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The Nonlinear Stationary State of Simple Interchange Turbulence KENNETH GENTLE, W.L. ROWAN, C.B. WILLIAMS, M.W. BROOKMAN, University of Texas at Austin — The Helimak is an approximation to the infinite cylindrical slab with a size large compared with turbulence transverse scale lengths, but with open field lines of finite length. Interchange modes are the dominant instability. Radially-segmented isolated end plates allow application of radial electric fields to modify the plasma flow transverse to B and the radial equilibrium gradient. Measurements of the ion flow velocity profile are made by Doppler spectroscopy of the argon plasma ion. The level of non-linearly saturated turbulence has been measured over a wide range of collisionality, parallel connection length, and flow pattern, but none of the processes found effective for setting the level of saturated turbulence for the weaker turbulence in the plasma interior are found applicable. Quasi-linear theory is inconsistent with the observations, zonal flows are not observed, and local flow shear does not correlate with local turbulence level. Weak correlations are found between turbulence level and radial correlation length for some restricted data subsets, but no broad correlation or predictive power exists. Work supported by the Department of Energy OFES DE-FG02-04ER54766.

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