Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Synthetic Gas Puff Imaging Diagnostic for the XGC1 Turbulence Code[1] D.P. STOTLER, S.H. KU, S.J. ZWEBEN, R.M. CHURCHILL, C.S. CHANG, PPPL, J.L. TERRY, MIT — The full-f edge gyrokinetic code XGC1 has been used recently to study problems of significant interest, such as the divertor heat flux width[2] and the L-H transition[3]. Moreover, XGC1 simulations of the heat flux width in ITER have different edge turbulence characteristics that lead to widths large relative to those based on empirical scalings. To be confident that this and other XGC1 predictions are accurate will require more detailed validation tests of the code against experimental data. One invaluable source of such data is the gas puff imaging (GPI) technique, which measures edge plasma turbulence. We have developed a synthetic GPI diagnostic for XGC1 based on the DEGAS 2 neutral transport code, allowing a direct comparison of simulated and observed turbulence characteristics, such as fluctuation amplitude, auto-correlation time, and correlation lengths. The DEGAS 2 simulations are 3-D and have sub-microsecond time resolution; both Alcator C-Mod fast camera and APD images are produced. We will describe the synthetic diagnostic and present an initial comparison of its results with the corresponding GPI data from two C-Mod discharges.

[1]This work supported by US DOE contracts DE-AC02-09CH11466 and DE-FC02-99ER54512.
[2]C.S. Chang et al., Nucl. Fusion 57 (in press; 2017).
[3]C.S. Chang et al., Phys. Rev. Lett. 118, 175001 (2017).

Daren Stotler
Princeton Plasma Physics Lab

Date submitted: 13 Jul 2017 Electronic form version 1.4