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Turbulence and Turbulence Suppression in the Helimak KENNETH GENTLE, WILLIAM ROWAN, KEN LIAO, University of Texas at Austin, BO LI, MIT — The Helimak is an approximation to the infinite cylindrical slab, but with open field lines of finite length. Radially-segmented isolated end plates allow application of radial electric fields that drive radial currents. Above a threshold in applied voltage (driven current), the fractional turbulent amplitude is greatly reduced. Reductions are observed for both positive and negative bias. Concurrent measurements of the ion flow velocity profile are made by Doppler spectroscopy. The turbulence – density, potential, and temperature fluctuations, will be compared with simulations from a fluid model for this geometry, which also shows reduced turbulence with bias. Comparisons of turbulence reduction with changes in radial correlation length and flow shear will be given. Although the radial correlation length is much smaller than the plasma, turbulent structures of large spatial scale but short lifetime are seen. The amplitude reduction is associated with shrinkage in size of the structures. No evidence of zonal flows has been found. Work supported by the Department of Energy OFES DE-FG02-04ER54766.

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