Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

PHAse Space MApping (PHASMA) Experiment EARL SCIME, CUYLER BEATTY, DAVID CARON, REGIS JOHN, MATTHEW LAZO, OLIVIA LEHKI, JACOB MCLAUGHLIN, MICHAEL MORAN, MITCHELL PAUL, ETHAN SCIME, THOMAS STEINBERGER, DEREK THOMPSON, West Virginia University — A new experiment, called the PHAse Space MeAsurements (PHASMA), features laser induced fluorescence diagnostics for ion measurements, Thomson scattering diagnostics for electron velocity distribution function measurements, and a microwave scattering system for turbulence measurements. PHASMA is designed to enable the direct measurement of ion and electron vdfs in space-relevant plasma phenomena including reconnection, shocks, and turbulence. To create the conditions necessary for different experimental regimes, PHASMA will employ a 5 kW, steady-state helicon source capable of generating variable-density background hydrogen, helium, and argon plasmas with controllable plasma pressure (relative to the magnetic pressure), collisionality, and azimuthal flow shear. Reconnecting flux ropes will be created through the merging of discharges from two pulsed plasma guns. Measurement objectives include fully 3D ivdf measurements in a 3D volume with spatial resolution less than 0.2 cm (the expected electron skin depth in PHASMA) and similarly resolved evdf measurements, in all three laboratory coordinate axes. We present initial ion velocity distribution function measurements, Langmuir probe measurements, and electromagnetic fluctuation measurements in PHASMA.

Earl Scime
West Virginia University

Date submitted: 03 Jul 2019 Electronic form version 1.4