

Comparison of H-mode Pedestal Characteristics with RF and NBI

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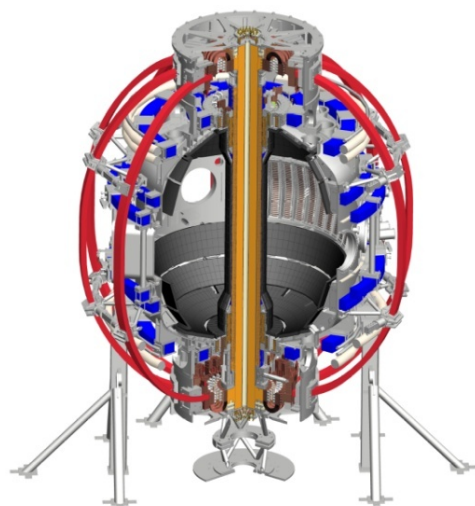
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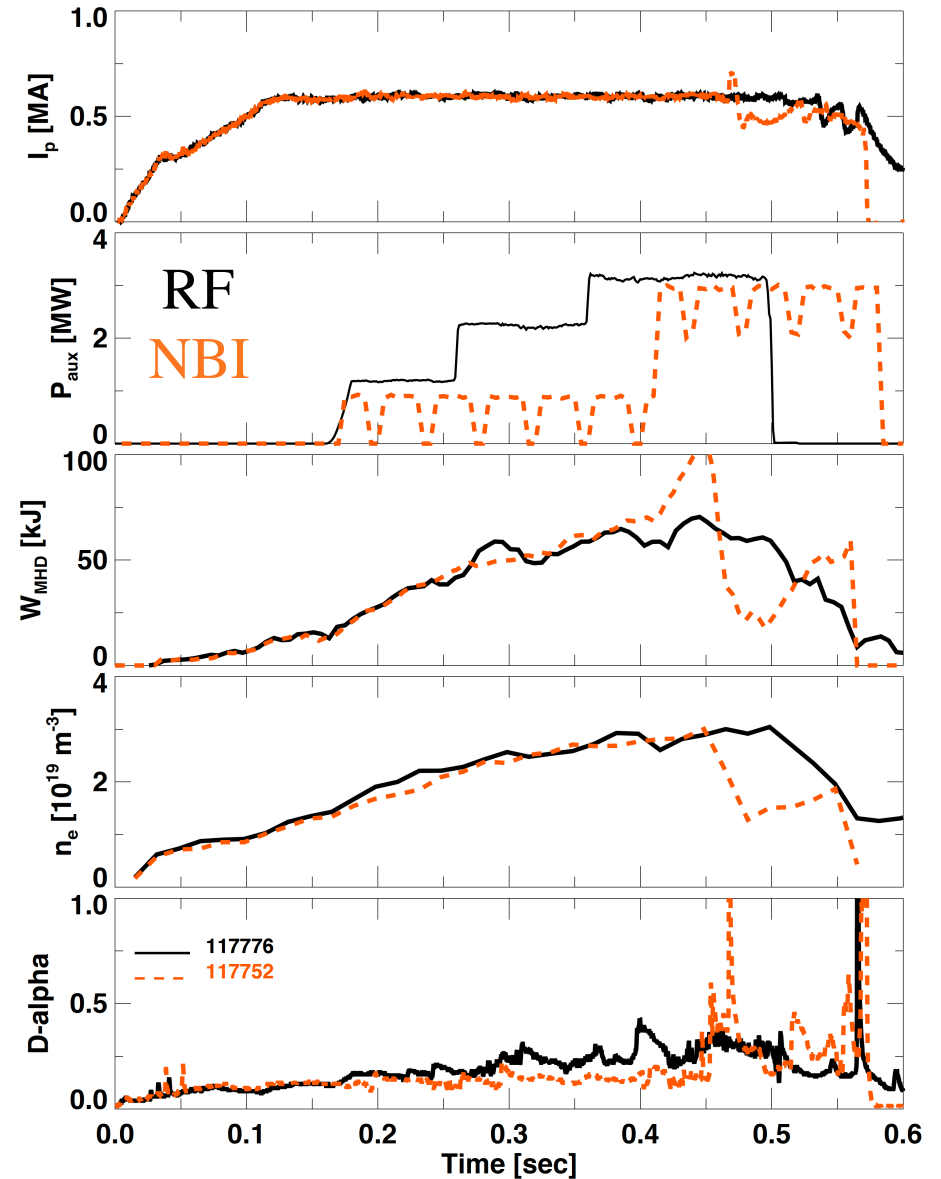
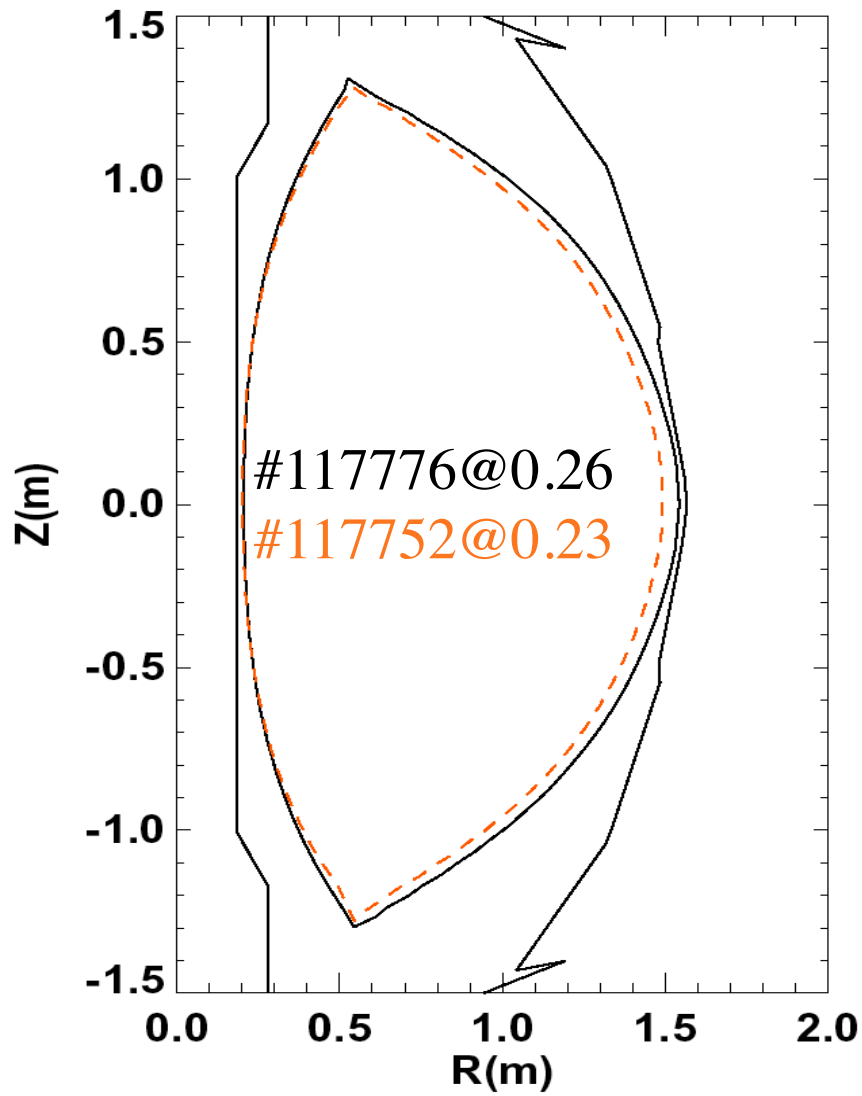


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Goals and Background

- Goal: systematic comparison of the pedestal characteristics of RF heated H-modes with NBI heated H-modes
 - Relevant because the RF does not input momentum or particles
 - The same shape should be used to the extent possible, including outer gap
- A reasonable comparison of RF and NBI heated H-modes was done in 2005 as part of XP505
 - The goal of the experiment was to measure the L-H power threshold
 - Quasi-steady H-mode phases with the same heating power were not compared
- Since that time, the Thomson system has been upgraded (up to 42 channels, from 20), and poloidal CHERs has been added
 - Also the outer gap was smaller in the previous RF discharges
- Here we hope to use larger outer gaps, possibly in double-null configuration, to get comparable gaps for the RF and NBI discharges
- A 3-point power scan is proposed as the central point

Discharges with matched n_e possible at medium I_p



Experimental Plan (1 day – maybe Piggyback?)

- Start with a double-null discharge with good H-mode access using RF heating
 - In the previous XP505, this was optimized at low triangularity ~ 0.5 , and $I_p \sim 0.6$ MA to overlap with NBI H-modes, e.g. #117776 (RF) and #117752 (NBI)
 - Consider a low I_p , higher triangularity fiducial-like shape, if H-mode access with RF was established previously in the FY11 run in that configuration
- Tweak the outer gap to as large of a value as possible (but < 10 cm) to get as close to an NBI shape and the high-resolution edge Thomson as possible
- Perform a three-point power scan; time permitting, on a shot-to-shot basis, otherwise with three power steps in a single discharge
- Time permitting, repeat the RF discharges with NBI blips
- Reproduce the obtained power ramps in RF with NBI
- Time permitting, use RF solely to access H-mode, and then replace the RF with NBI after the L-H transition