Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Fluctuation Measurements at New Spatial Scales[1] RYAN HOOD, SEAN MATTINGLY, JORGE BERUMEN, University of Iowa, DERETH DRAKE, Valdosta State University, FRED SKIFF, University of Iowa — We present preliminary measurements from a laser induced fluorescence detection system used to resolve ion density fluctuations on spatial scales approaching the ion Debye length $\sim$0.5 mm. The detection system consists of a pair of moveable periscopes which collimate light collected from a small measurement region ($\sim$0.1 cm^3) along the axis of a magnetized singly ionized Argon plasma column. The light is imaged onto a pair of 16-channel linear photomultiplier arrays with digitized photon counting on all 32 channels at 1 MHz or on 8 channels at 4 MHz. The viewing regions may be resolved spatially either along or radial to the magnetic field axis depending on the orientation of the entrance slit. Plasma fluctuations resolved in ion velocity have never been observed at this scale. Measurements may provide insight into transport phenomena, which are fundamentally linked to plasma fluctuations.

[1]This work is supported by U.S. DOE Grant No. DE-FG02-99ER54543

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Date submitted: 12 Jul 2013 Electronic form version 1.4