Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Fast Sweeping Probe System for Characterization of Spokes in ExB Discharges[1] VALENTIN SKOUTNEV, PAUL DOURBAL, EDUARDO RODRIGUEZ, YEVGENY RAITSES, Princeton Plasma Physics Laboratory — We have developed a rapidly swept, back-to-back 100kHz Langmuir probe system using a variable compensating capacitor scheme to study the temporal evolution of spoke oscillations in Penning discharges, Hall Thrusters and other ExB discharges. Experimental validation of the probe system is done at low and high sweeping frequencies in a stable Penning discharge. Then application of the probe system to measurements of plasma parameter fluctuations in a low frequency (4kHz) rotating spoke and an analysis method using the Hilbert transform are shown. [1] Cross-field electron transport induced by a rotating spoke in a cylindrical Hall thruster, C. L. Ellison, Y. Raitses and N. J. Fisch, Physics of Plasmas 19, 013503 (2012). [2] Transition in electron transport in a cylindrical Hall thruster, J. B. Parker, Y. Raitses, and N. J. Fisch, Applied Physics Letters 97, 091501 (2010). [3]Particle-in-cell simulations of anomalous transport in a Penning discharge, J. Carlsson, I. Kaganovich, A. Powis, Y. Raitses, I. Romadanov, and A. Smolyakov, Physics of Plasmas 25, 061201 (2018).

[1]This work was supported by the Air Force Office of Scientific Research (AFSOR).

Valentin Skoutnev
Princeton Plasma Physics Laboratory

Date submitted: 18 Jun 2018 Electronic form version 1.4