Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

**Phase Contrast Imaging and Analysis of Turbulence Dynamics in the H-mode edge on DIII-D**[1] J.C. ROST, A. MARINONI, M. PORKOLAB, MIT-PSFC — Recent analysis of H-mode edge plasma turbulence measured by Phase Contrast Imaging (PCI) suggests a significant difference in the flow of energy in the fluctuation spectrum compared to L-mode plasmas, with an H-mode spectrum dominated by large sinks in the ITG range while L-mode turbulence is consistent with a cascade to high wavenumber. Earlier analysis of PCI measurements of the line-integrated density fluctuations in H-mode [Rost et al, Phys. Plasmas 21 (2014) 062306] represented the turbulence by spectral moments such as wavenumber and correlation length and generated implausible results even for the H-mode edge, including $k_r > k_\theta$ and sub-mm radial correlation lengths. Re-analysis with a new model was able to successfully match the experimental data by assuming a non-Gaussian turbulence spectrum. A Gaussian turbulence spectrum results from strong wave-wave interactions and a cascade to damped short wavelength modes, while the non-Gaussian spectrum results from large energy sinks in the ITG range. While validation metrics used in comparing theoretical models to diagnostic measurements often focus on quantities derived from spectral moments, such as correlation lengths, these results suggest that the full 2-d spectrum is vital to such comparisons

[1]Work supported by the US Department of Energy under DE-FG02-94ER54235, DE-SC0016154, and DE-FC02-04ER54698.

Jon Rost
MIT-PSFC

Date submitted: 26 Jun 2020 Electronic form version 1.4