Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Measuring the Dependence of Turbulence Characteristics and Transport Behavior on $\rho^*$ Through Dimensionless Scaling Experiment in HL-2A

XIJIE QIN, GEORGE MCKEE, LUCAS MORTON, RAYMOND FONCK, ZHENG YAN, University of Wisconsin-Madison, RUI KE, MIN XU, TING WU, Southwest Institute of Physics, China — The variation of local long wavelength density fluctuation characteristics with $\rho^*$ are measured with beam emission spectroscopy (BES) in HL-2A plasmas while other dimensionless quantities are held nearly fixed, to examine how turbulence and transport depend on $\rho^*$, the dimensionless size parameter. The ion gyroradius is varied while holding other dimensionless parameters ($\beta$, $q$, $\kappa$, $\nu$, $R/a$, $M_A$, $T_i/T_e$) nearly fixed by varying the toroidal field and plasma current and adjusting input power and density accordingly to match profiles. The normalized density fluctuation amplitude ($\tilde{n}/n$), poloidal and radial correlation lengths, decorrelation time, and poloidal velocity are calculated from a 16 (radial) by 2 (poloidal) channel array of BES density fluctuation measurement over the minor radial range, $\rho = 0.2-0.8s$. Initial results demonstrate localized poloidal velocity flow reversals and variation in correlation properties with $\rho^*$. The analysis of turbulence and transport dependence on $\rho^*$ is aimed at predicting confinement in ITER-like large scale plasmas.

Work supported by US DOE under DE-FC02-04ER54698, and DE-FG02-08ER54999, and China CNEIC project 15CMIA194US/UW202.

Xijie Qin
University of Wisconsin - Madison

Date submitted: 02 Jul 2019

Electronic form version 1.4