Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Turbulent Ion Fluctuation Measurements in Negative Triangularity Plasmas[1] DINH TRUONG, GEORGE MCKEE, ZHENG YAN, RAYMOND FONCK, University of Wisconsin - Madison, MAX AUSTIN, University of Texas - Austin, ALESSANDRO MARINONI, Massachusetts Institute of Technology, THE DIII-D TEAM — A new detector array on the UF-CHERS (Ultra Fast CHarge Exchange Recombination Spectroscopy) diagnostic at DIII-D has resulted in significantly improved signal to noise ratio and sensitivity to ion thermal fluctuations. UF-CHERS measures local, long-wavelength Carbon density, ion temperature, and toroidal velocity fluctuations at turbulence-relevant spatiotemporal scales (1 μs time resolution, ˜1 cm spatial resolution which is approximately the turbulence correlation length) from emission of the CVI n=8→7 transition. UF-CHERS and BES fluctuation measurements were obtained in equivalent positive and negative triangularity (δ) discharges with an L-mode edge to compare with theoretical models of turbulence-driven transport and elucidate the mechanisms for improved confinement with negative-δ. Finite coherence is observed between UF-CHERS and co-located BES channels, demonstrating that critical multifield fluctuations such as $<n^*T_i>$and $<n^*v_{tor}>$can be measured. Initial analysis shows positive-δ has radially decreasing, low coherency between ˜20-200 kHz for main ion density (BES) and Carbon density, ion temperature, and toroidal rotation (UF-CHERS) fluctuations.

[1]Supported by DOE grants DE-FG02-08ER54999, DE-FC02-04ER54698, and NSF GRFP grant DGE-1256259.

Dinh Truong
University of Wisconsin - Madison

Date submitted: 13 Jul 2017 Electronic form version 1.4