system has been commissioned and is undergoing initial tests. A LFS movable midplane needle gas injection system is currently under design and will reach $r/a \sim 0.25$. Initial results from both systems will be presented.

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[2]Garstka, G.D. *et al.*, Phys. Plasmas **10**, 1705 (2003)

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