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NSTX

Profile Comparisons from the MAST/NSTX Power Threshold Identity Experiment

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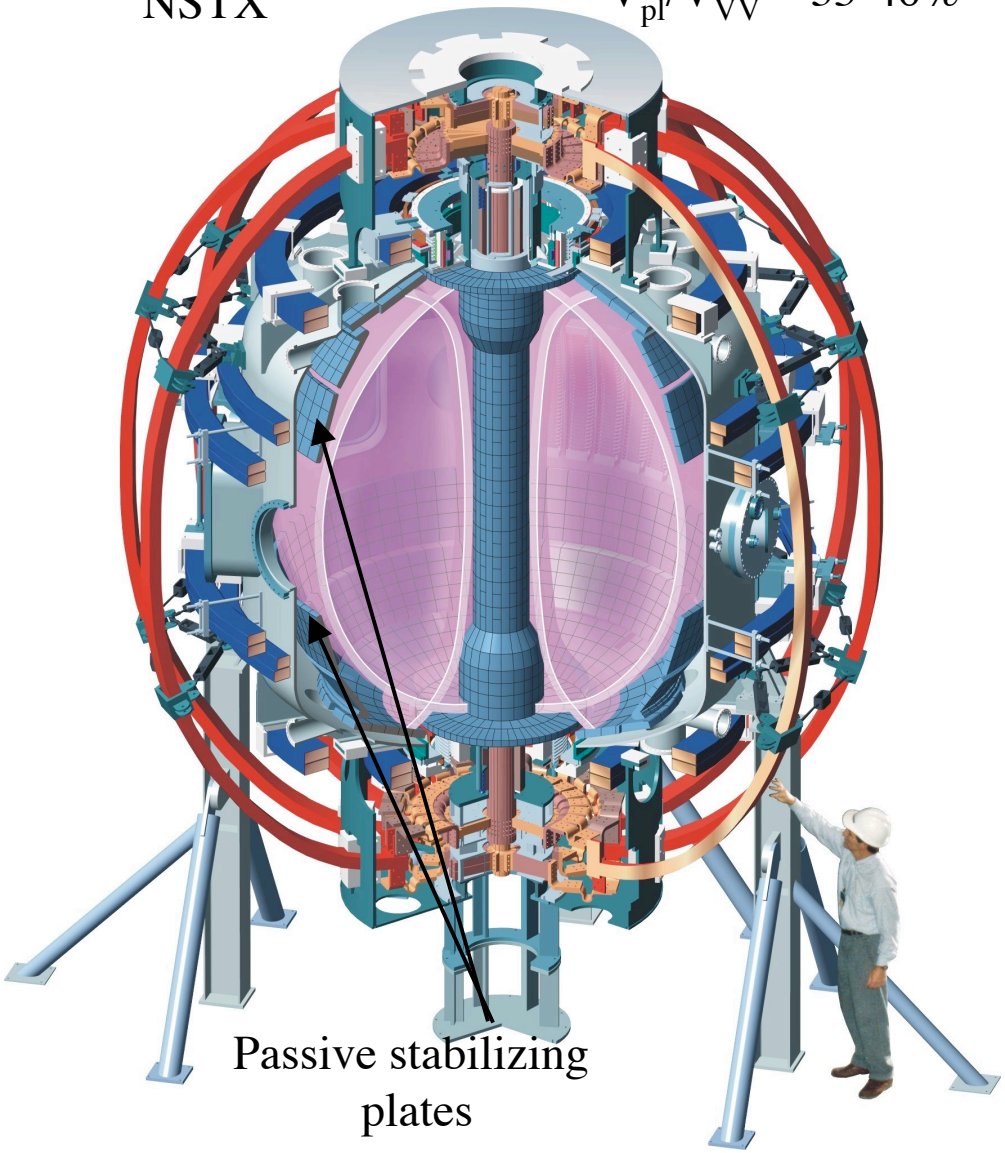
NSTX and MAST save similar plasma size but MAST vacuum vessel larger and outer walls further away

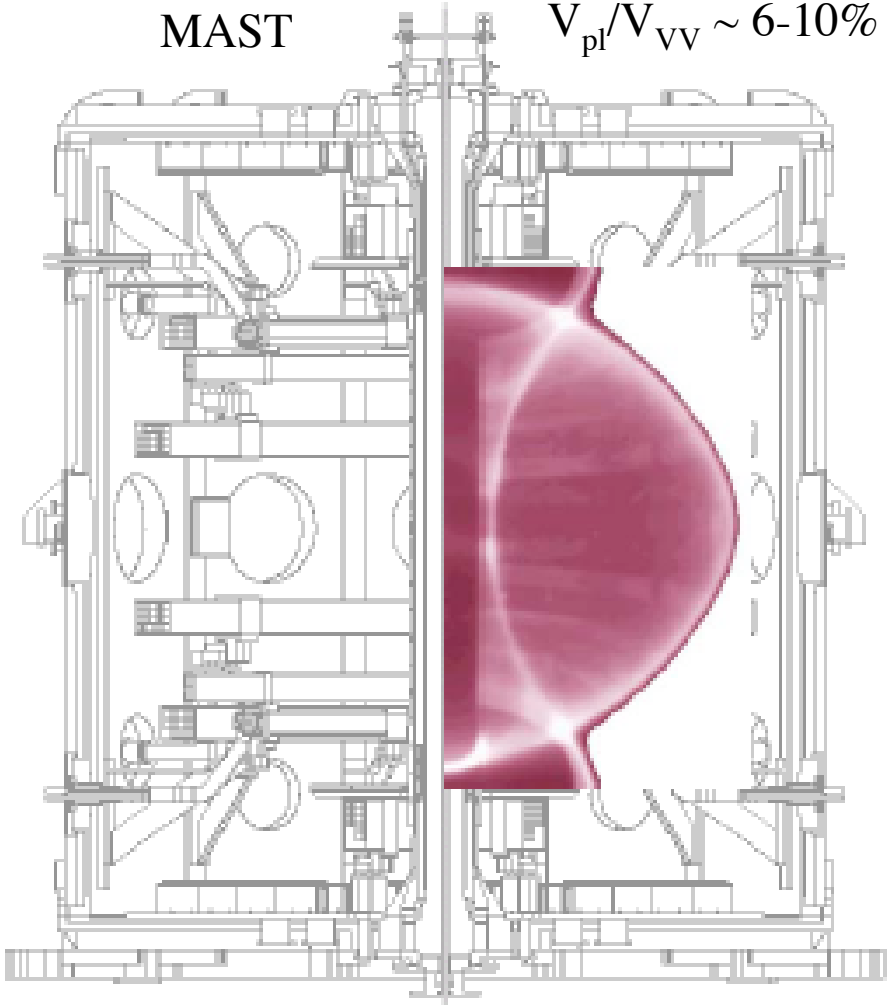
NSTX

V_{pl}/V_{VV} ~ 35-40%



MAST

V_{pl}/V_{VV} ~ 6-10%



First Detailed MAST/NSTX Identity Experiment Has Been (Nearly) Completed!

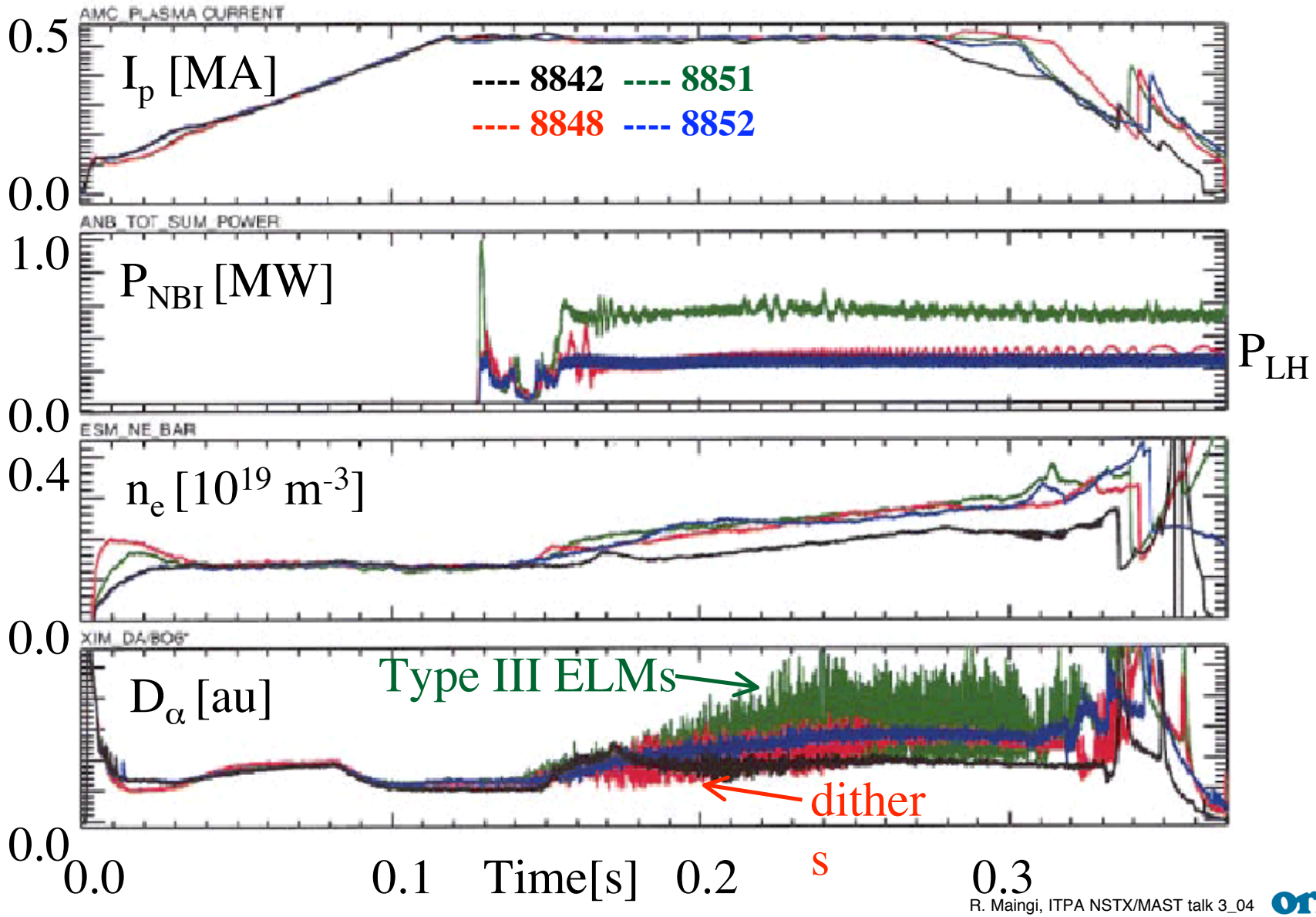
Goals:

- compare L-H power threshold in same CDND (double-null with drsep < 3mm) shape with same I_p, B_t, density, inner-wall midplane fueling location, etc.
- determine if P_{LH} lowest with drsep=0 (go to +/- 10 mm)

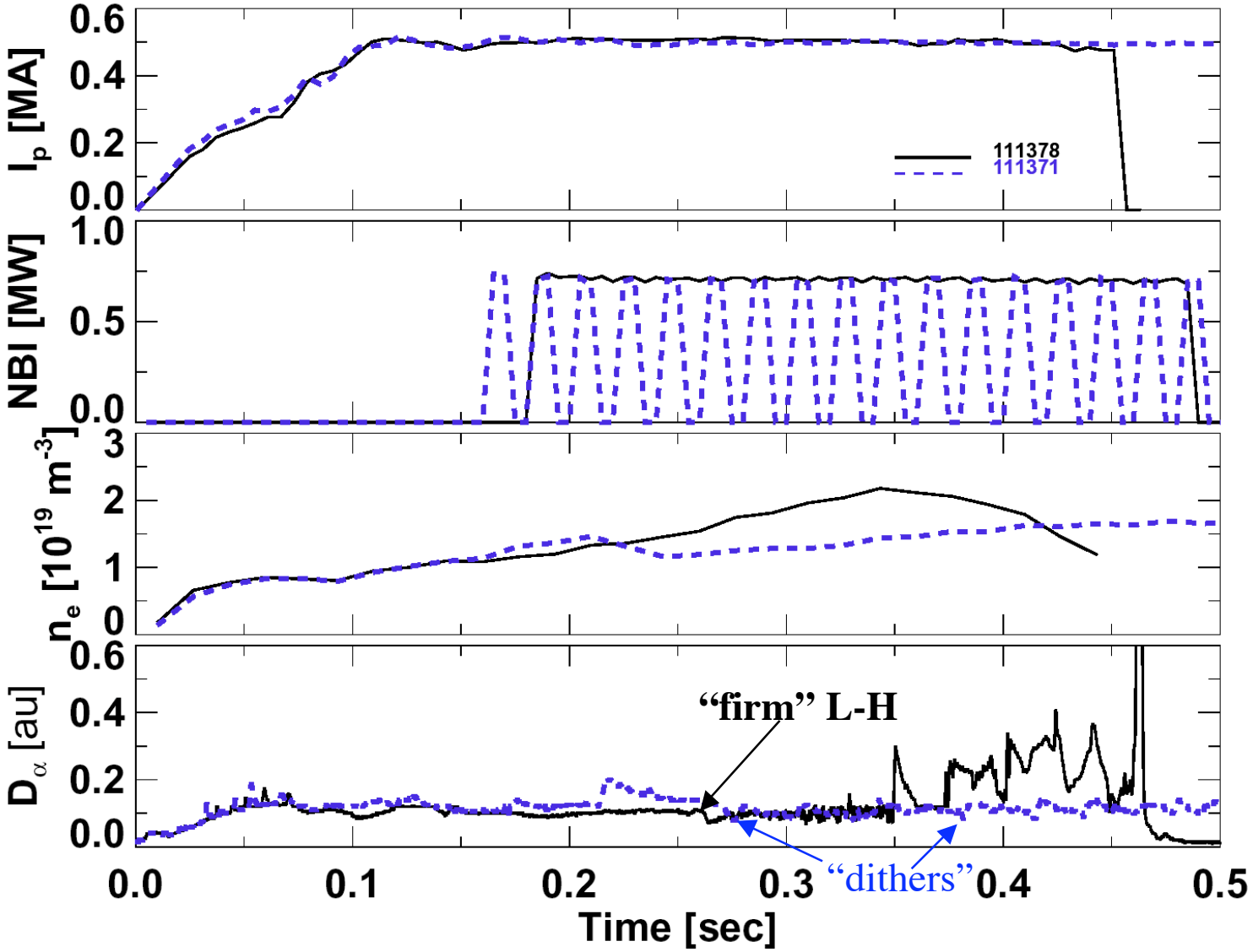
Results:

- **CDND NBI power very similar near LH transition (~300-350 kW); need to compute P_{LOSS}**
- **LDND (DN with drsep ~ 10 mm, downward) had higher P_{LH} > 1.7 MW**
- **NSTX shape was a little bigger, and was developed with rtEFIT control (needs only a little more development)**

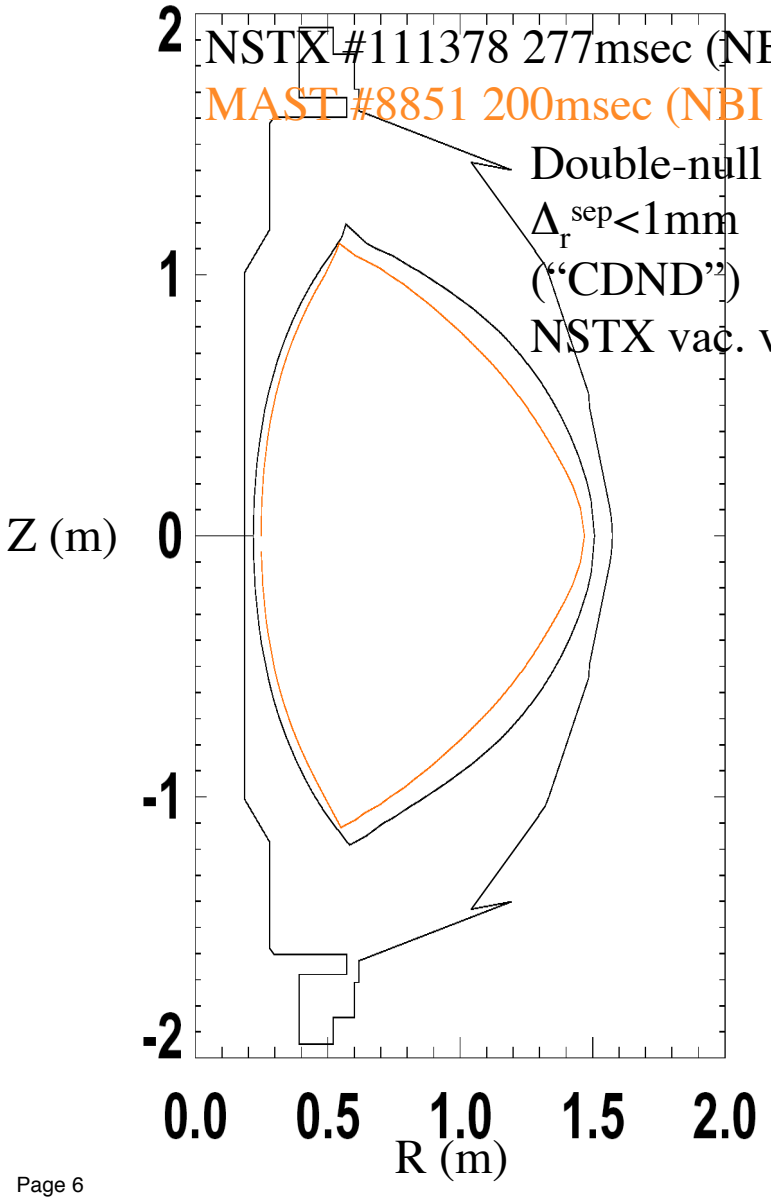
Dithery H-mode in CDND near P_{LH} in MAST

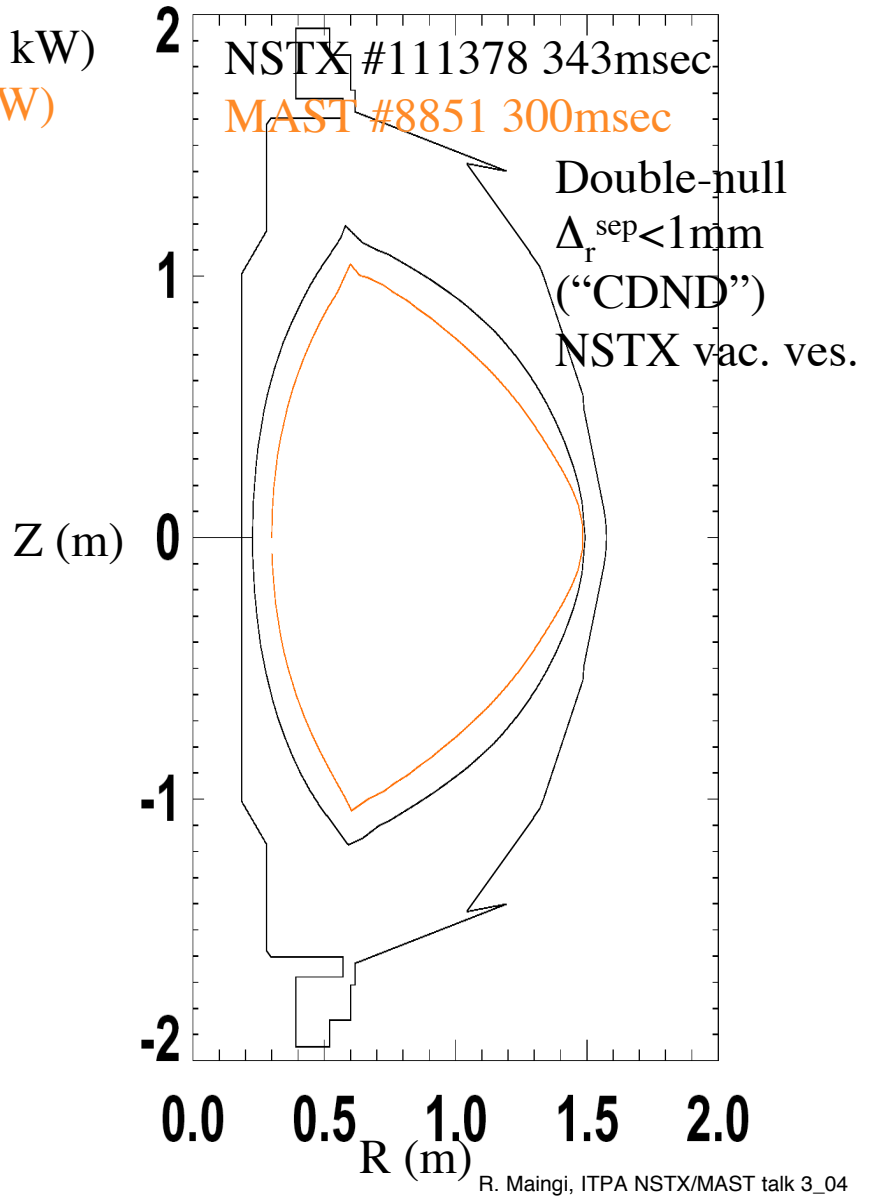


NSTX dithers not as 'periodic' as MAST (CDND near P_{LH})

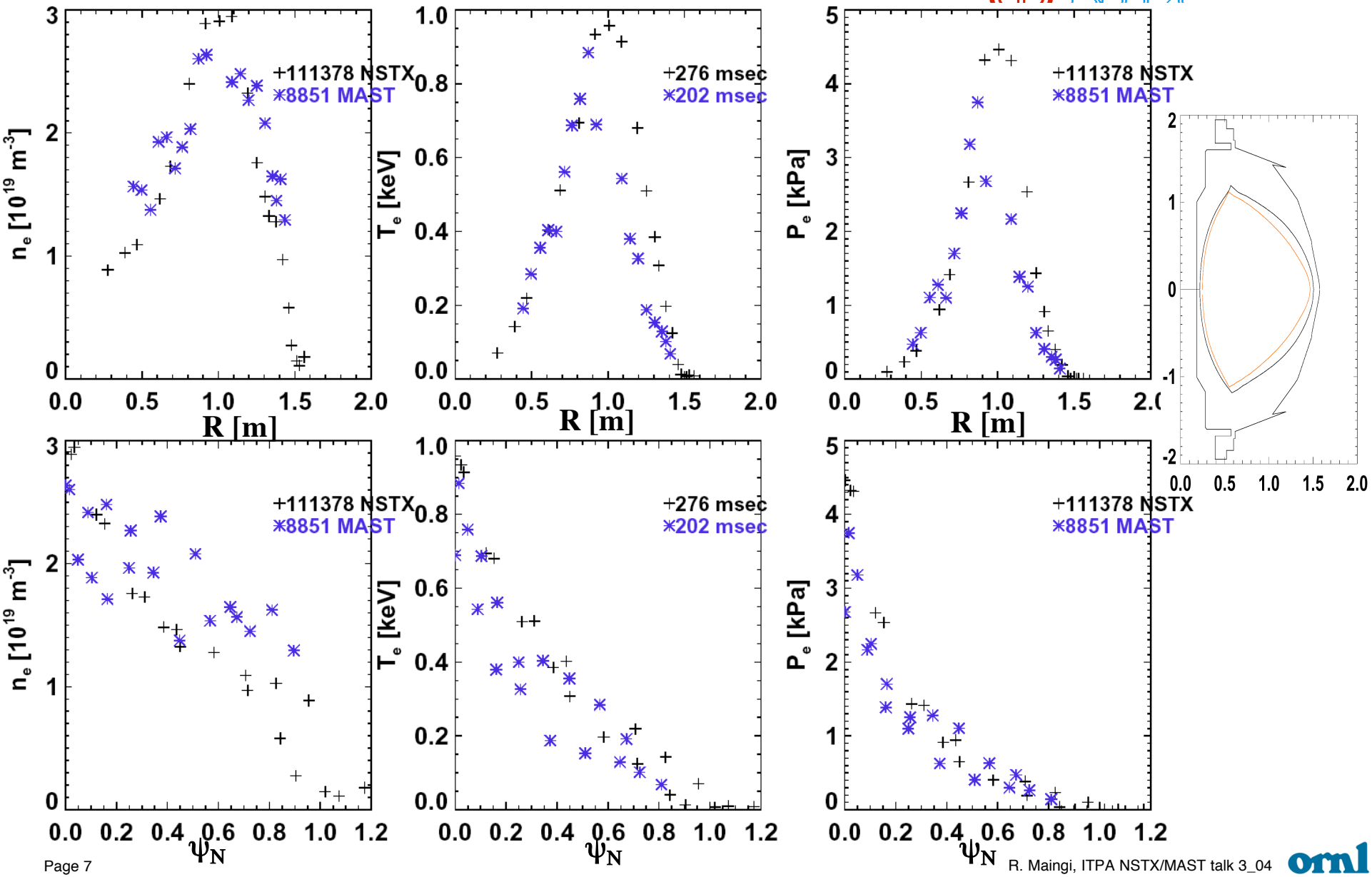


CDND Shapes were reasonably well matched, although NSTX shape (under rtEFIT) was a little larger

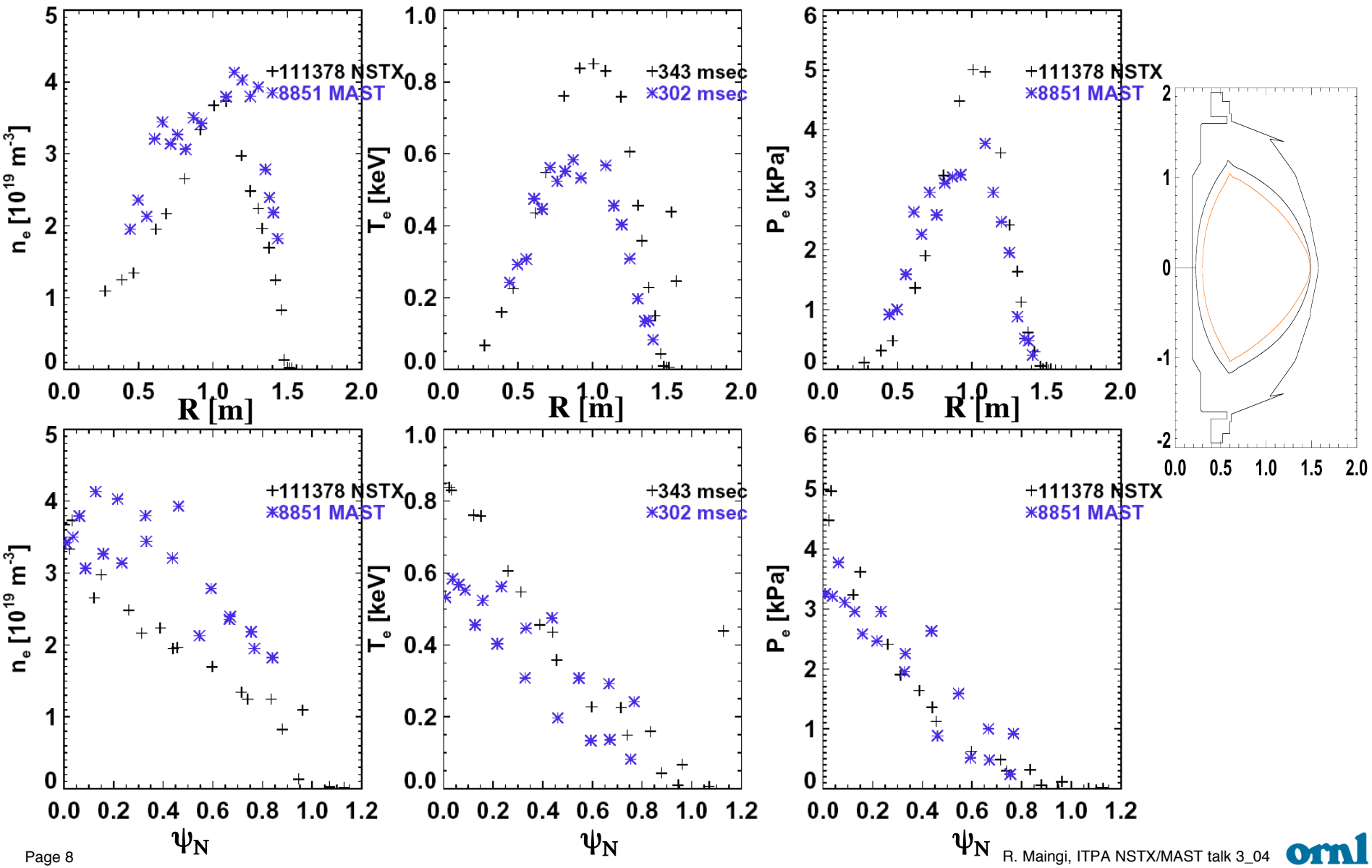




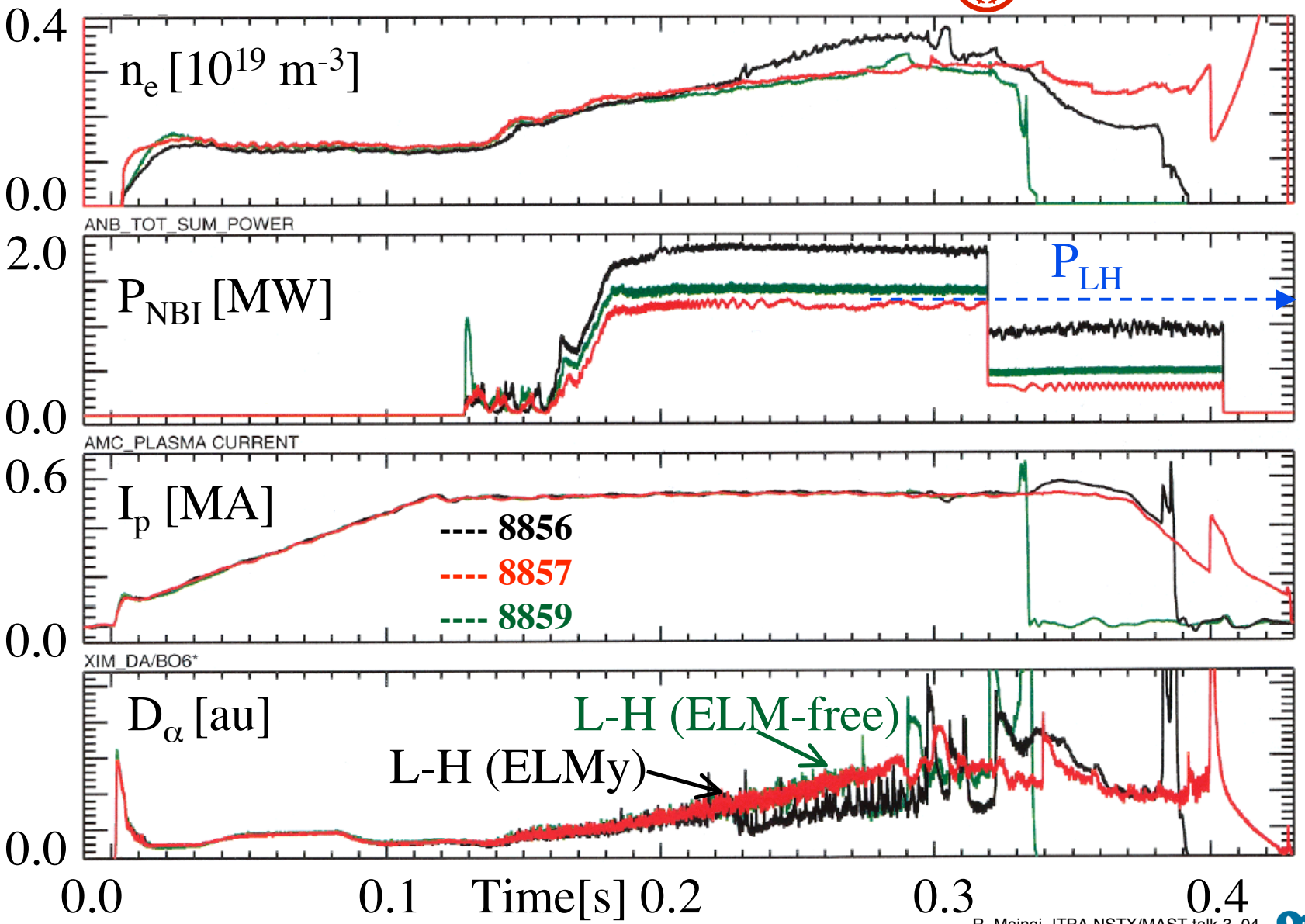
NSTX n_e profile more peaked and Te profile broader early



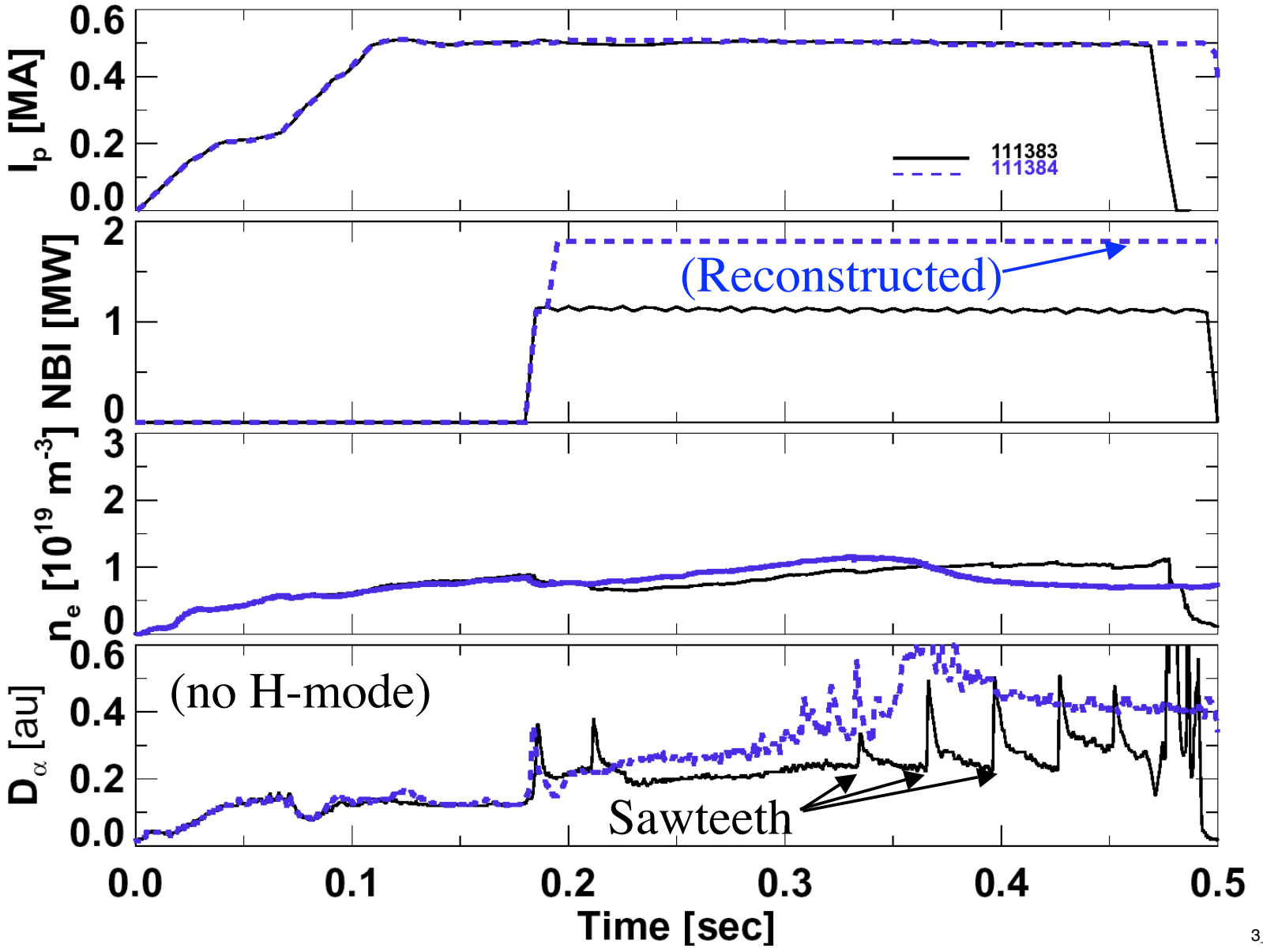
NSTX n_e (T_e) lower(higher) later in H-mode phase



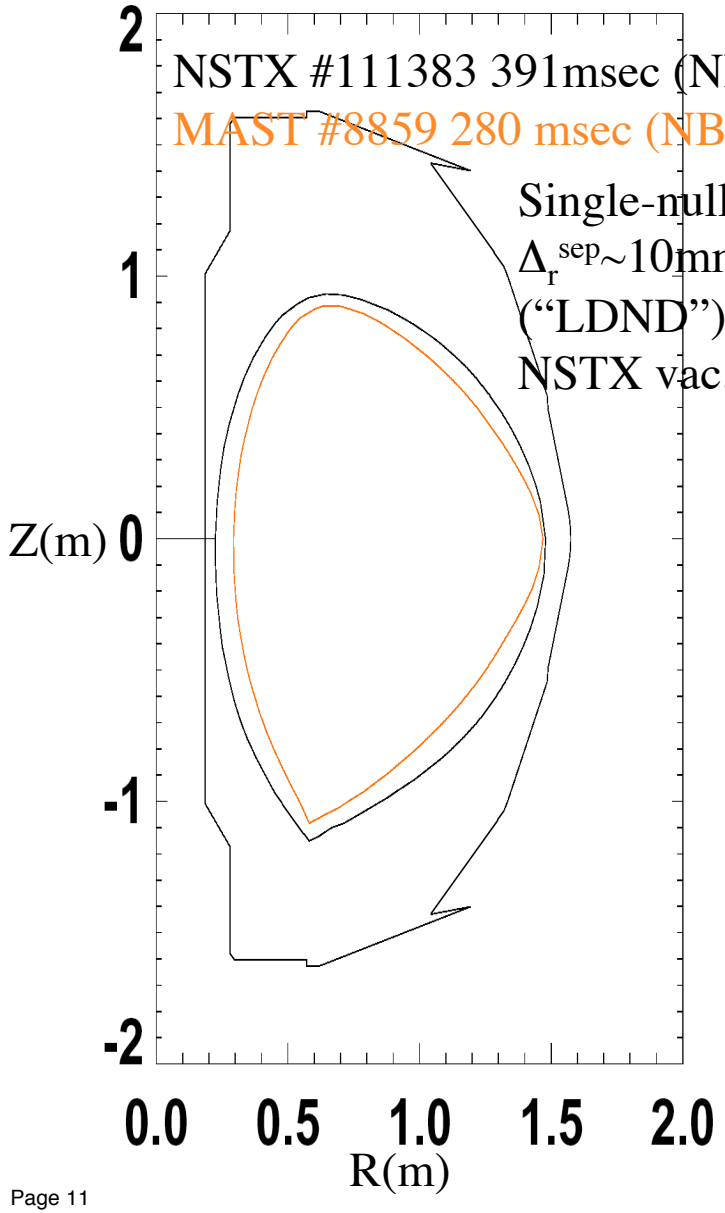
Clear H-mode Transition in LDND near P_{LH} in MAST

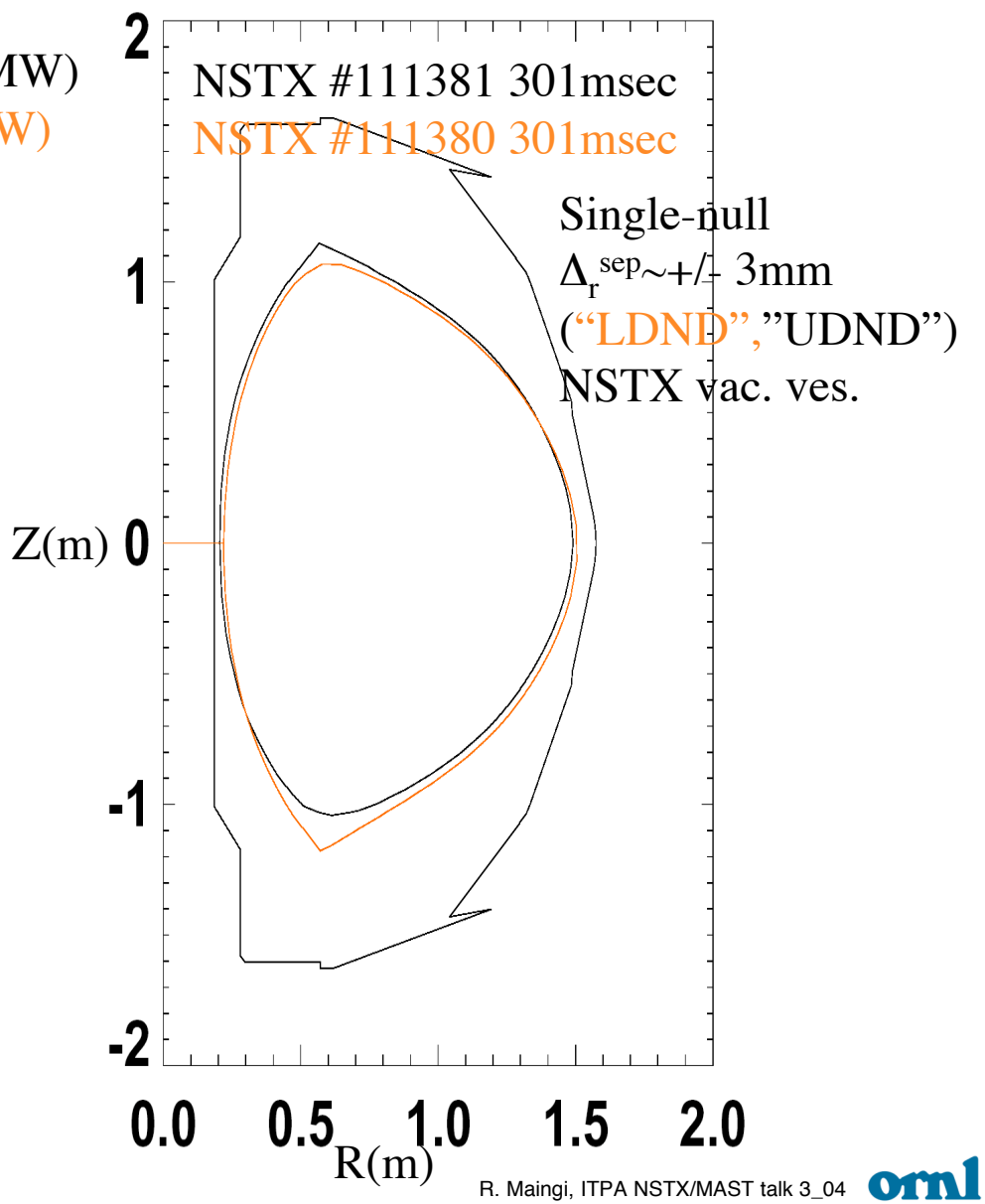


No transition observed in LDND in NSTX (too low density or MHD at NBI turn-on?)

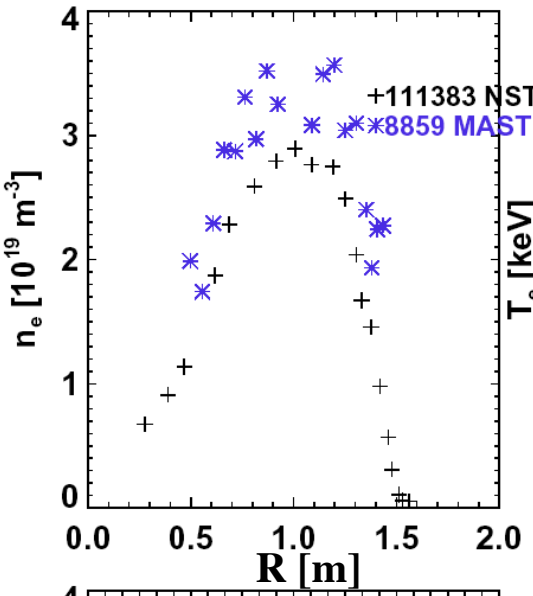


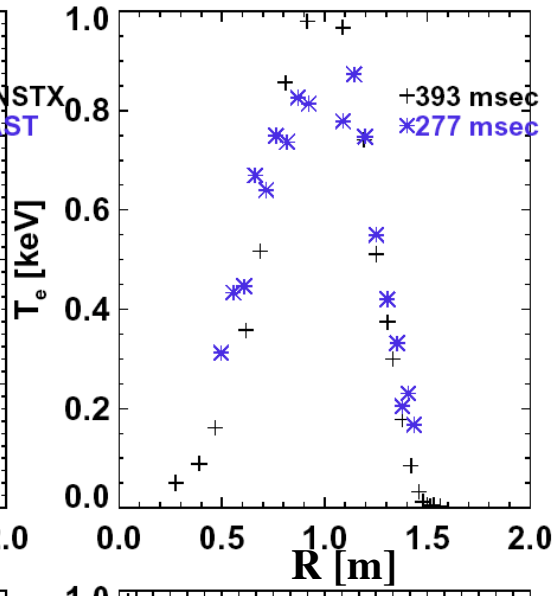
NSTX LDND shape a little larger than MAST
Magnetic balance (drsep) scan possible with rtEFIT

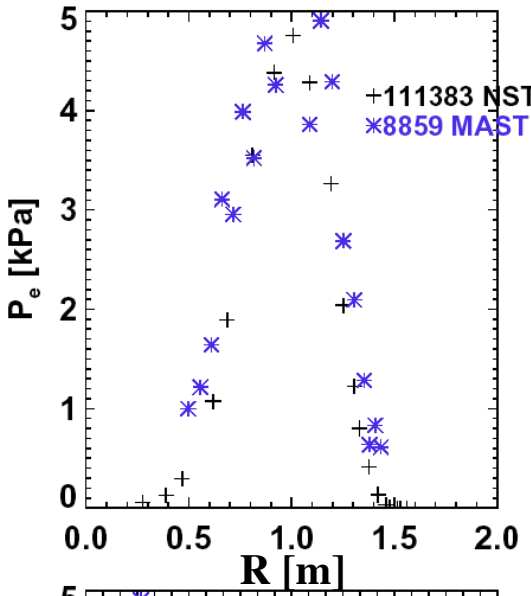


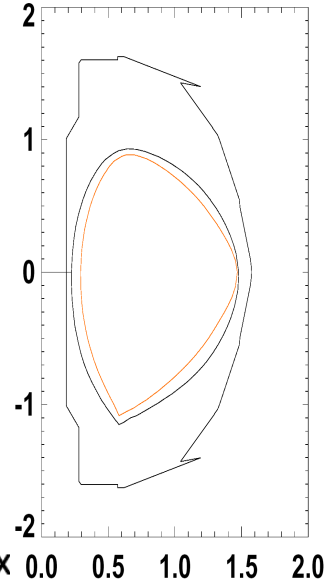


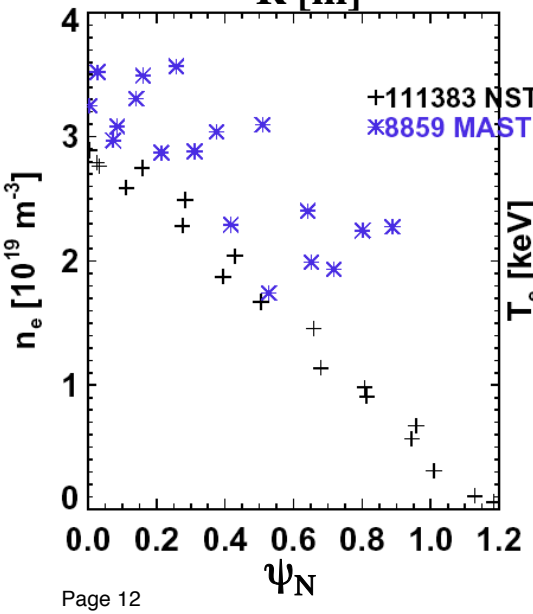
NSTX never achieved H-mode in LDND, but maybe needed a little more power or higher density?

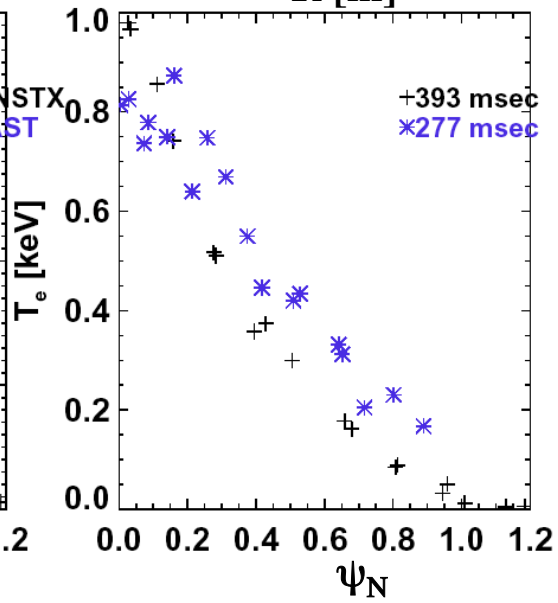


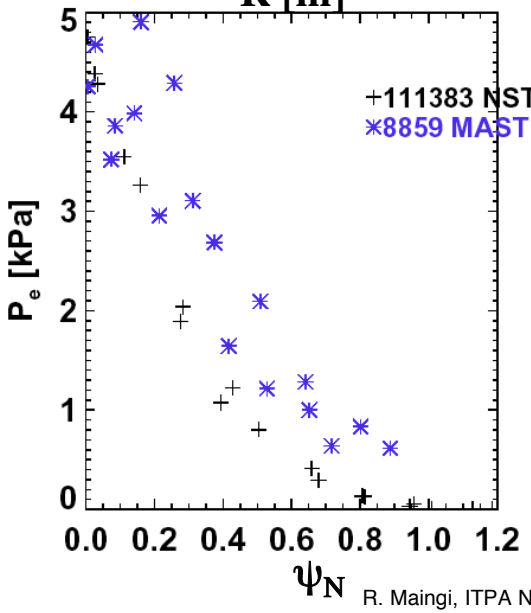












Summary and Future Work

- First joint NSTX/MAST experiment was a good first step toward the proposed 3-way NSTX/MAST/DIII-D collaboration on the effect of aspect ratio on pedestal
- CDND power threshold was remarkably similar in terms of NBI power -> wall proximity does not play a big role in these conditions?!
- Higher power CDND discharge had type IIII ELMs in MAST but largely ELM-free in NSTX
- Need more LDND data from NSTX (w/edge rotation data…)
- Need to work out issues related to mapping of profiles inside and outside of magnetic axis
- Need better comparison shots well in H-mode, at higher I_p…