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Turbulence and Turbulence Suppression in the Helimak[1] K.W. GENTLE, W.L. ROWAN, K. LIAO, University of Texas at Austin, B. LI, Dartmouth College — 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, as is the radial turbulent particle transport in the region of applied bias. Stabilization is observed for both positive and negative bias. Concurrent measurements of the ion flow velocity are made by Doppler spectroscopy. The turbulence – density, potential, and temperature fluctuations and their relations, will be compared with simulations from a fluid model for this geometry. 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, the turbulent structures have a large spatial scale of short lifetime. The amplitude reduction is associated with shrinkage in size of the most coherent structures.

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