XP 709: SOL width scaling (Feb. 22, 2007)

- Goal: measure the I_p and B_t dependence of the SOL n_e, T_e, particle and heat flux widths at the outer midplane
  - The first three quantities are measured by the reciprocating probe (Boedo, Ahn), and the latter one is obtained from the divertor IR camera (Maingi) data after field line mapping
  - Also obtain SOL turbulence data (Maqueda)
- Ultimate aim: devise a physics-based model to extrapolate the measured SOL widths for NHTX, to better predict the heat and particle flux footprints for PFC design

- Requirements: 200ms quasi-steady window free of large excursions for optimum reciprocating probe data

- Result: obtained good IR camera data (analysis in progress), but nearly all discharges only had at most a 100ms steady phase, plagued by a reconnection that varied in time
  - Probe plunged into the scrape-off layer in many discharges, but a reconnection or large event often hit the probe, causing arcing -> analysis in progress

- Will require more run time to complete
- General comment: steady PF2L LSN discharge not yet obtained, hopefully will improve with machine conditions over next few weeks

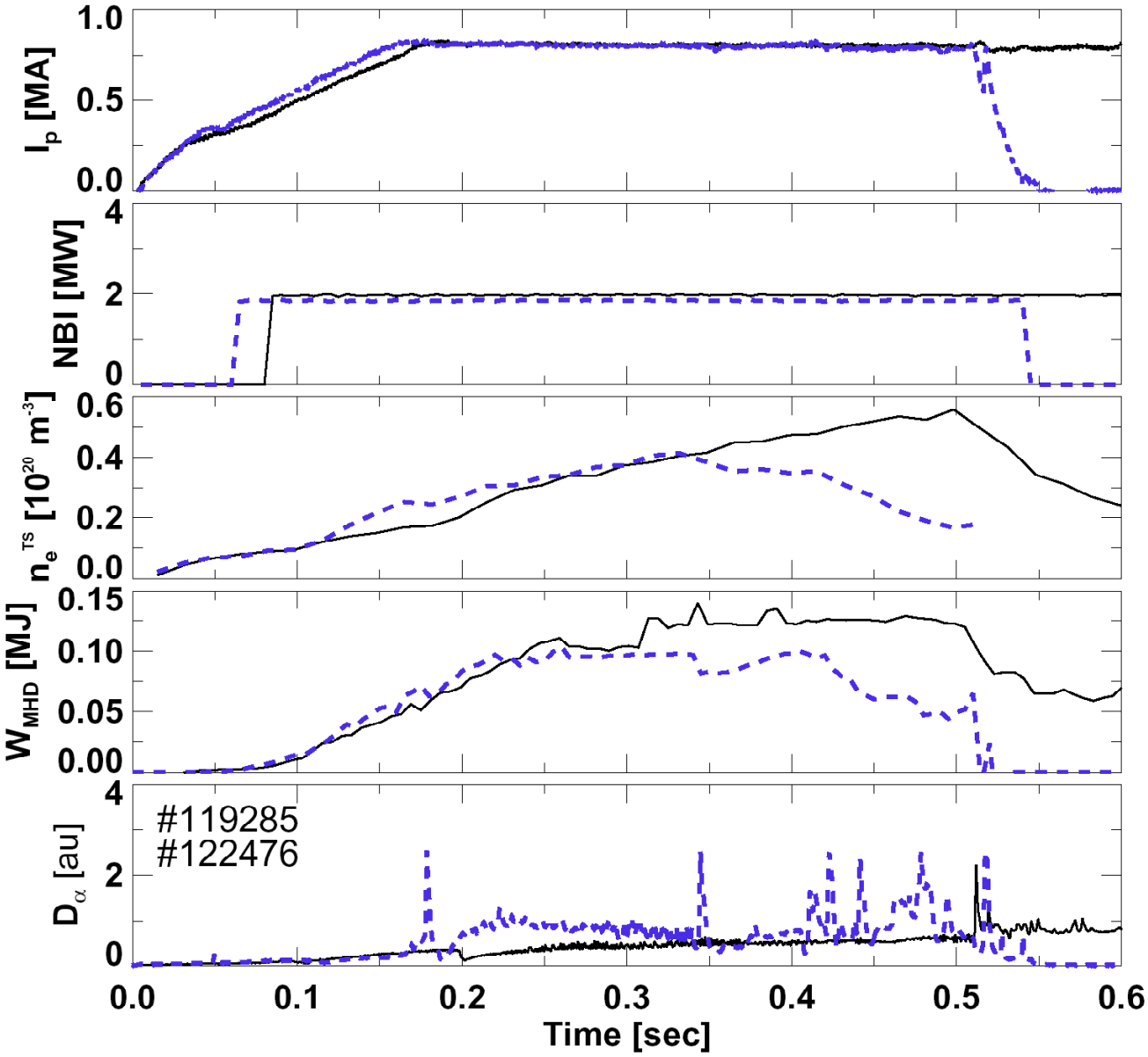
XP 709: SOL width scaling shot plan (Feb. 22, 2007)

- Reproduce baseline PF2L LSN #119083 or newer version from 2007 with 1100-1200 Torr on CS to suppress large ELMs, B_t=0.4 T, and P_{NBI}=3 MW. Use source C at reduced voltage to get 3 MW. **If discharge does not have a minimum 200ms quasi-steady period**, consider either increasing B_t to 0.44 T or κ to 2.2 for higher q_{95}. (5 shots)
- Repeat above with P_{NBI}=5 MW + src B. (2 shots)
- Perform I_p scan at approximately fixed q95 (at fixed I_p/B_t=2, or 1.818 if B_t=0.44 T is used above) and at P_{NBI}=3 MW, 5 MW (15 shots)

I. 1.1 MA, 0.55 T (1.0 MA, 0.55 T if lower I_p/B_t)
II. 1.0 MA, 0.5 T (0.9 MA, 0.495 T if lower I_p/B_t)
III. 0.9 MA, 0.45 T ~~(1.1 MA, 0.55 T to test I_p scaling)~~
IV. 0.7 MA, 0.35 T (0.7 MA, 0.385 T if lower I_p/B_t)
V. 0.8 MA, 0.4 T (0.8 MA, 0.44 T if lower I_p/B_t)

- ~~Time permitting: Perform B_t scan at I_p=0.8 MA, P_{NBI}=5 MW (6 shots)~~

~~I. 0.8 MA, 0.55 T~~
~~II. 0.8 MA, 0.35 T~~
~~III. 0.8 MA, 0.5 T~~


1.0
0.5
0.0
I_p [MA]
4
2
0
NBI [MW]
0.6
0.4
0.2
0.0
n_e^{TS} [10^{20} m^{-3}]
0.15
0.10
0.05
0.00
W_{MHD} [MJ]
4
2
0
D_α [au]
#119285
#122476
0.0
0.1
0.2
0.3
0.4
0.5
0.6
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