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Relation between Turbulence Suppression and Flow Shear for Interchange Modes KENNETH GENTLE, WILLIAM ROWAN, CHAD WILLIAMS, University of Texas at Austin, BO LI, Peking University — 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. Above a threshold in applied voltage, the fractional turbulent amplitude is greatly reduced. Reductions are observed for both bias polarities over a broad range of collisionality and parallel connection length. Simultaneous measurements of the ion flow velocity profile are made by Doppler spectroscopy of the argon plasma ion. Turbulence reductions are weakly correlated with reductions in radial correlation length, but neither turbulence levels nor turbulence reductions are correlated with velocity flow shear. No evidence of zonal flows has been found. The turbulence – density and potential fluctuations, is compared with simulations from a two-fluid model for this geometry, which also show turbulence stabilization with bias without increased shear. Work supported by the Department of Energy OFES DE-FG02-04ER54766.

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