Edge Turbulence Physics with Enhanced GPI

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Physics Issues & Questions:

Identification of edge zonal flows

- Edge poloidal flow relationship with turbulence
- Identification of GAMs in NSTX

L-H transition physics

• Limit-cycle behavior predicted/observed

ELM physics/transport

• Impact of turbulence and 3-D fields on ELMs

Effect of 3-D fields (RMP) on edge turbulence and flow

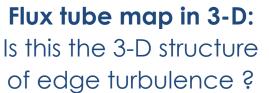
Mapping of turbulent structures as flux tubes deform

 Lithium effects on edge behavior

RF Coupling

Needs Addressed with Upgraded GPI

- Expand views from 1 to 5 (or 6)
- At least 2 toroidally-separated views (alternate phasing of RMP)
 - Above/below midplane
 (along common B-field line)
 - Toroidally-separate midplane
 - Tangential X-point view
 - Top-down divertor view
 - Inboard limiter view
- Re-entrant ports/windows and additional fast cameras/fibers (possibly faster than current gen)
- Increase poloidal view from 25 cm to 40 cm
- Develop/test narrower sheet of neutral gas (sharpen images)
- Combine measurements with:
 - > edge-rotation diagnostic
 - > edge/divertor probe arrays
 [map along common B-field]



Farina, Pozzoli, Ryutov

NF 1993

GPI views to follow 3-D structure of B

