Iota scans in OP2

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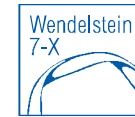
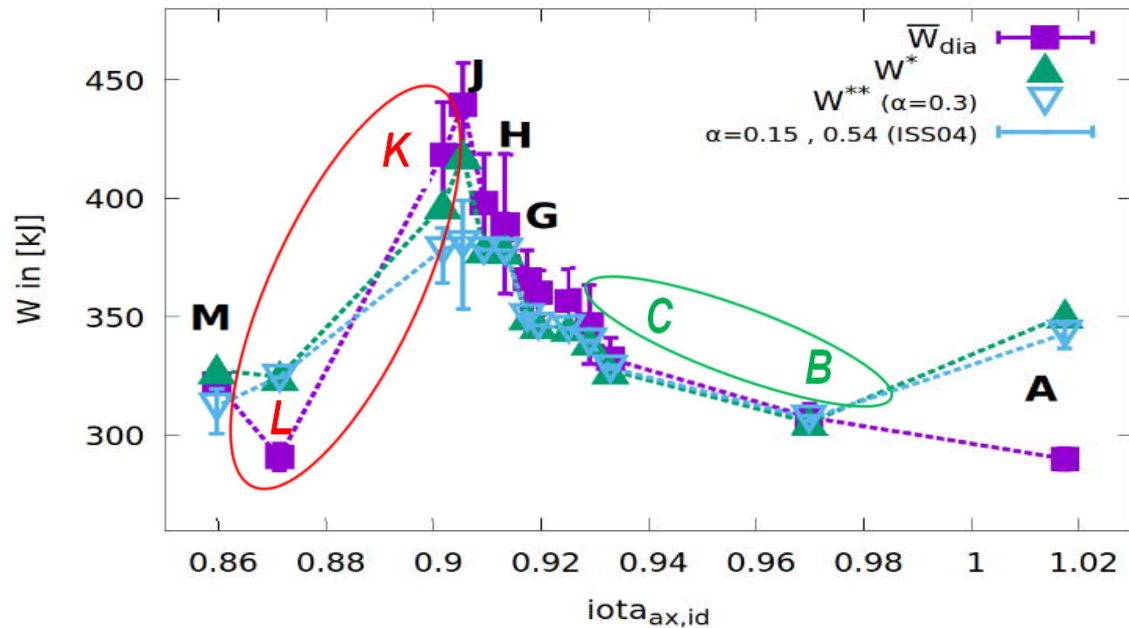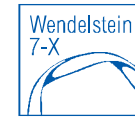- Repeat main discharges of the main iota scan session (20180927) to check the repeatability of the results of the iota scan between High-Iota and Standard configurations.
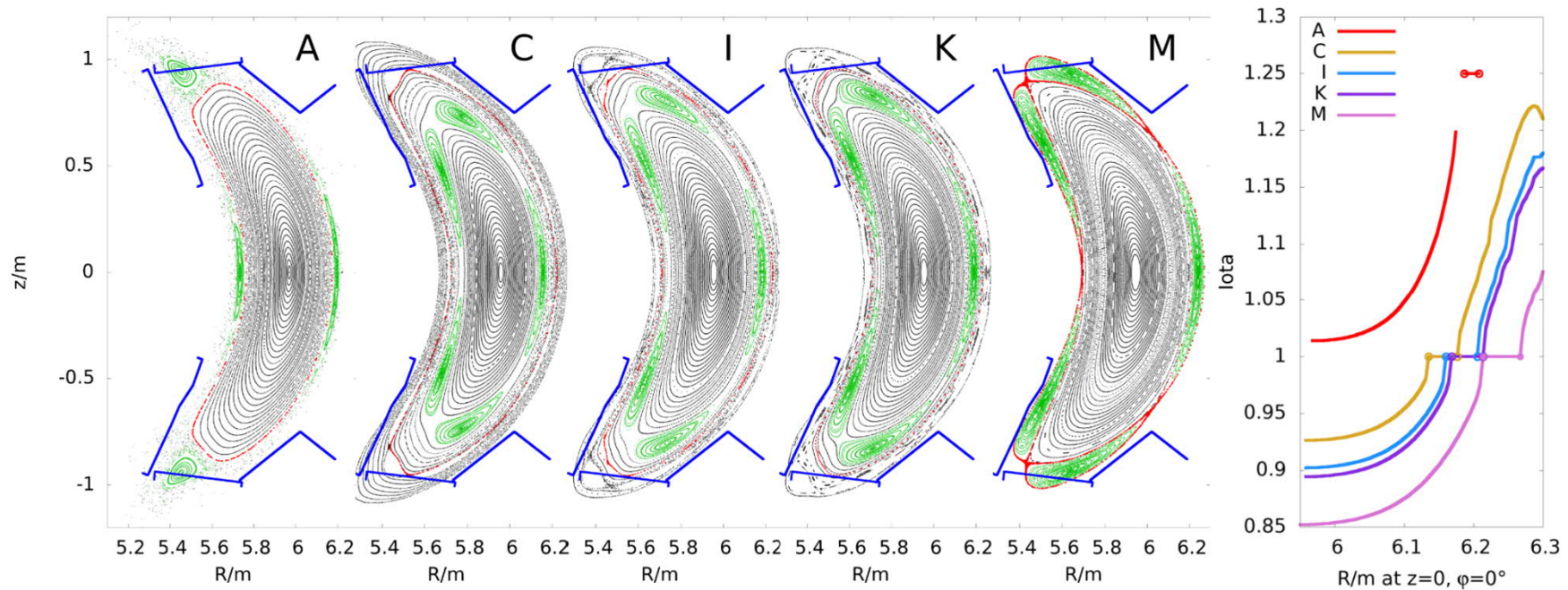
* Andreeva et al 2021 *Nucl. Fusion* https://doi.org/10.1088/1741-4326/ac3f1b

conf. label	exp.ID	W7-X config. name	NPC current [A]	PC current [A]
A	20180927.09	FTM001	14219	-10040
B	20180927.15	FQM001	13883	-7290
C	20180927.16	FOM003	13608	-5040
D	20180927.17	FNM	13577	-4790
E	20180927.18	FNM001	13546	-4540
F	20180927.19	FNM002	13515	-4290
G	20180927.20	FMM	13485	-4040
H	20180927.21	FMM001	13454	-3790
I	20180927.22	FMM002	13423	-3540
J	20180927.28	FMM003	13392	-3290
K	20180927.29	FLM	13361	-3040
L	20180927.30	EJM	13114	-1040
M	20180927.33	EJM004	13016	-250

- Complement iota-scan between High-Iota and Standard configurations with configurations towards Standard configuration, between K (FLM) and L (EJM). These configurations were not allowed by Engineering in OP1.2b, but are allowed at present.

- Complement iota-scan between High-Iota and Standard configurations with configurations between C (FOM003) and B (FQM001).

OP2 iota scan plans: power & density variation, high performance discharges, island rotation (HSI-scan + IS-scan)

- Perform P/n_e-scan (3-4 density steps), also P downwards.

- n_e ramping (start with low density and let ILMs develop to be regular, then slowly increase density. Influence on ILMs, what happen with their frequency? Influence on confinement?

- Iota scan in high performance discharges (O2-heated discharges) + detachment investigations.

- Repeat the IS-session (20181017) with larger islands and poloidally rotated islands with the aim of the mode analysis and profile effect analysis (Thomson-scattering), understanding of T_i influence
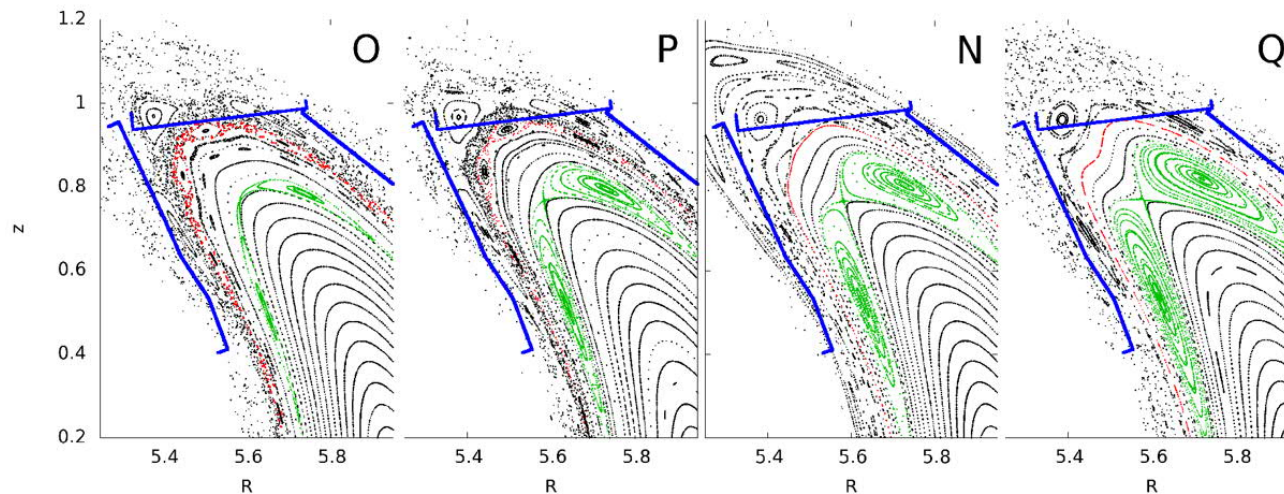
O: Icc=-1.745kA, strongly reduced isl. size
*P*: Icc=-1 kA, reduced island size
N: Icc=0 kA, reference
Q: Icc=+1kA, increased island size

O: Icc=-1745A
P: I_{cc}=-1000 A
N: I_{cc}=0 A
Q: I_{cc}=+1000 A
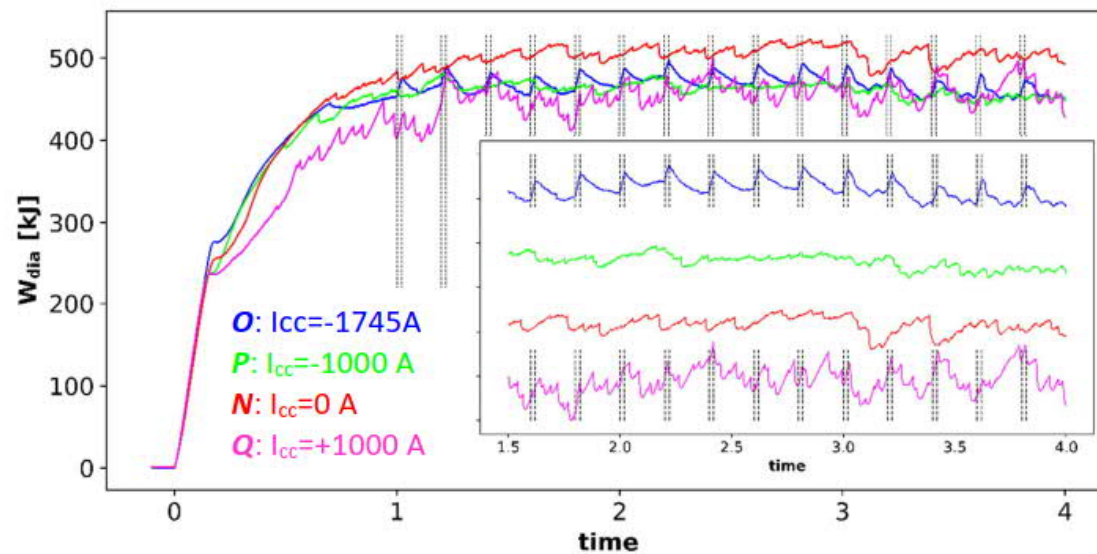
| conf. label	exp.ID	W7-X config. name	NPC current [A]	PC current [A]
N	20181017.21	FMM002	13423	-3540
O	20181017.22	FMM002	13423	-3540
P	20181017.23	FMM002	13423	-3540
Q	20181017.24	FMM002	13423	-3540

- Precise characterization of the observed modes as well as the evaluation of the inversion radius (and, hence, location) of the modes. One of the aims is to see, whether it is possible to show a shift of the radial mode location with iota.

G. Wurden, DOE contrib., 2021
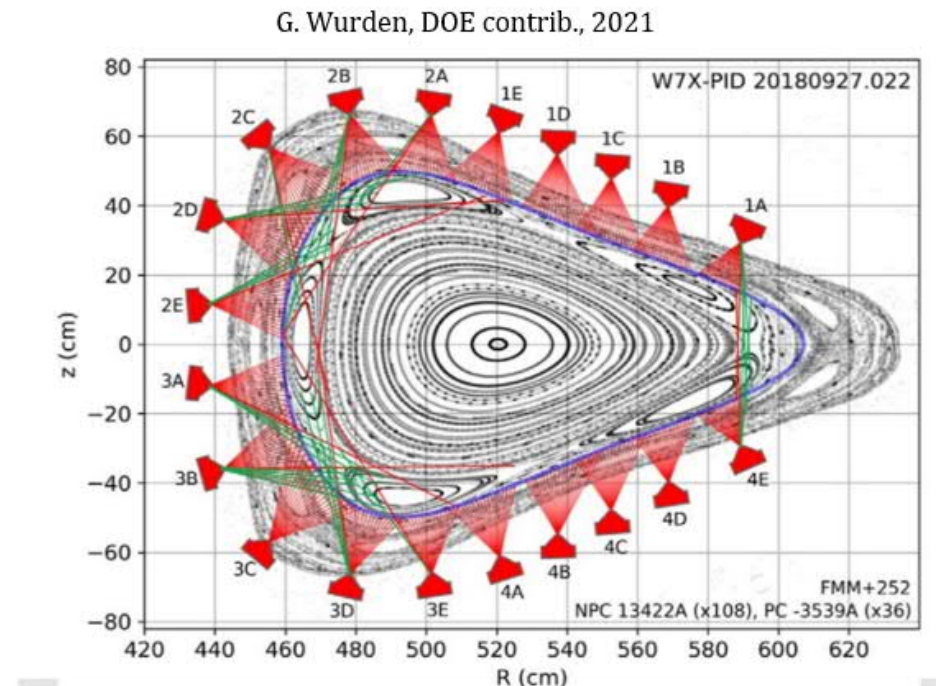
- Comparison of ECRH and an NBI heated discharges (other type ILMs ?)

- Experiments to analyze the role of island chains of higher order, observed within the last-closed-magnetic-surface in W7-X (B-C configurational space + Icc experiments).

- Turbulence and ExB-flow investigations

- Low iota – Standard configuration scan
  - 5/6-islands close to boundary similar to configurations FMM002 et al.
  - around 10/11-islands (i_b=0.91) at boundary or just inside (small islands, effect could be negligible)
  - Profile effects
  - P/n_e-scan
  - mode analysis, sensitivity to island size, rotation
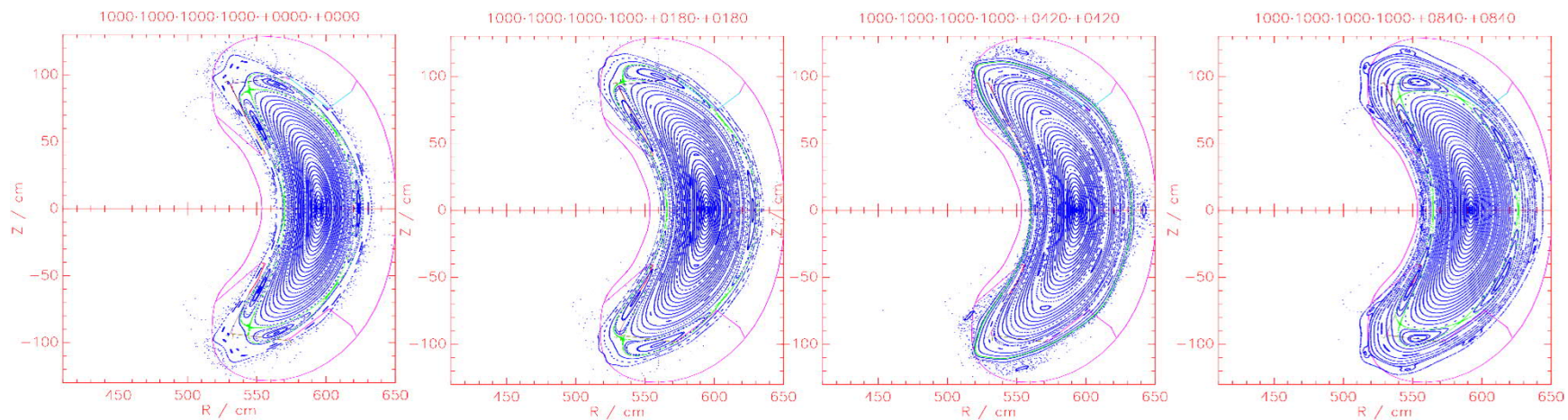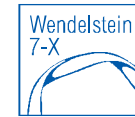

EIM: PCA=PCB=0; i_b=1   EEM: PCA=PCB=5 kA,   DBM: PCA=PCB=10 kA, i_b=0.83

- look at OP1.2b Low iota - Standard iota scan (20180818) w.r.t. to the confinement &

modes (Tamara + volunteers)

- check compatibility with divertor loads (pumping gap) for OP2 Low iota - Standard iota

scan (5/5-islands just outside)

- analysis of ECE-data w.r.t. ILMs

- apply the model of R. Brakel to W7-X data

- "shear"-scan between low and high shear configurations (in relation to W7-AS

experiments)

- power deposition steps (G. M. D. Hogeweij et al., Nucl. Fusion 38, 1881 (1998))

- islandrotation: analysis how far we can rotate them

- continuous ramp of coil currents

- iota scans with eliminated by CC islands

Thank you very much for your attention!
All your ideas are very welcome!

T. Andreeva, TG Scenarios & Profiles, 13.12.2021

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