

GPI (edge turbulence) experiments

R. J. Maqueda, S. J. Zweben, et al.

- Edge turbulence physics
- H-mode physics (ELMs)
- Preliminary experiments and measurements

Upgrades for FY03 (GPI)

- New manifold position, optimized for 1 MA, 4.5 kG.
- Improved light collection optics (~x10).
- ...PSI-V camera (312 frames vs. 28 frames) at up to 1 MHz frame rate.



Edge turbulence physics

Motivation

Test edge turbulence simulation models over the normal operation range of NSTX (without attempting control)

Experiment

- Measure frequency spectra, k-spectra and fluctuation levels.
- Coordinate with all available diagnostics (GPI, probes, reflectometer).
- Need time-averaged edge profiles (n, Te, Ti, EFIT, etc.).
- Model edge using UEDGE to estimate 2-D edge profiles.
- Use BOUT (and other codes) to compute edge turbulence.

-> compare measured and simulated edge turbulence results

Needs

- Define subset of experimental conditions (LSN H&L modes, Te scan, etc.).



H-mode physics

Motivation

- What are the edge turbulence characteristics during the L->H and H->L transitions?
- What are the ELMs?
- What is the relationship between “edge turbulence” and blobs/intermittency?

Experiment

- Use GPI with PSI camera to follow transitions and ELM onset.
- Coordinate with all other available fast diagnostics.

Needs

- PSI camera.
- “Transition” trigger for PSI camera.



Preliminary experiments and measurements

“exploration”

Experiments

- Observe inner gas puff.
- Edge turbulence during HHFW.
- Divertor biasing using CHI hardware (LSN Ohmic? discharges)

Needs

- Use Kodak system...
- Is HHFW compatible with GPI?
- Biasing...

