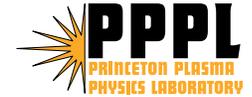


Density Control through plasma termination control.



C. H. Skinner, D. Mueller, R. Maingi
 NSTX Research Forum Nov 10-12, 2003

Motivation:

The IPPA 5 year goal for end FY 2005 includes:
 “Determine the ability for managing intense energy and particle fluxes in the edge geometry and for increasing pulse durations...”

Review: FY2003 XP304:

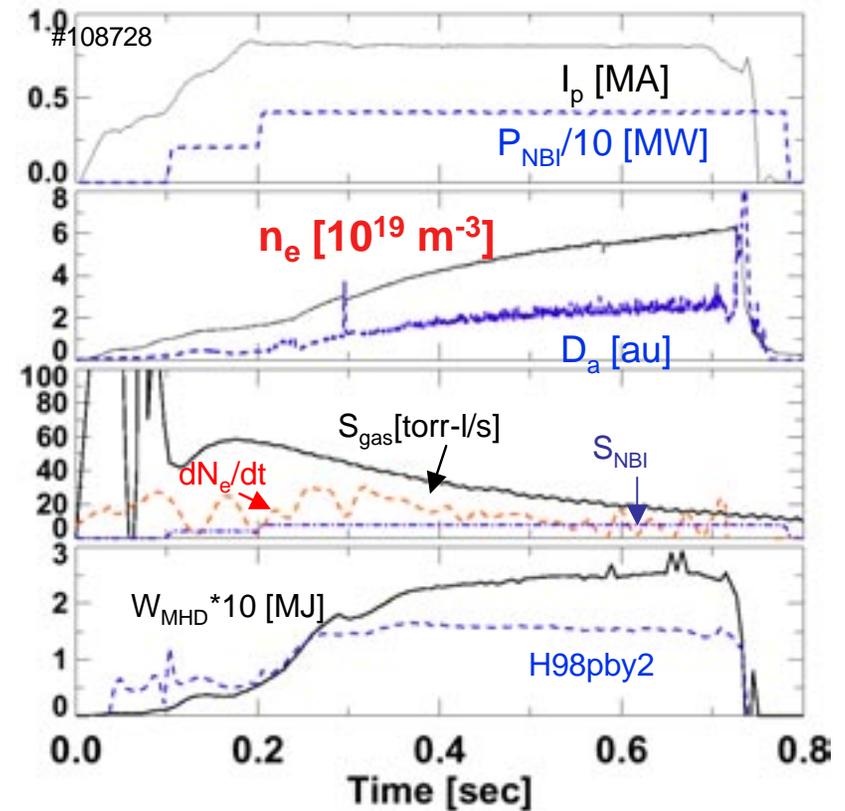
Goal 1: Assess role of divertor temperature in density rise and impurity generation by strike point jog.

Result: roll over in density observed after jog, but motion away from CS caused major part.

Goal 2: Reduce density rise by depleting D in divertor with He conditioning with NBI

Result: Modest change - after 17 discharges D-alpha decreased by 40% cf x10 TFTR.

Uncontrolled (non-disruptive) density rise in long pulse H-modes



Next step ?

Potential factors in XP 2003 run 11th February:

- Heat flux profiles on divertor not matched
 - Inefficient gas fueling during discharge (unlike TFTR)
 - H-mode physics (SOL transparency, transport barrier)
 - Tail end disruptions.
-
- Rajesh, Dennis note:
 - RF heated Helium discharges of Feb 11th 2003 did a much better job of degassing tiles than NBI heated ones.
 - Every He conditioning discharge ended with a disruption whereas Dennis took care that Feb 11th discharges did not.

Explore density control in XP.

Comparison of 110118 (toward end of He conditioning XP304 11 Feb 2003)
and
110162 (toward end of HHFW CD XP 312 12 Feb 2003)

Shots:
110118
110162



Draft Conceptual Proposal for XP:

- Establish long pulse H-mode fiducial
- Run RF heated He discharges of XP 312 Feb 12th 2003 to deplete limiter
- Repeat attempts at long H-modes - check for reduced density rise.
- Identify density dependence on:
 - plasma termination
 - RF power
 - He gas feed.

