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Characterization of Drift-wave Turbulence in the Sheared, Cylindrical Slab KEVIN LEE, KENNETH GENTLE, Fusion Research Center, The University of Texas at Austin — We present an experimental characterization of drift-wave turbulence in the Helimak, a finite realization of the sheared, cylindrical slab used in turbulence calculations. Measurements of electrostatic turbulence are made both using an large fixed array of langmuir probes and a moveable array on a motorized probe drive. We examine such non-spatially oriented quantities as turbulence levels, fluctuation frequencies, and phases between density and electrostatic potential fluctuations. Measurements on dispersion relations and coherence lengths in both the radial and vertical directions are used to characterize the turbulence in the plane perpendicular to the magnetic field. Radial turbulent transport is also investigated. In addition to this information, we present a study of fluctuations parallel to the field lines, including measurements of parallel coherence lengths and parallel wavenumbers. Furthermore, we characterize fluctuations of both radial and vertical magnetic fields. We explore the relationships between density, potential, and magnetic turbulence. Finally, a description of nonlinear aspects of the turbulence in this configuration such as mode coupling and intermittency is offered. To complete our characterization, comparisons to theory are given where possible. Supported by DOE-OFES grant DE-FG02-04ER54766.

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