

Summary and motivation for the XP's presented at NSTX FY'03 Research Forum

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Presented XP's

- Achievement of Divertor Detachment in NSTX
- Assessment of Neon Glow Discharge and development of mitigation scenarios
- Plasma fueling from LDGIS
- A. Pigarov (UCSD) - Fast transport L-mode comparison

- New addition: Daily fiducial XMP (XMP-21 mod)

Divertor detachment in NSTX

- **Goal:** attempt to obtain a clear detached divertor state and assess main plasma parameters (confinement, impurities)
- **Target plasma:** 1 MA LSN NBI-heated (1 - 2 src), with heavy puffing D₂ and Ne in flat-top phase
- **Required diagnostics:** MPTS, CHERS, magnetics, spectroscopy, bolometry, cameras, probes
- Would benefit from following Heat Flux Scaling XP
- Would benefit from Divertor Langmuir Probes

Assessment of Neon Glow Discharge

- **Goal:** (1) assess and (2) understand PFC conditions after NeGD (run fancy fiducial discharges)
- **Comment:** - NeGD is used for CHERS in situ calibration
 - In FY'02 one hour NeGD caused problems
- **Target plasma:** 1 MA IWL, LSN, DND NBI-heated (1 - 2 src) (2-3 shots), following by 4 - 6 MW HHFW heated plasmas (2 - 3 shots)
- **Required diagnostics:** MPTS, CHERS, magnetics, spectroscopy, bolometry, cameras, probes
- May be reduced (replaced by) to 1-2 standard fiducials for short term assessment only

Plasma fueling from LDGIS

- **Goal:** attempt to obtain plasma with fueling from LDGIS and assess fueling efficiency and plasma performance
- **Comment:** XP can be expanded into “Fueling XP” and include characterization of new HFS and other gas injectors
- **Target plasma:** 0.8 MA LSN ohmic plasma fueled from one injector at a time (6 - 8 shots)
- **Required diagnostics:** MPTS, pressure gauges, spectroscopy
- Can be run before NBI comes on-line

Edge transport in L-mode “simple as possible” plasmas (A. Pigarov (UCSD))

- **Goal:** Characterize heat and particle edge transport in L-mode “simple as possible” plasmas
- **Comment:** - Simple plasmas - easier to scan parameters
 - UEDGE modeling converges for L-mode profiles
 - Continuation of previous work at NSTX
 - Inter-machine comparison
 - Collaborator’s proposal
- **Target plasma:** 1 MA LSN NBI-heated plasmas - scan density, magnetic field, inner gap, input power (0.5 - 1 day)
- **Required diagnostics:** MPTS, CHERS, reflectometer, magnetics, spectroscopy, bolometry, cameras, probes
- Would benefit from following Heat Flux Scaling XP
- Would benefit from Divertor Langmuir Probes
- Important deliverables - edge transport publications

Daily fiducial XMP (modification of XMP-21)

- **Goal:** assess machine performance, PFC conditions, diagnostic operations by running 1-2 *different* fiducial discharges every day
- **Target plasma:** 1 MA ohmic and 2-src NBI H- and L-mode IWL, LSN, DND plasmas
- **Required diagnostics:** all available
- **Comments:**
 - run one magnetic configuration a day
 - collect a database of "standard" various types over a run
 - assess fuel source distribution
 - assess impurity production and distribution