Experimental investigation of drift instabilities in ExB discharges

NICOLAS GASCON, CHRIS V. YOUNG, ANDREA LUCCA FABRIS, Stanford Univ, TSUYOHITO ITO, Osaka University, MARK A. CAPPELLI, Stanford Univ — Drift plasma instabilities are characterized in three ExB discharges operating on noble gases: two Hall-type plasma thrusters with insulating channel walls (70 mm outer diameter, 20 mm long, and 90 mm outer diameter, 80 mm long), and a small magnetron discharge (5 mm diameter). Plasma instabilities in the ExB discharges are investigated using arrays of electrostatic probes. The signals from the probes arrays are processed with wavelet filtering, and frequency-wavelength dispersion analysis tools. Results are compared to hybrid PIC-fluid axial azimuthal simulations and analyzed in light of recent theories of gradient-driven drift instabilities, in an effort to better understand the relation between drift instabilities and anomalous electron transport in these discharges.

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