Abstract Submitted
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Control of the cross field plasma flow in a simplified magnetic configuration (The Helimak)[1] W.L. ROWAN, K.W. GENTLE, C.B. WILLIAMS, M.W. BROOKMAN, K.T. LIAO, IFS, The University of Texas at Austin — Cross field plasma flow is measured in a simplified magnetic configuration [1] that recreates essential aspects of the SOL of a tokamak. Flow velocities are measured via the Doppler shift of the spectrum of the main plasma ion. The magnetic field has a strong toroidal component and a weaker perpendicular component, and field line pitch is varied from 0.5° to 2.7° which corresponds to the pitch for q > 6 in tokamaks. The flow velocity is controlled by biasing conductors in contact with the plasma. The bias is varied from -50 V to 20 V in a plasma with unbiased plasma potential near 25 V. The perpendicular mass flow responds in the range -0.5 km/s to 1 km/s and saturates for bias less than -25 V. The flow is consistent in direction with the $E \times B$drift, and the inferred electric field is consistent in magnitude with that based on measured plasma potential. Flow control is exploited to explore turbulence supression by varying flow shear within a factor 2 of 1x10^4 s^{-1}. This flow shear is comparable with estimates for turbulence growth rate: 0.1 of the diamagnetic frequency and the autocorrelation time of the broadband turbulence.

[1] K.W. Gentle, Plasma Sci. Technol. 10, 284 (2008)

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