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Experimental Relation of Velocity Shear to Turbulence Suppression[1] KENNETH GENTLE, WILLIAM ROWAN, KEN LIAO, KEVIN LEE, University of Texas at Austin — 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 sharp threshold in applied voltage (driven current), the fractional turbulent amplitude is greatly reduced, as is the radial turbulent particle transport. Stabilization is observed for both positive and negative bias. Concurrent measurements of the ion flow velocity are made by Doppler spectroscopy. The ions are cold and give no diamagnetic contribution to the velocity. The turbulence reduction cannot be explained by the standard model of flow shear reducing the radial correlation length and thus turbulent amplitude. For positive bias, neither flow shear increase nor radial correlation reduction accompany the turbulence reduction. For negative bias, the turbulence level and radial correlation decrease before flow shear increases at high bias.

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