

A Spectral Analysis for Mode Identification on LAPD Edge Turbulence

D. Schaffner, T.A. Carter, P. Popovich, B. Friedman

University of California, Los Angeles

Edge turbulence in the Large Plasma Device (LAPD) is developed primarily due to the drift-wave instability, but other primary and secondary instabilities related to flow and flow shear (i.e. Kelvin-Helmholtz, rotational interchange) can also be present. A temporal and spatial spectral analysis of LAPD edge turbulence is conducted in an effort to extract details as to which instabilities are active and/or dominant and in which radial region of the plasma. Frequency spectra and time-series data are used to construct wavenumber spectra using a two-point crossphase technique. Wavenumber spectra are then used to calculate m-number spectra for the cylindrical LAPD geometry. Comparing power in m-number spectra with growth rates calculated by a linear two-fluid Braginskii eigenmodes solver, we can identify the presence of both drift-wave modes and non-drift-wave flute modes as well as the radial locations where they are most active. Additionally, mode identification can be confirmed looking at other experimentally measured fluctuation characteristics, such as cross-phase between density and potential.