

TSVV3 10/07/2024

Experimental session TCV-X23

Week 25 (19-21/06/24)

D. Mancini, D. S. Oliveira



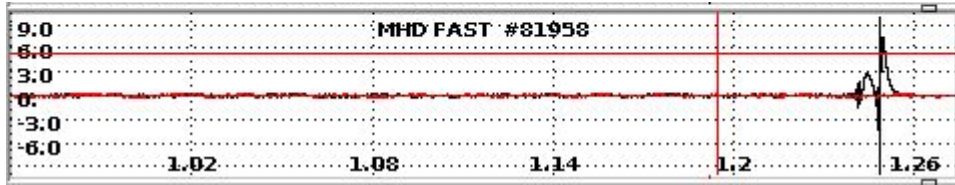
Swiss
Plasma
Center



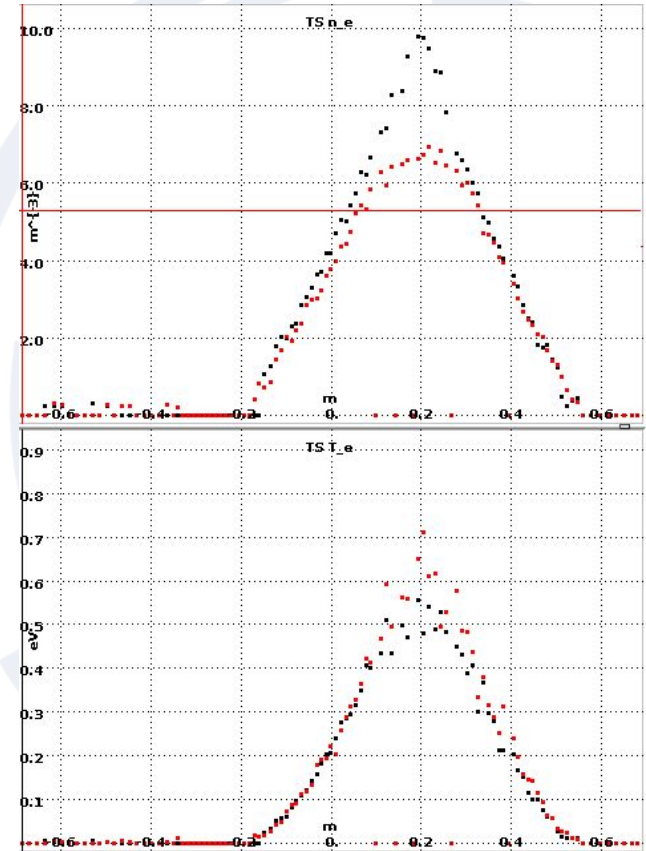
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From density ramps to flat-top : high-density scenario



- More fuelling $\rightarrow T_e$ core too low (peaked n_e) \rightarrow MHD
- Max line averaged n_e for high density shots
 - RF: $4.9 \cdot 10^{19} \text{ m}^{-3}$ (before: $6.1 \cdot 10^{19} \text{ m}^{-3}$)
 - FF: $5.6 \cdot 10^{19} \text{ m}^{-3}$ (before: $6.8 \cdot 10^{19} \text{ m}^{-3}$)
- P_{ohm} for high density shots (still need P_{rad} for P_{sol})
 - RF: 256 kW (before: 254 kW)
 - FF: 266 kW (before: 260 kW)

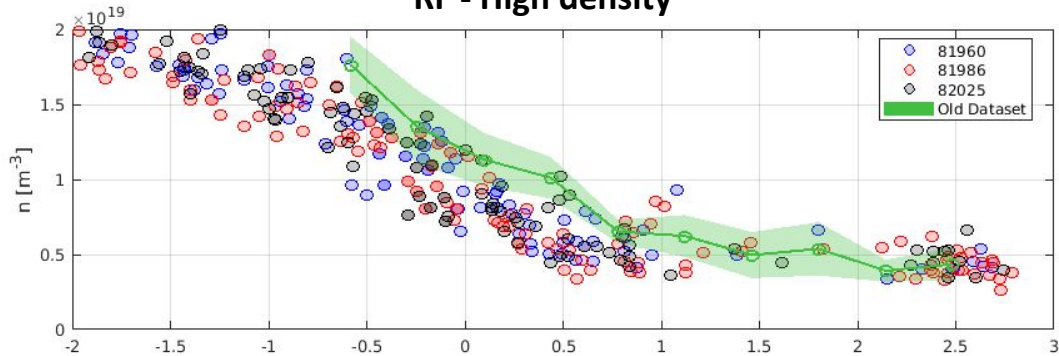




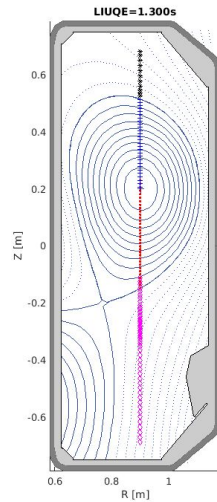
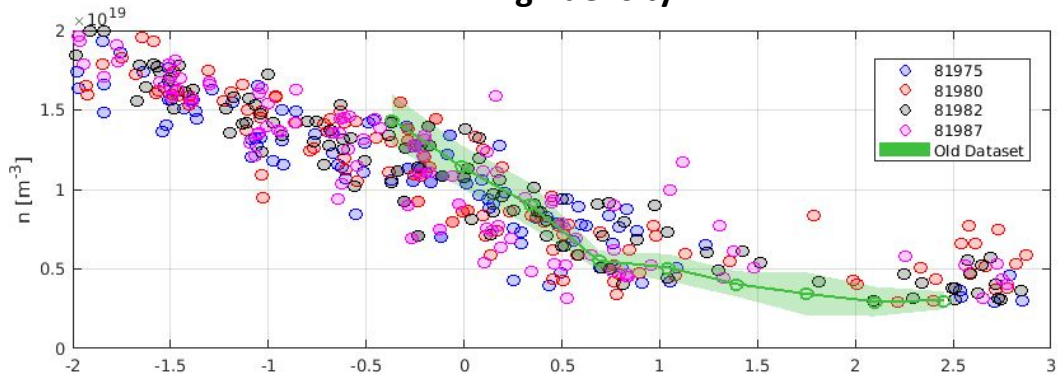
# Shot	sign(B_t)	f_{GW}	LPs modes	RDPA modes	DBS
[81956, 82029, 82030, 82032]	RF	0.35 ± 0.02	[Swp, J_{sat} , J_0 , V_{fl}]	[Swp, J_{sat} , $_{-}$, V_{fl}]	[Omp, Top, Top, Top]
[81960, 81986, 82025, 82027]	RF	0.49 ± 0.03	[Swp, V_{fl} , J_{sat} , J_0]	[Swp, V_{fl} , J_{sat} , Swp]	[Omp, Top, Top, Top]
[82034, 82038, 82040, $_{-}$]	FF	0.33 ± 0.02	[V_{fl} , Swp, J_0 , $_{-}$]	[V_{fl} , Swp, Swp, $_{-}$]	[Top, Top, Top, $_{-}$]
[81975, 81980, 81982, 81987]	FF	0.54 ± 0.04	[Swp, J_{sat} , V_{fl} , J_0]	[Swp, J_{sat} , $_{-}$, V_{fl}]	[Omp, Swp, Top, Top]

- Hard to get high densities → values lower than density ramp sessions
- Diagnostics: standard (LPs, TS, Bolo, ...), DSS, IR, RDPA, DBS
- Different probes modes (LPs and RDPA)
- DBS at different angles to optimize measurements (for TCV-X23 better Top than OMP)

RF - High density



FF - High density



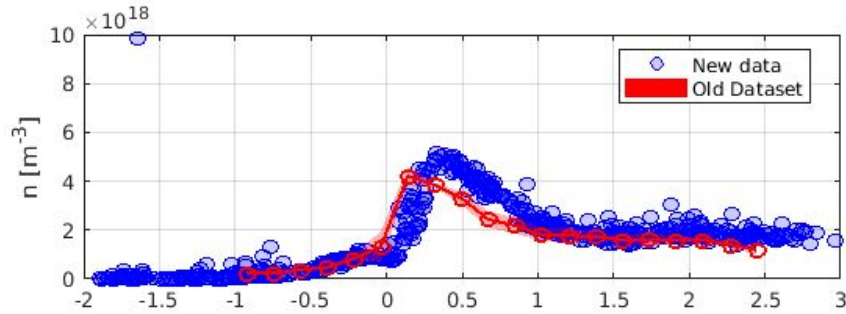
$\text{sign}(B_t)$	$n_{e,\text{sep}} [10^{19} \text{ m}^{-3}]$	$T_{e,\text{sep}} [\text{eV}]$
RF	0.84 (0.91 ± 0.12)	31.2 (40.2 ± 8.7)
RF	1.00 (1.20 ± 0.20)	23.0 (26.1 ± 7.5)
FF	0.78 (0.98 ± 0.13)	27.0 (35.5 ± 6.5)
FF	1.02 (1.13 ± 0.14)	20.4 (24.0 ± 4.5)

(old density ramp)

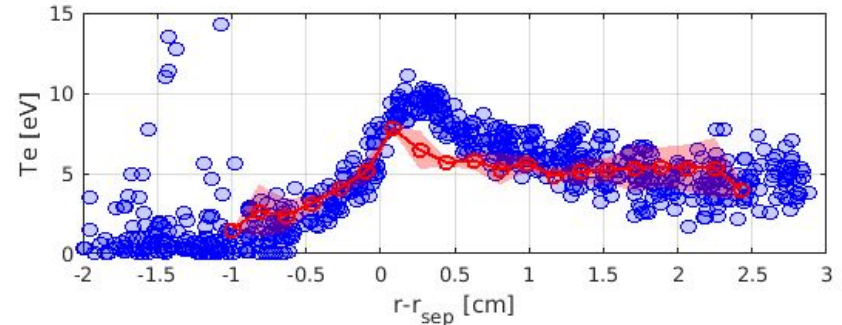
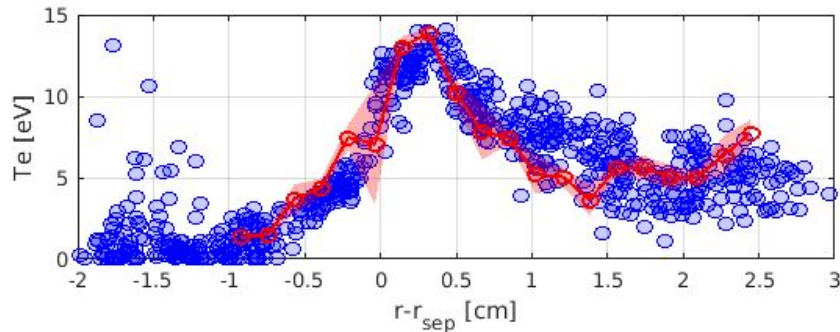
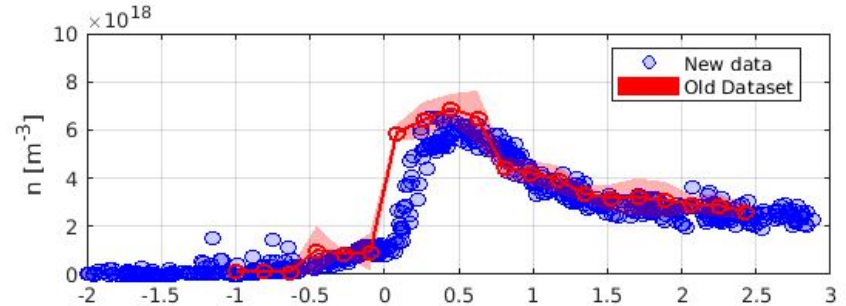
Better data:

- Longer time intervals
- Strike points position sweeping

RF - Low dens



RF - High dens

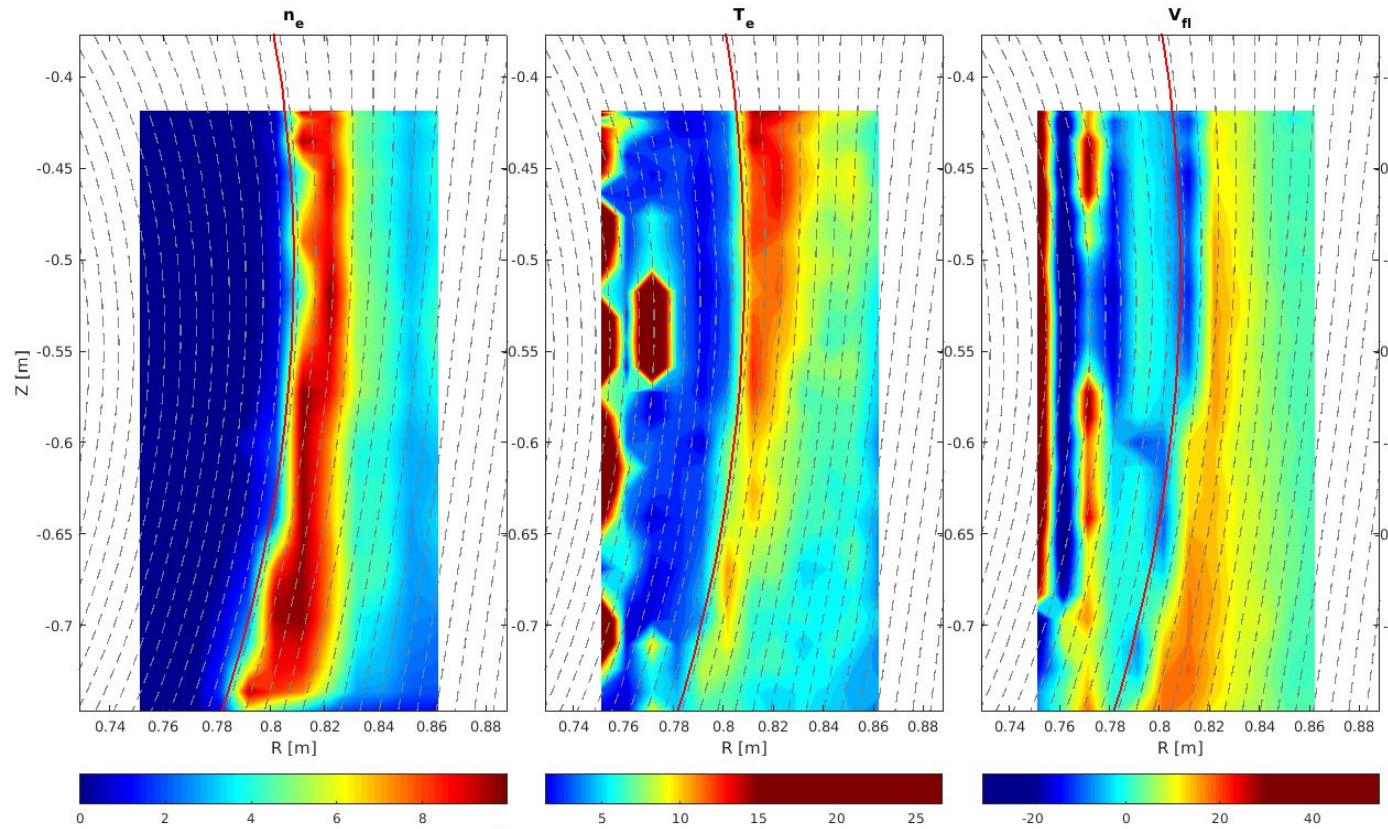




RDPA in the diverter volume

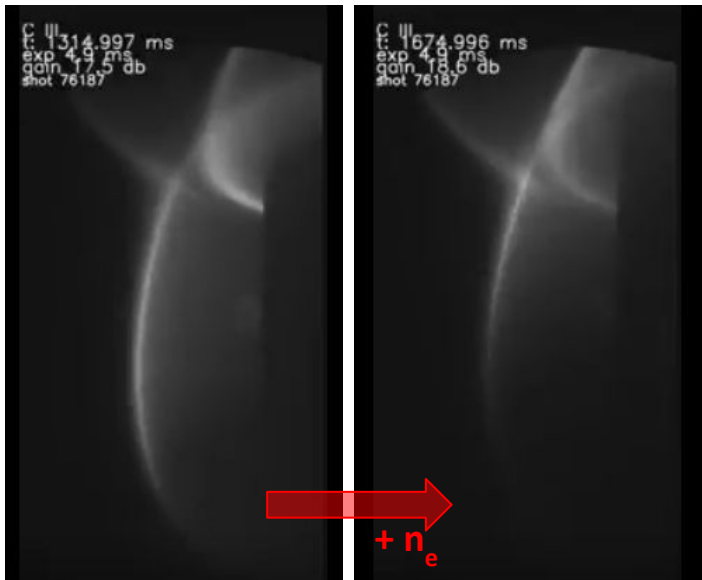
- Two plunges per shot
- Long time interval at constant density

RF - High density

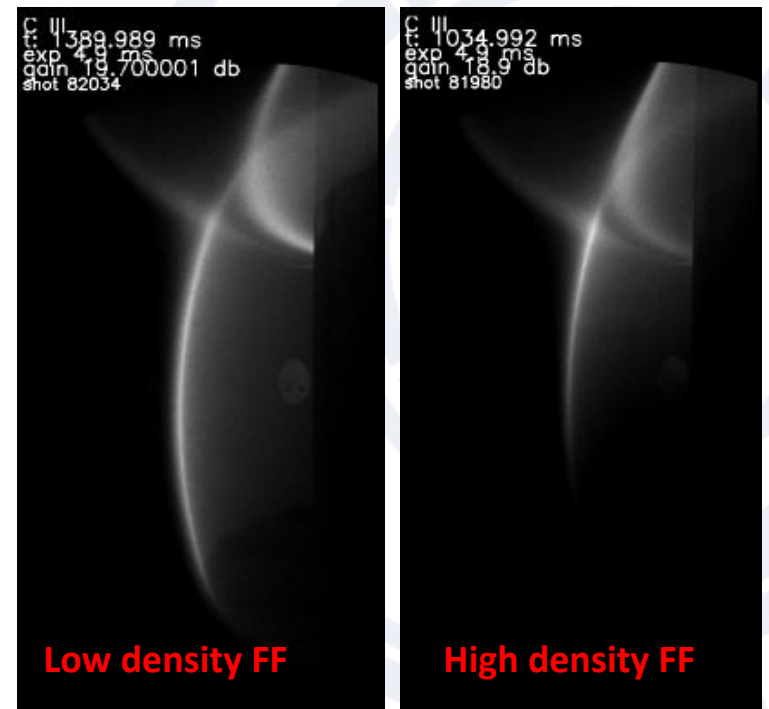


CIII emission is above 7 eV → front is proxy for low T_e plasma

Density ramp example:



Flat-top example:





New experimental session to collect TCV-X23 data not baffled:

Diagnostic	Observable
Wall LPs at the targets	$n_e, T_e, V_{pl},$ $J_{sat}, \sigma(J_{sat}), skew(J_{sat}), kurt(J_{sat})$ $V_{fl}, \sigma(V_{fl})$ $J_{ }, \sigma(J_{ })$
IR camera	$q_{ }$
RDPA in the divertor volume	$n_e, T_e, V_{pl},$ $J_{sat}, \sigma(J_{sat}), skew(J_{sat}), kurt(J_{sat})$ $V_{fl}, \sigma(V_{fl})$
TS	n_e, T_e
DBS	Velocity of \tilde{n}

+DSS , Bolometry, Mantis

Next steps:

- Analysis of the raw data
- Complete dataset with baffled shots to have X-point GPI coverage