Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Collisionality Dependence of 2D Inter-ELM Pedestal Fluctuation Measurements MAXIMILLIAN MAJOR, ZHENG YAN, DAVE SMITH, GEORGE MCKEE, University of Wisconsin - Madison, UNIVERSITY OF WISCONSIN - GENERAL ATOMICS BES GROUP COLLABORATION — Localized 2D measurements of density fluctuations in the H-mode pedestal of DIII-D plasmas reveal a range of broadband modes that vary temporally and spatially during the inter-ELM cycle. These measurements are obtained with Beam Emission Spectroscopy and a new higher radial resolution $(\Delta R\sim 0.8 cm)$ Charge eXchange Imaging (CXI) prototype diagnostic. Fluctuation characteristics will be presented as a function of collisionality, which has been predicted to impact the growth rate of microtearing modes (MTM) and other pedestal-localized instabilities in ELM'ing H-mode plasmas. MTMs are predicted to cause electron thermal transport in the pedestal and other regions of high-beta plasmas. A future optimized CXI diagnostic will measure carbon density fluctuations at the pedestals with up to 3-4 mm radial resolution and complement the Beam Emission Spectroscopy (BES), which is limited to about 1 cm radial resolution. This will enhance sensitivity to fluctuations localized to the narrow pedestal range, potentially enabling the detection of MTM as well as other pedestal instabilities, and their dynamics in between ELMs. Preliminary analysis with prototype data indicates that CXI's enhanced radial resolution resolves multiple simultaneously coexisting inter-ELM instabilities.

Maximillian Major
University of Wisconsin - Madison

Date submitted: 28 Jun 2020 Electronic form version 1.4