

# Boundary Physics Experimental Task Group Session & Strategy Summary

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# Boundary Physics Experimental Task Group Session Summary



- There were 17 Experimental Proposals presented and discussed for Implementation in FY03
- and 3 Post Deadline Proposals
- The Experimental Proposals were focused on the FY03 Milestone (Heat Flux) and the goals given in the operative NSTX Boundary Physics 5 Year Plan (Forum-98, WG5 Rpt) in the following areas:
  - Power and Particle Control
  - Edge Characterization
  - Divertor Physics
  - Confinement and Transport

# Boundary Physics Experimental Task Group Session Summary



- 2 XP's can be consolidated into one 2-Day Boundary Physics Group Characterization (XP-217, rev-2)
- 9 XPs will require dedicated time
- 4 XP's can be accommodated in Parallel with other XP's (Piggy Back)
- 8 XP's facilitate operations and can be accommodated as Cross Cutting Enabling XPs
- 5 XP's involve Collaborative Proposals

# Presentations: NSTX Forum 2002, ET Breakout II & IV: Boundary Physics



## Power & Particle Control

TITLE	AUTHOR (Presenter)
Heat Flux and Particle Flux Scaling vs. Heating Power, Density, and plasma current in NSTX	R. Maingi
ALIST Liquid Surface Module and NSTX Boundary Physics Research	R. Kaita
Boron and Lithium Pellet Injection	H. Kugel
Deuterium Pellet Fueling Scoping Studies for NSTX	L. Baylor (H. Kugel)
Assessment of Helium Conditioning On Confinement	C. Skinner
Fuelling with TMB for Conditioning Plasma Wetted Surfaces and Establishing Low-Z Mantle	H. Kugel
Plasma fueling using lower dome gas injector (pre-requisite to divertor regimes XP)	V.Soukhanovskii
Development of mitigation scenarios for neon GDC	V.Soukhanovskii

## Edge Characterization

TITLE	AUTHOR (Presenter)
Characterization of the Boundary Layer and Power Flow to the Divertor, XP 217, Rev 2	S.Paul
Quartz Crystal Deposition Monitor Experiments	C.Skinner
Characterization of edge neutral pressures in NSTX Ohmic and CHI discharges	R. Raman
Fast transport in NSTX / Spherical Torus Scrape-Off-layer	A. Pigarov

# Presentations: NSTX Forum 2002, ET Breakout II & IV: Boundary Physics



## Divertor Physics

TITLE	AUTHOR (Presenter)
Scanning of strikepoint with flush-mounted Langmuir Probes	C. Bush
Divertor regimes for advanced NSTX plasmas	V. Soukhanovskii
Effect of grad-B drift direction on edge and divertor properties	R. Maingi

## Confinement & Transport

TITLE	AUTHOR (Presenter)
Edge Turbulence Control via Wall Biasing or Edge Fueling	S.Zweben
Establishing H-modes in NSTX with highly conditioned walls and low neutral influx	C.Bush

# ET-Boundary Physics Strategy Summary



XP (Topic)	Collab Proposal	Number of BndPhys Days	Number of Enabling Days	How Many Conditions (Ohmic,NBI,R F, P.B)	Any Time Filler XP	Deliverables
Heat Flux (R. Maingi)		3d		Ohmic, NBI CSL,LSN,DN	YES	FY-03 Milestone
Liquid Surface Module (R. Kaita)	YES	piggyback				FY-03 Decision
Boron & Li Pellet Inj (H.Kugel)			2d	Ohmic, NBI CSL,LSN,DN	PB PHDC	Particle Control
Deuterium Pellet Inj (L. Baylor)	YES		2d	NBI		Particle Control
He Discharge Cond. (C. Skinner)	YES		2d		PB	Particle Control
TMB fueling (H. Kugel)			1d	NBI	PB PHDC	Particle Control
Lower Dome Fueling (V.Soukhanovskii)			1d		YES	Particle Control
NEON GDC Mitigation (V.Soukhanovskii)			1d	RF	After NeGDC	Particle Control
Edge Characterization XP-217 (S. Paul)		2d		Ohmic, NBI CSL,LSN,DN	PB	IPPA Objectives 3.2.1 & 3.1.4.1
QuartzXtalDepMonitor (C. Skinner)		piggyback				IPPA Objective 3.1.4.3

## Notes

**PB** = Post Boronization

**PHDC** = Post He Discharge Conditioning

# ET-Boundary Physics Strategy Summary (cont.)



XP (Topic)	Collab Proposal	Number of BndPhys Days	Number of Enabling Days	How Many Conditions (Ohmic,NBI,R F, P.B)	Any Time Filler XP	Deliverables
Neutral Pressure (R. Raman)		piggyback				FY-03 Decision Particle Cntrl
Fast transport (A. Pigarov)	YES					IPPA Objectives 3.2.1 & 3.1.4.1
LP Strike-Point Scan (C. Bush)		0.5d	0.5d	NBI	YES	ST Strike-Point Location
Divertor Regimes (V.Soukhanovskii)		1d		NBI	YES	Power Control
Grad-B Drift (R. Maingi)		0.5d	0.5d	NBI	YES	ST Physics IPPA 3.2.1
Edge Biasing /Fueling (S. Zweben)		1d		NBI	YES	C&E Coupling IPPA 3.1.4.2
Optimizing H-mode (C. Bush)		1d		NBI	PB	C&E Coupling IPPA 3.1.4.2
ELM & Pedestal Phys (J. Boedo)		1d			PB	C&E Coupling IPPA 3.1.4.2
Edge transport (J. Boedo)		1d			PB	C&E Coupling IPPA 3.1.4.2
Non-maxwllian effects (J.P. Matte)	YES	piggyback				IPPA Objectives 3.2.1 & 3.1.4.1
Totals		11	10			

## Notes

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# ET-Boundary Physics Summary



- **Distribution of XP Run Days is about half between Boundary Physics and Cross Cutting & Enabling**
  - **Boundary Physics XP's - 11 days**
  - **Cross Cutting & Enabling - 10 days**
- **The required Boundary Physics XP days are 13% of total**
  - **$10 \text{ d} = 0.13 [ 105\text{d} - 28\text{d} (\text{CC\&E} + \text{Scientific Contingency})]$**