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Ion Flow and Temperature Measurements in Turbulent CSDX Plasmas DUSTIN MCCARREN, EARL SCIME, West Virginia University, SAIKAT THAKUR, TY LEE, GEORGE TYNAN, University of California San Diego — Experiments in the Controlled Shear Decorrelation Experiment device have shown that an azimuthally symmetric, radially sheared plasma fluid flow arises spontaneously when the primarily axial magnetic field lines terminate on insulating boundaries. Theory suggests that the shear flow is sustained by the Reynolds stress generated by collisional drift turbulence. The measurements were based on Time Delay Estimation, which cannot distinguish between ion fluid velocities and wave phase velocities, and Mach probes, which are perturbative. We present measurements of the radial profiles of ion flows and temperatures as measured with laser induced florescence in argon. The measurements were obtained with a portable, high power (> 350 W), tunable diode laser-based system operating at 668.614 nm. Mode hop free tuning of the laser over 30 GHz permitted the measurement of the entire ion velocity distribution function in a single laser frequency scan. The absolute wavelength was simultaneously recorded for each laser frequency. We will report radial profiles of ion temperature and bulk flow for both turbulent and quiescent flow regimes.

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