Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Influence of Oblique Magnetic Angle on ExB drift in the Magnetic Presheath[1] DAVID CARON, EARL SCIME, WVU — Magnetically confined plasmas will always be subject to ExB drifts at physical boundaries due to sheath potentials. While electrostatic sheaths are often on the order of millimeters, the magnetic presheath, predicted by Chodura, can extend centimeters further into the plasma. This presheath supplies a potential which couples to the background magnetic field to give rise to an ExB drift. In this work we measured this effect as a function of incident magnetic field angle by inserting a rotatable plate into a helicon plasma. Using laser induced fluorescence and diagnostic probes we measure ion and electron temperatures, flows, and densities at different oblique magnetic field angles and distances from the plate. Our measurements demonstrate a magnetic field angle dependence of the magnitude of the ExB drift. The measurements also show the extent the magnetic presheath penetrates into the plasma. The location of the magnetic presheath boundary has been disputed in theory, but drift speed measurements provide a new backing for predictions.

[1]This work was supported by U.S. National Science Foundation Grant No. PHY-1617880

David Caron
WVU

Date submitted: 29 Jun 2020 Electronic form version 1.4