Status of NSTX XP's under development

V. A. Soukhanovskii in collaboration with NSTX Research team

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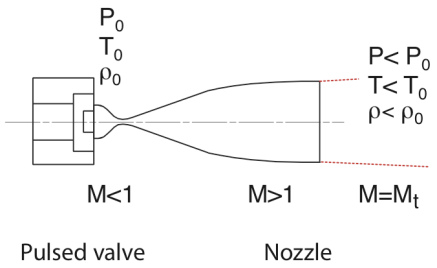
Supersonic gas injector - XMP and XP

• **Goal:** XMP - commission SGI; XP - evaluate and optimize fueling efficiency, demonstrate compatibility with H-mode, HHFW heating, explore potential for density control and ELM mitigation; demonstrate diagnostic applications

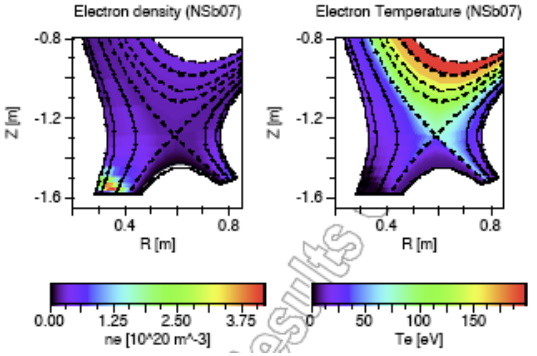
• **Prerequisites:** Supersonic Gas Injector mounted on NSTX
• **Target plasma:** 0.4-0.6 MA LSN / DN ohmic for XMP; ohmic, L- and H-mode plasmas with NBI and HHFW for XP
• **Present status:** Probe and parts are in procurement. Nozzle performance is being evaluated. Modeling of nozzle and NSTX exp'ts with DEGAS 2 is being discussed.

• **Suggested run date:** April-May 2004



Divertor detachment XP

- **Goal:** obtain a clear detached divertor state (1/ inner leg detached, outer leg attached 2/ both inner and outer legs detached); develop means (D_2, impurity puffing; locations) and assess threshold; assess main plasma parameters (confinement, impurities).
- **Prerequisites:** Well-developed LSN plasma with NBI and outboard gas fueling; D_α, D_γ filters for divertor m-ts, divertor Langmuir probes, predictive UEDGE runs
- **Target plasma:** 0.8-1.0 MA L- and H-mode LSN plasmas with NBI, pref. outboard fueling, neon injection
- **Present status:** XP ready for ET Group review, filters on order, Langmuir probes - **??**
- **Suggested run date:** April-May 2004

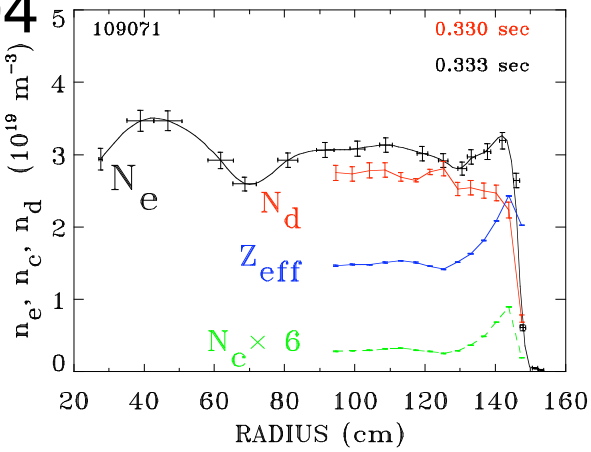


Simple as Possible (SAP) plasmas for edge transport and turbulence studies

- **Goal:** obtain simple ohmic and L-mode **steady-state** plasmas with maximum diagnostic coverage and compare to predictions from state-of-the-art models of edge turbulence and transport
- **Prerequisites:** Well-developed LSN plasma with NBI and steady-state density; guidance from UEDGE, BOUT, DEGAS 2 modeling groups (LLNL, UCSD, PPPL). Availability of edge turbulence diagnostics - UCSD probe, GPI, Divertor fast camera, FIReTIP. Assume all other diagnostics are working - ??
- **Target plasma:** 0.6-1.0 MA LSN ohmic and L-mode plasmas with NBI and outboard fueling
- **Present status:** UEDGE/BOUT predictive modeling in progress (NSTX shot 109033)
- **Suggested run date:** May-July 2004

Carbon sources and edge transport

- **Goal:** Evaluate carbon sources, relative strength, screening, edge transport in L- and H-mode LSN and DN plasmas with NBI and HHFW
- **Prerequisites:** Diagnostics - MPTS, CHERS, ERD, C cameras, UCSD probe
- **Target plasma:** 0.8-1.0 MA L- and H-mode LSN, DN plasmas with NBI, HHFW, pref. outboard fueling, possibly CH_4 injection
- **Present status:** camera filters on order
- **Suggested run date:** end of run FY' 04



No-plasma conductance measurements

- **Goal:** Initial evaluation of gas conductances through NSTX vacuum vessel inner structures using DEGAS 2 modeling and pressure measurements
- **Prerequisites:** Calibrated pressure gauges, calibrated gas injectors
- **Present status:** (almost) ready to execute
- **Suggested run date:** February-March 2004, no dedicated time needed
- **Target plasma:** no plasma