full ohmic scenario modelling
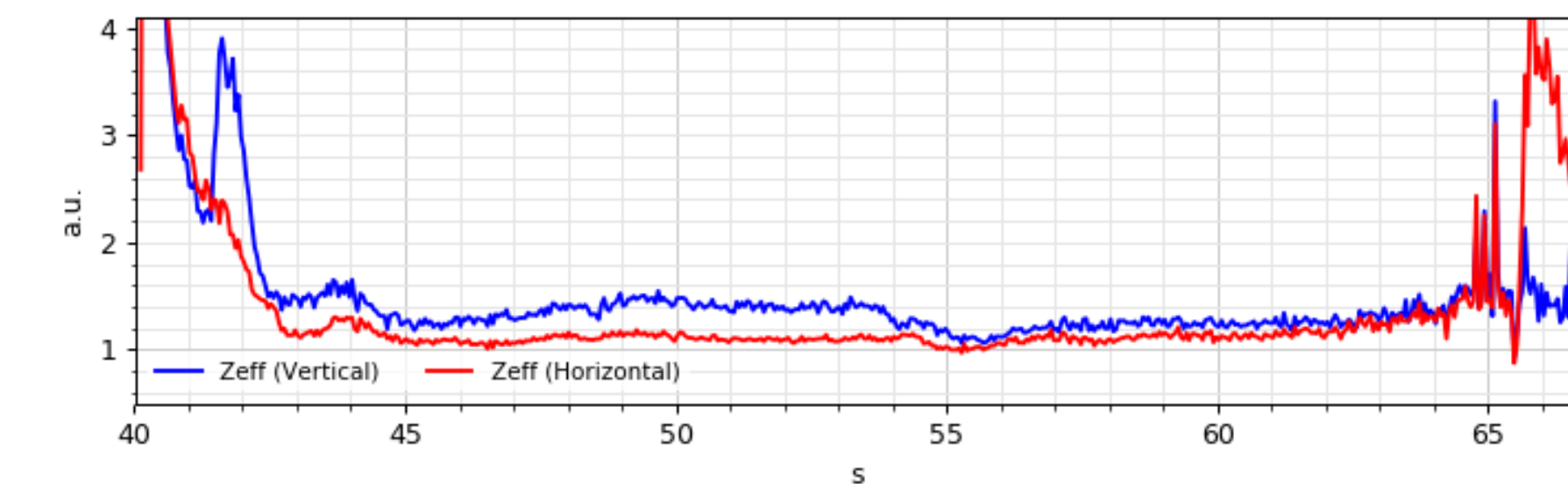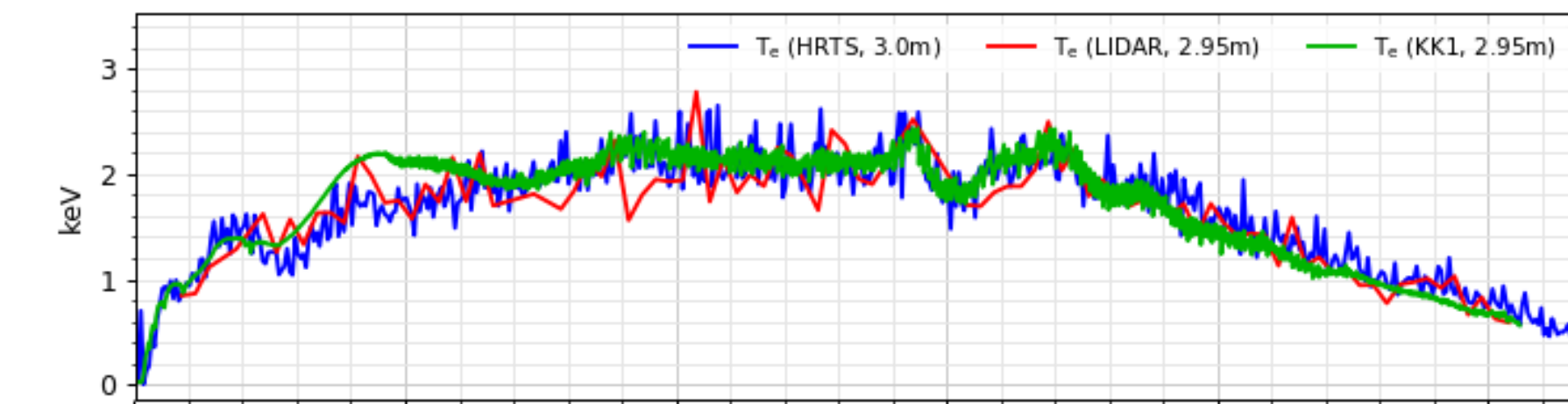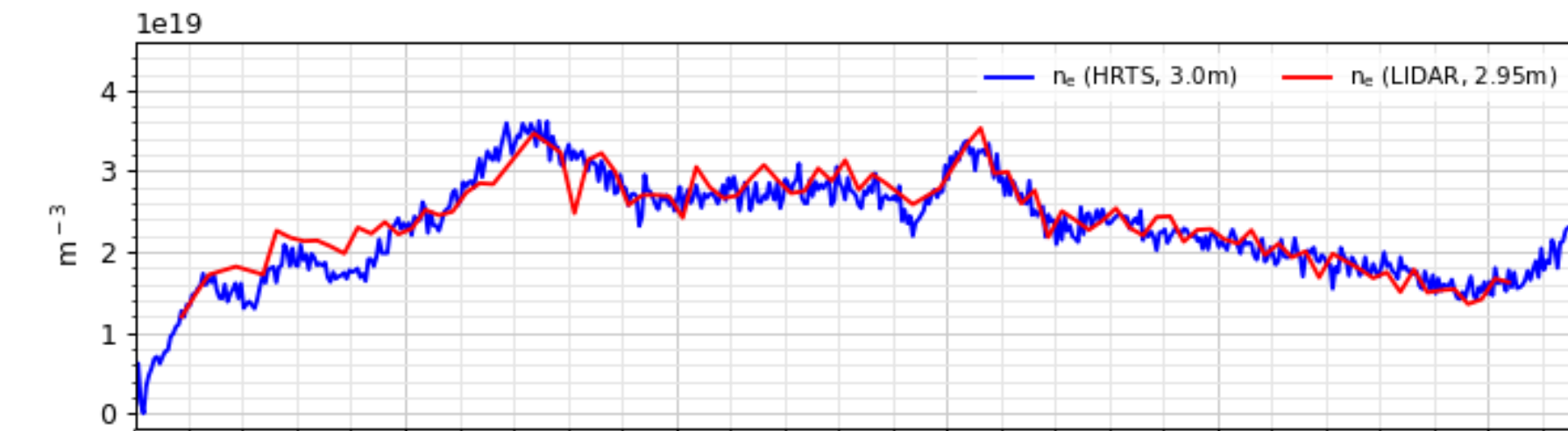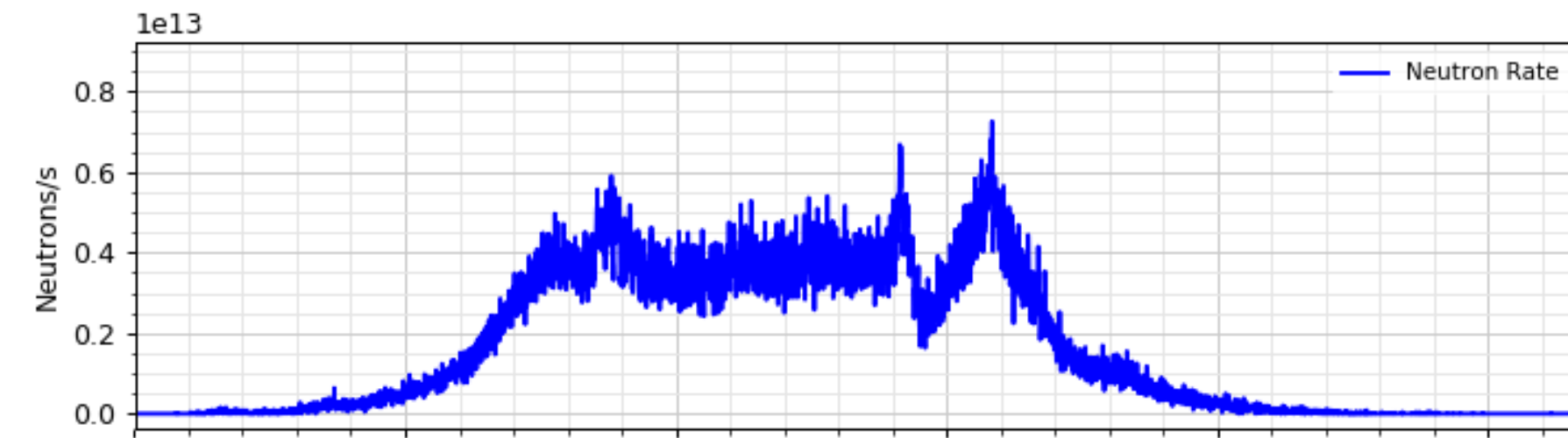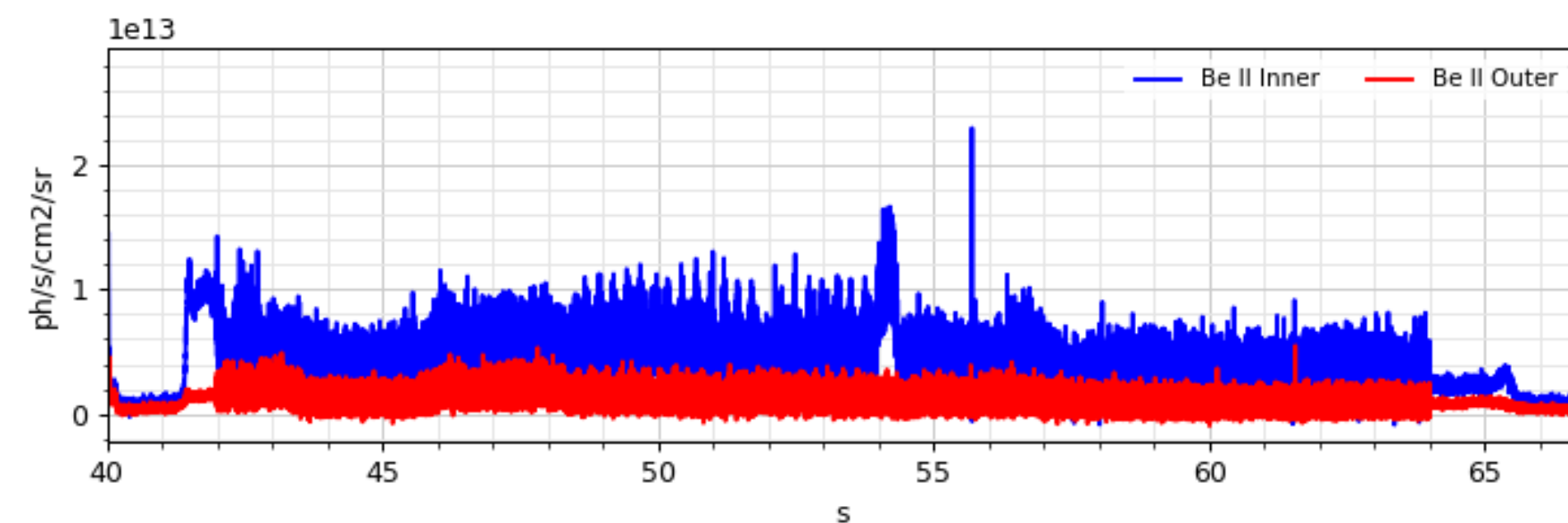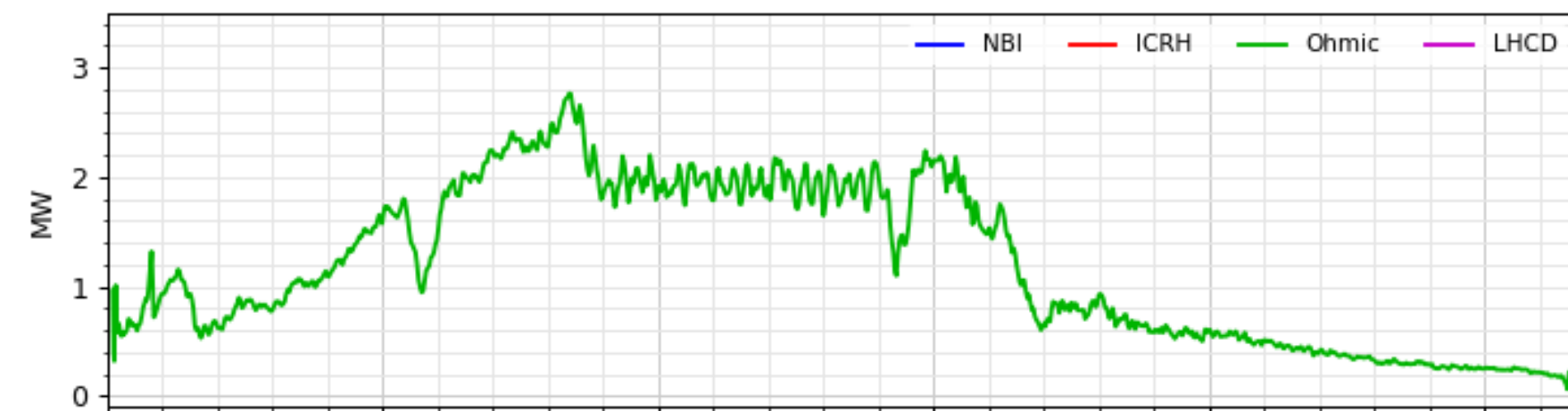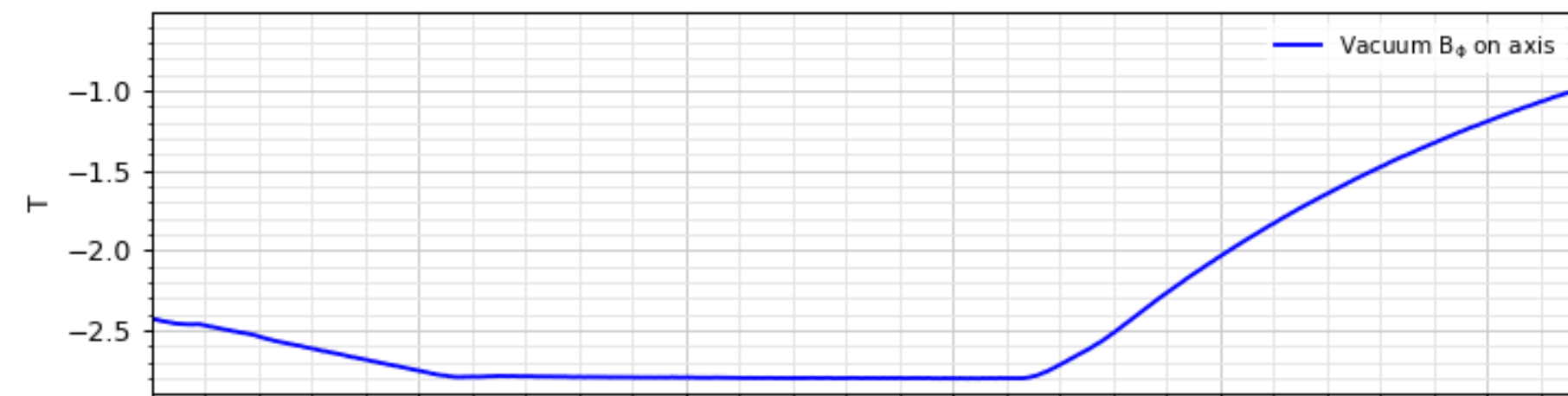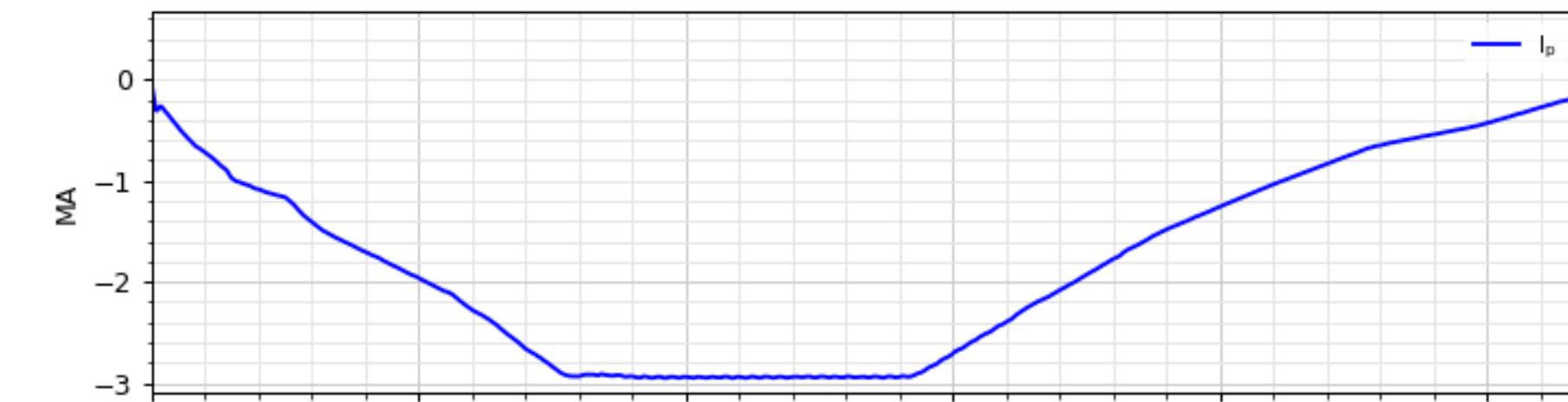
with ETS-6

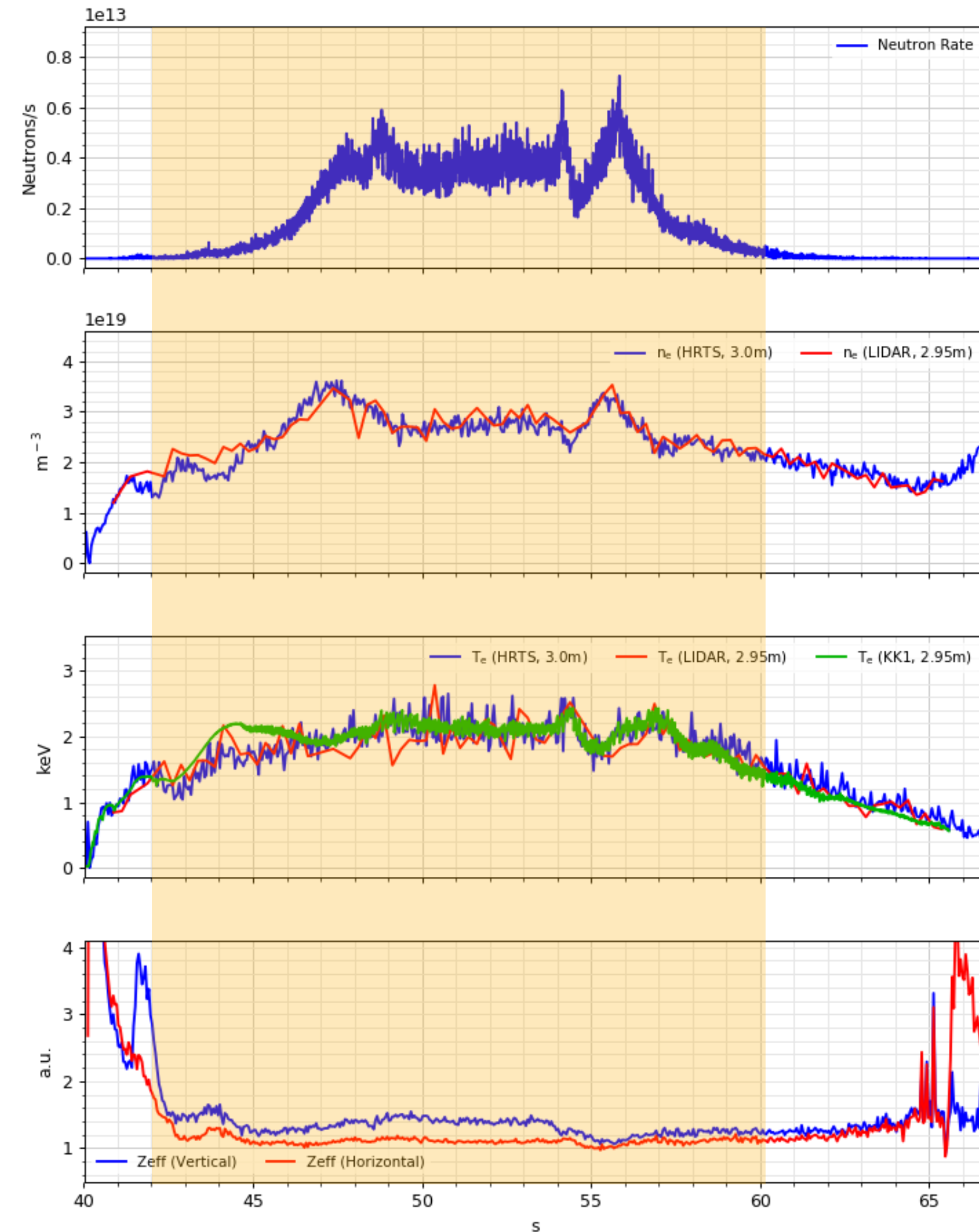**Jorge Ferreira, IPFN/IST, WIMAS-2 Weekly Meeting, 3rd June 2020**
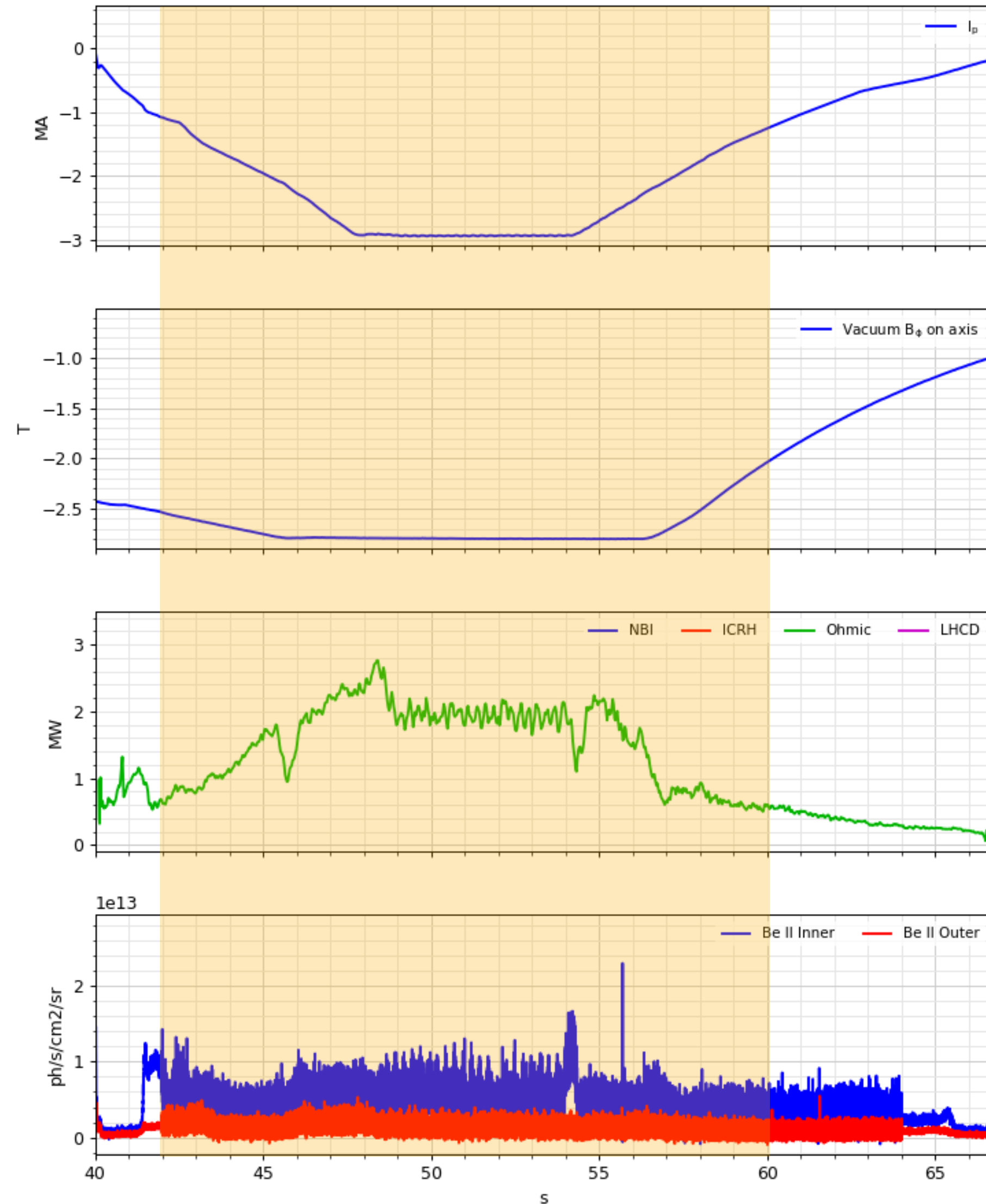
JET Ohmic scenario

#96648 - Ohmic 3.0MA baseline test

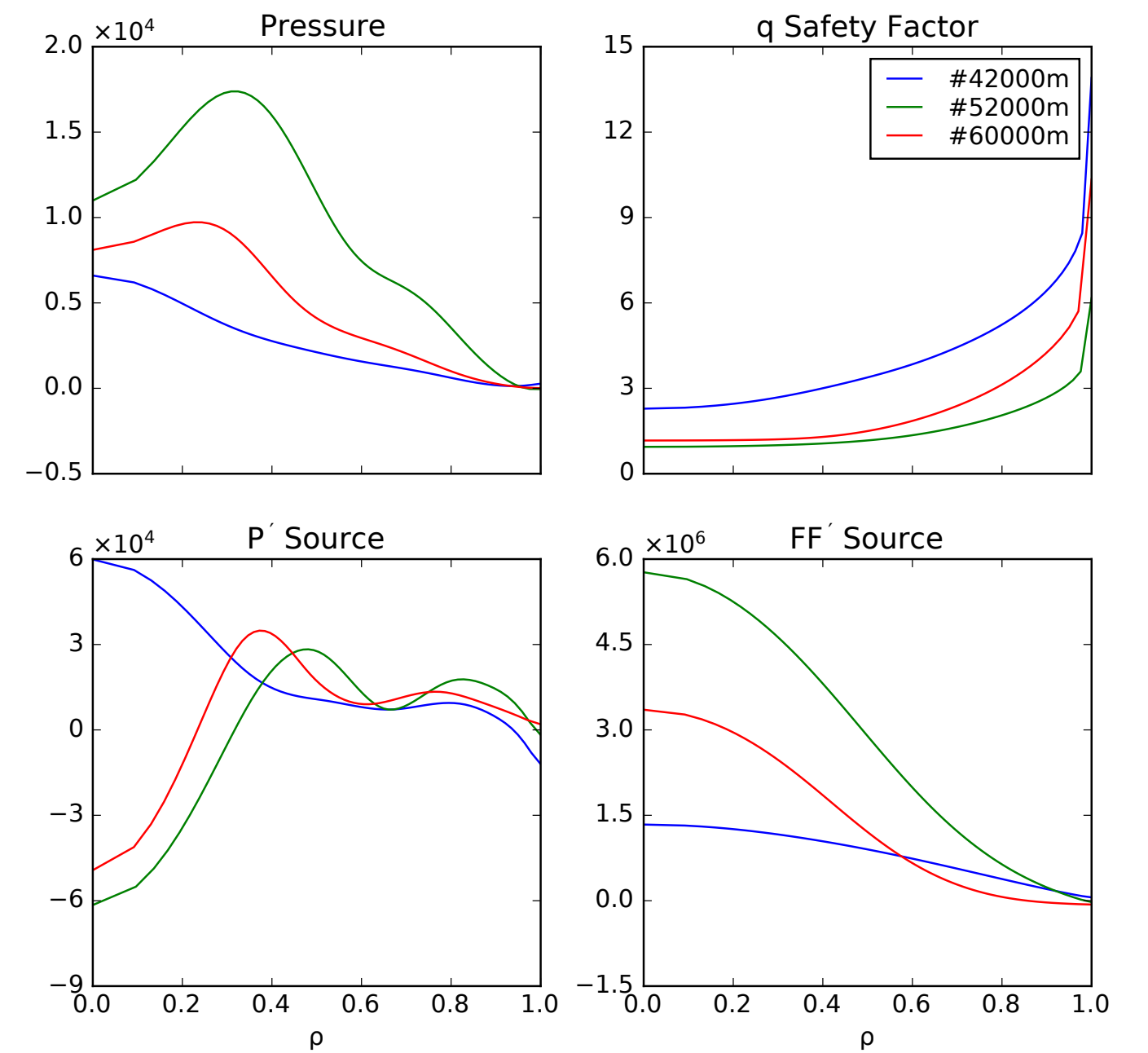From JET data dashboard

JET Ohmic scenario

#96648 - Ohmic 3.0MA baseline test

data preparation with IMASgo!

JET db → IMASgo! (OMFIT) → IMASdb (IDS)
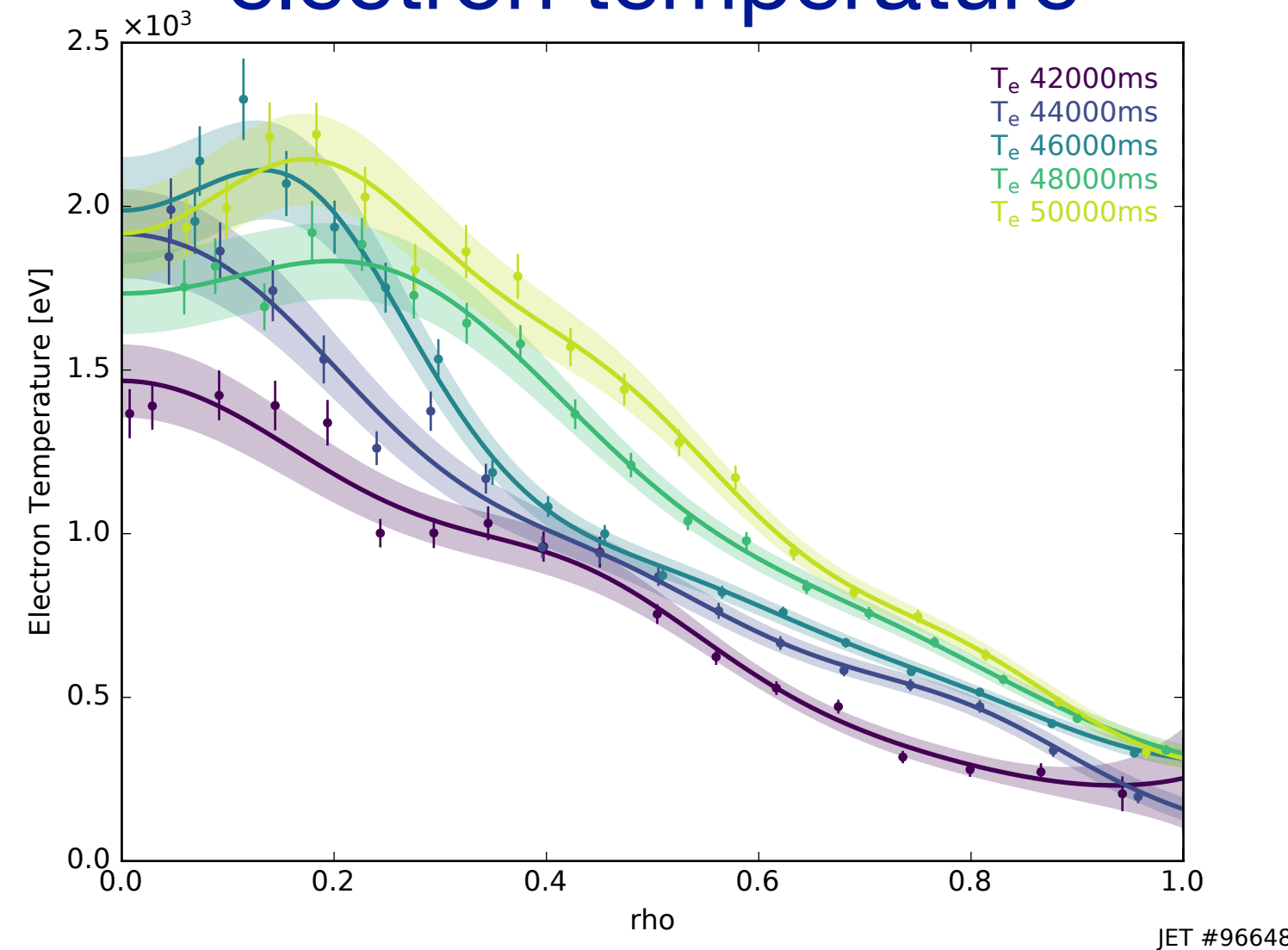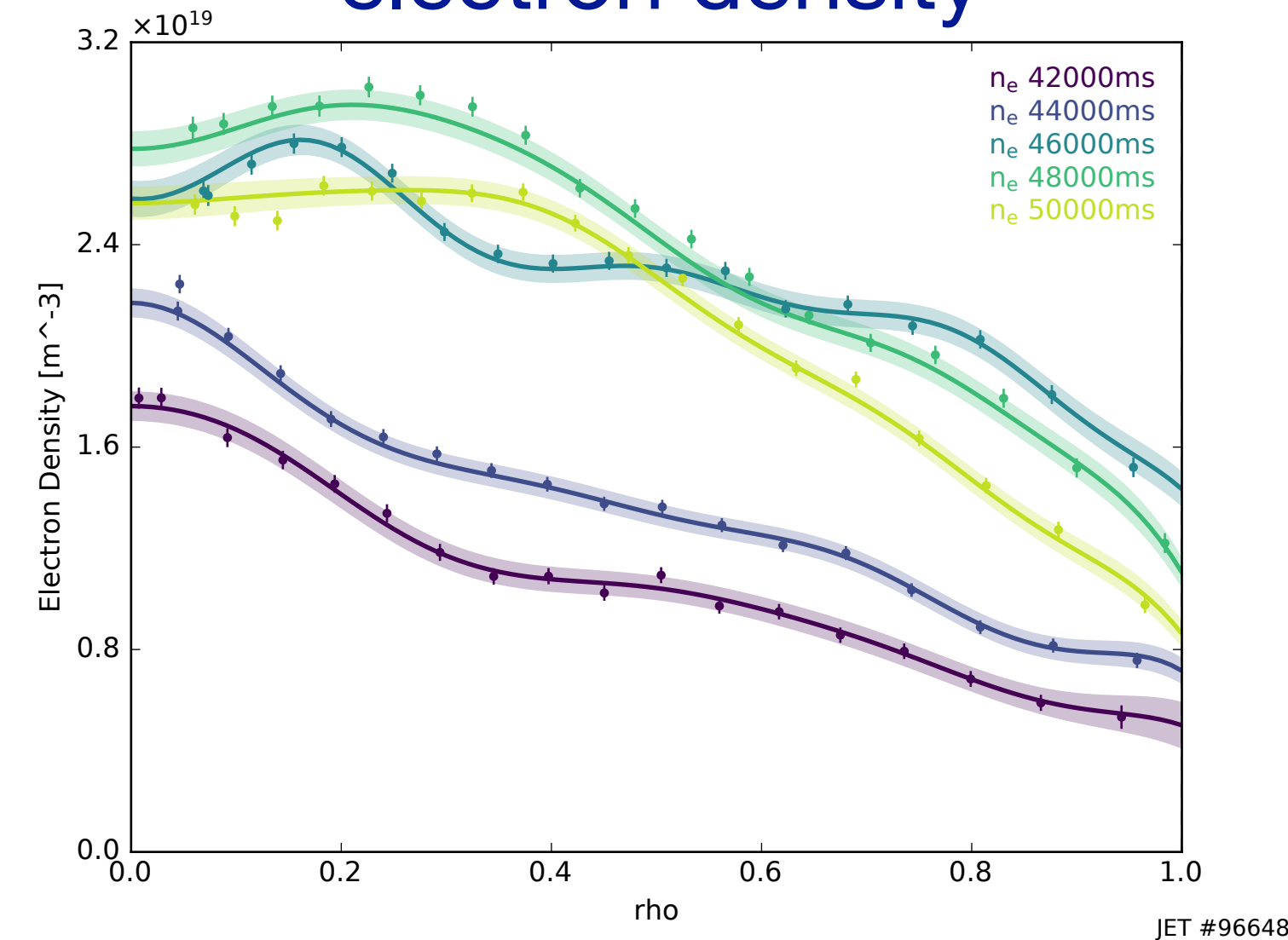
eqdsks
from
EFTP

Simple assumptions
for this preliminary test

- Te = Ti

- Zeff = 1 (exp. ~1.2 to 1.4)

- EFTP (EFIT w. pressure)

- profiles every 250ms
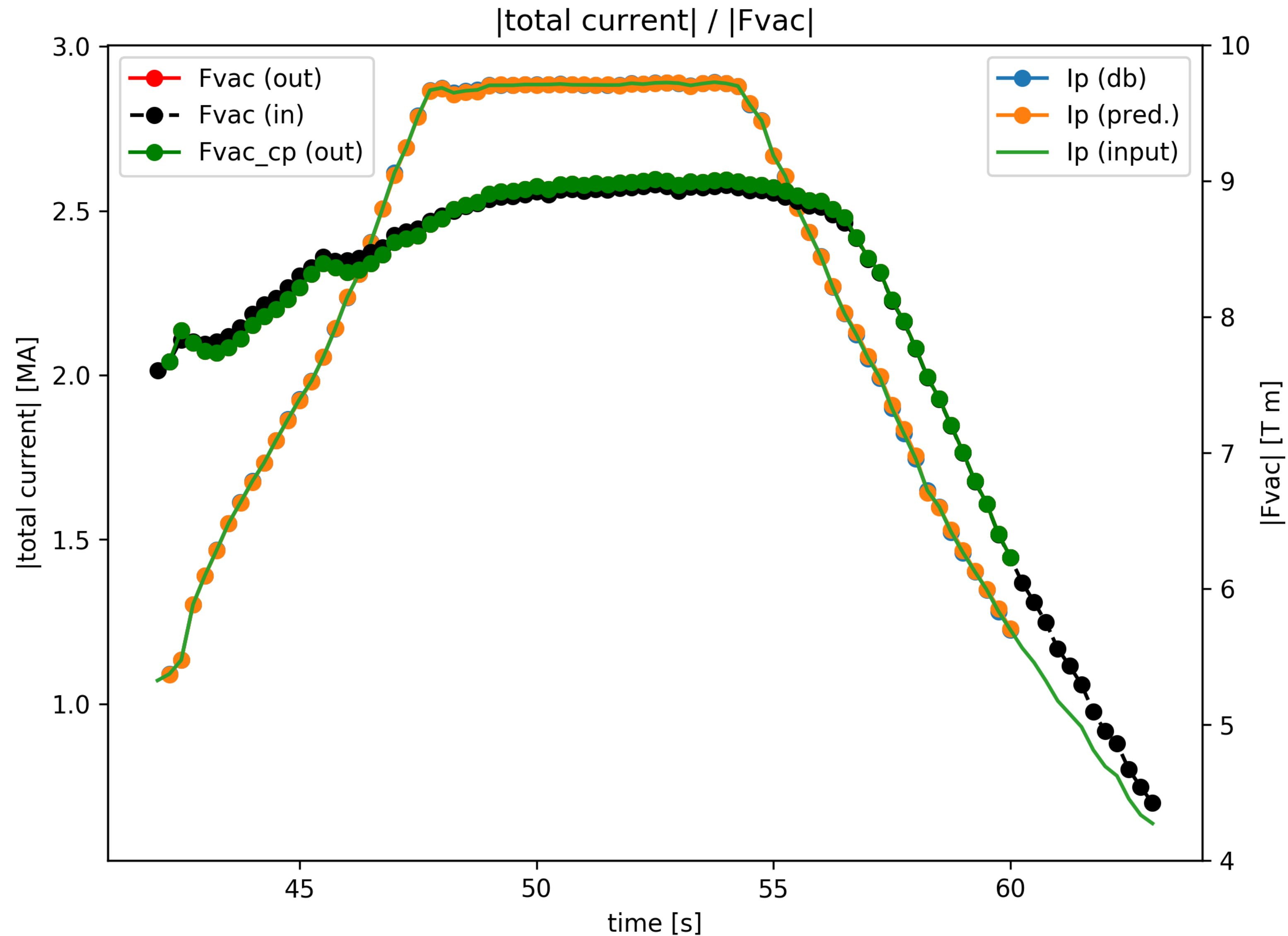

electron temperature

electron density

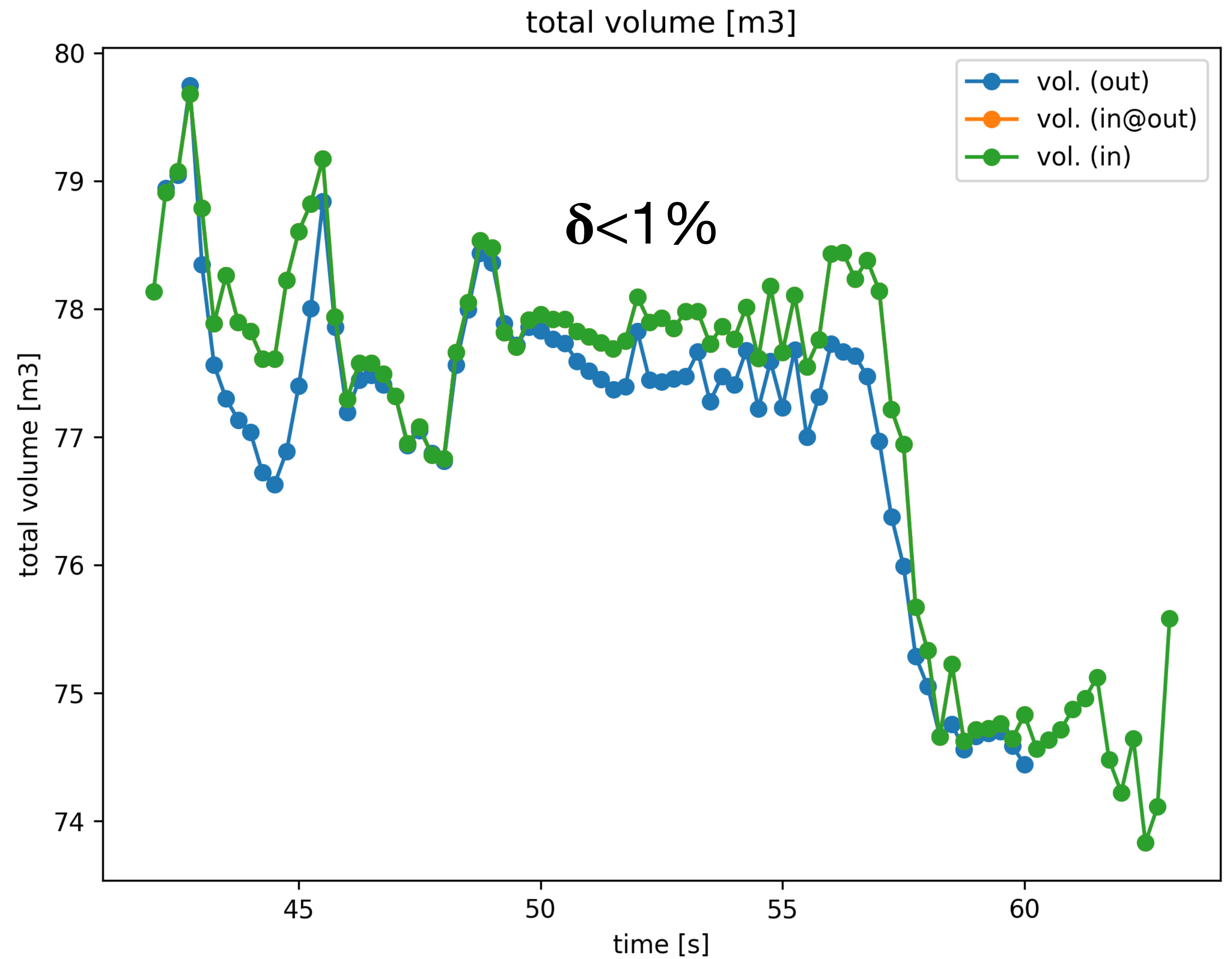JET #96648

JET #96648

ETS-6 modelling (branch IPramp)

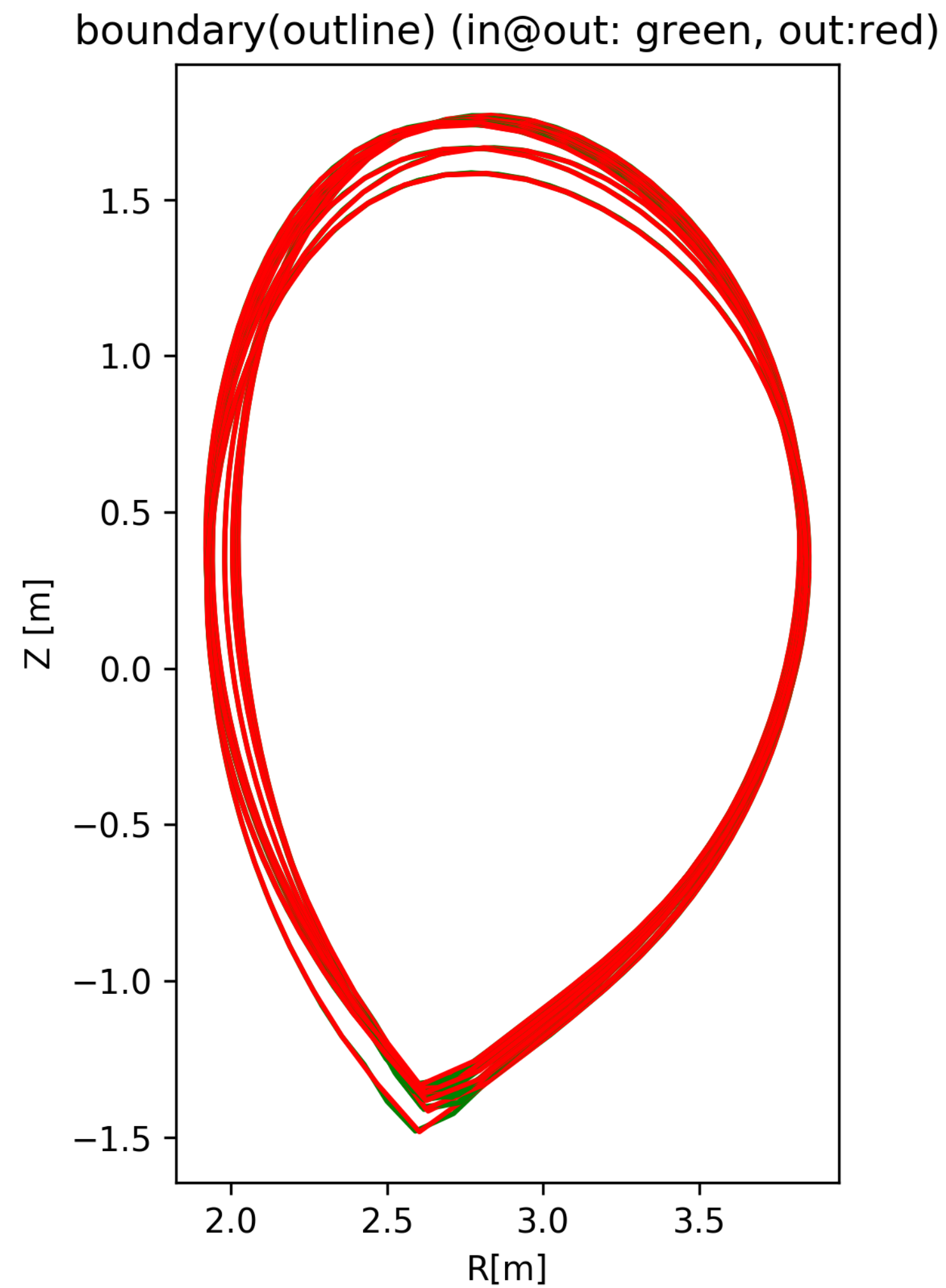- Only solve for poloidal flux
  (constrained by total current)

- Solver: FEM

- $\Delta t = 250$ms

- Neoclassic model: NCLASS
  (with bootstrap current)

- Solve equilibrium: CHEASE
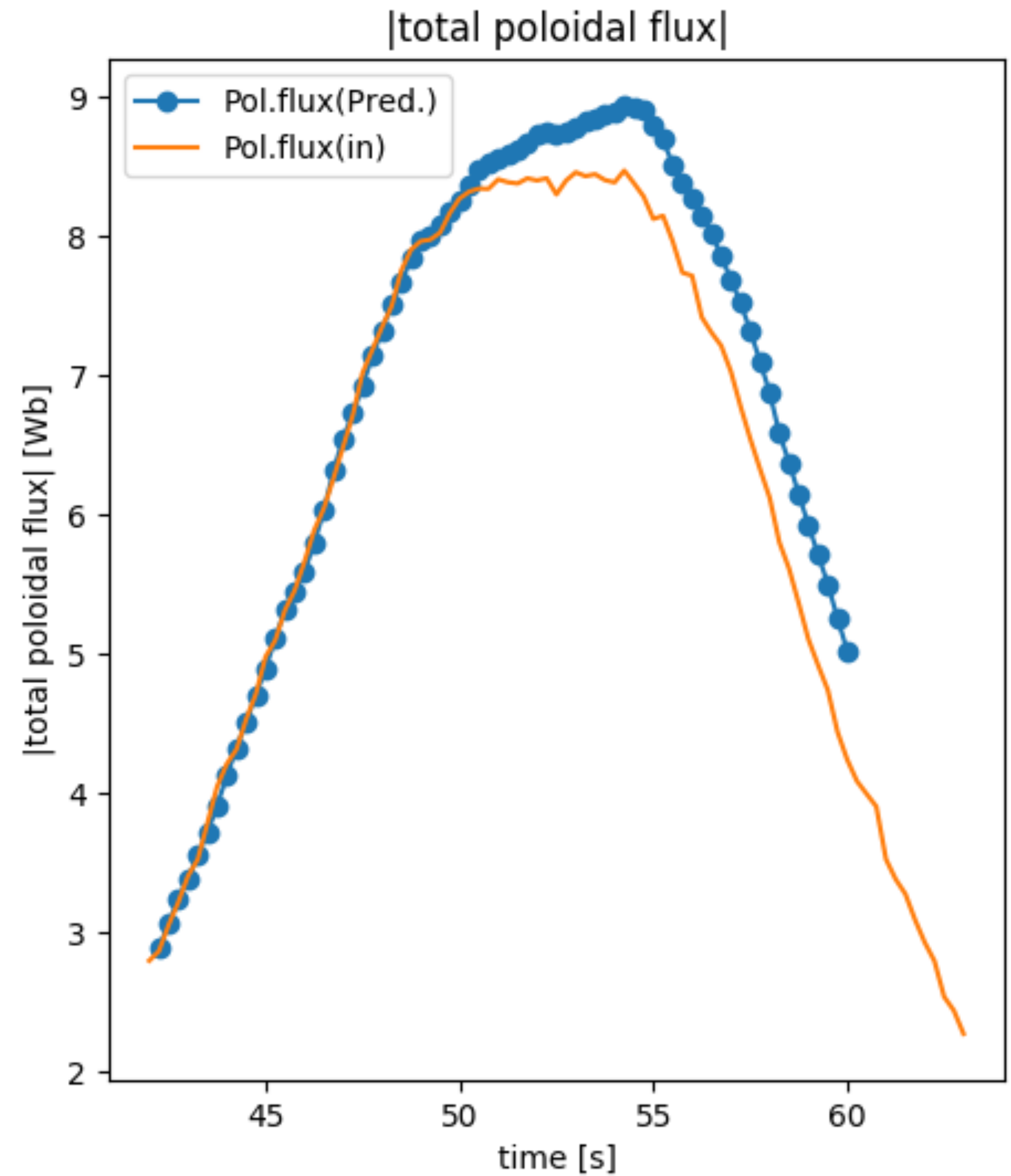 (every iteration)

ETS-6 - boundary conditions for psi and Fvac
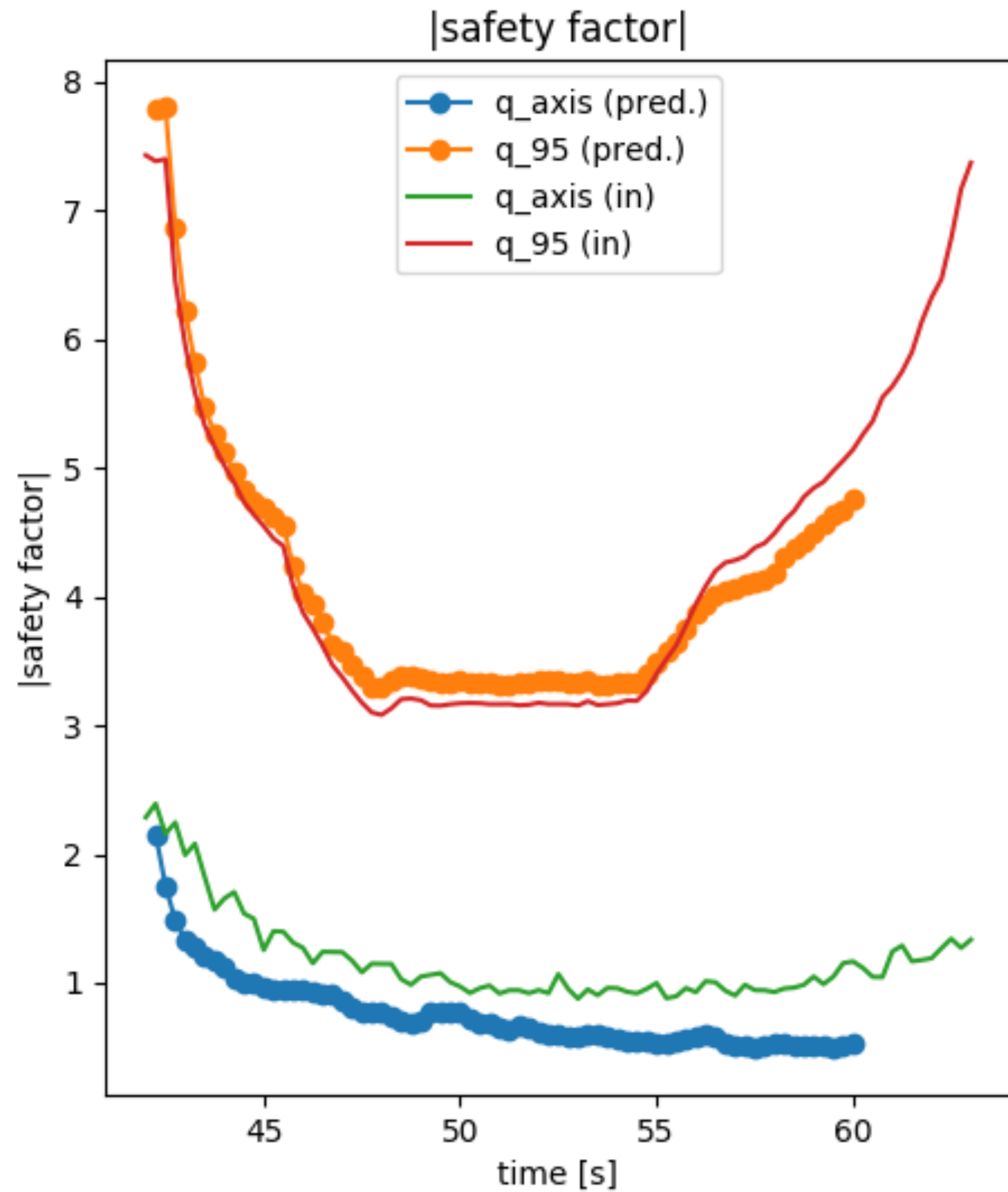

$$F_{vac} = R_0 B_0$$
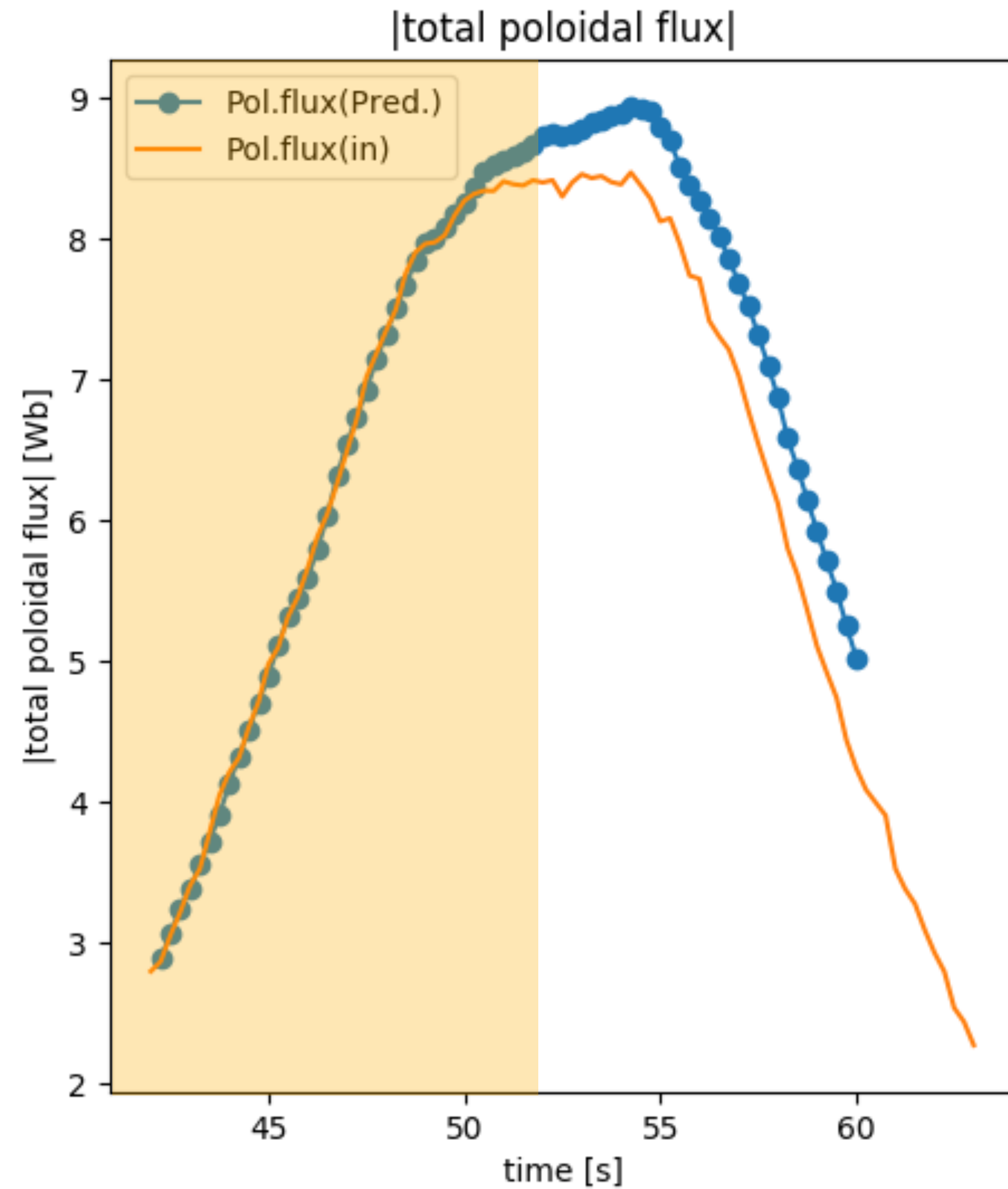
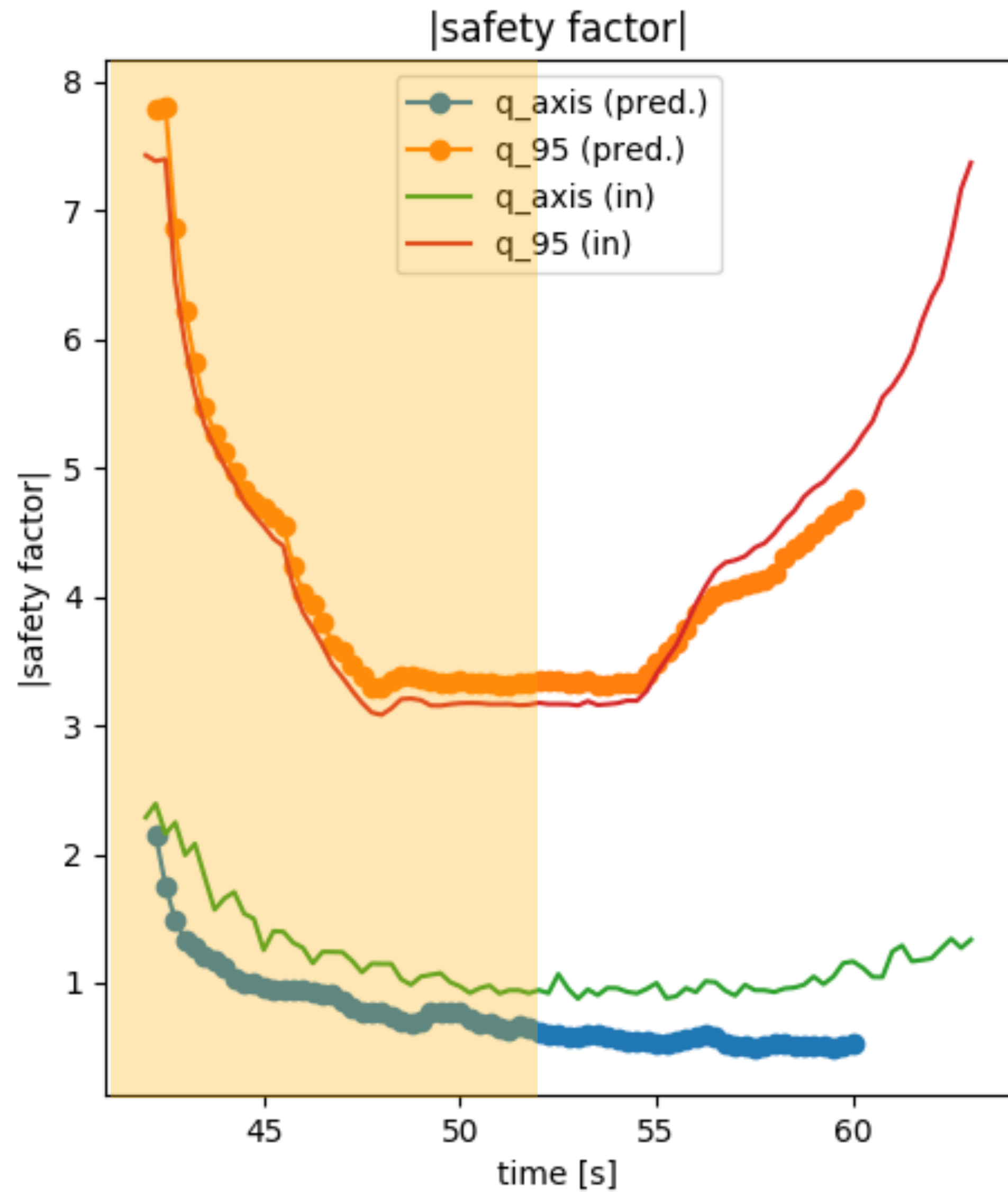# ETS-6 - plasma boundary, volume

boundary(outline) (in@out: green, out:red)

total volume [m3]
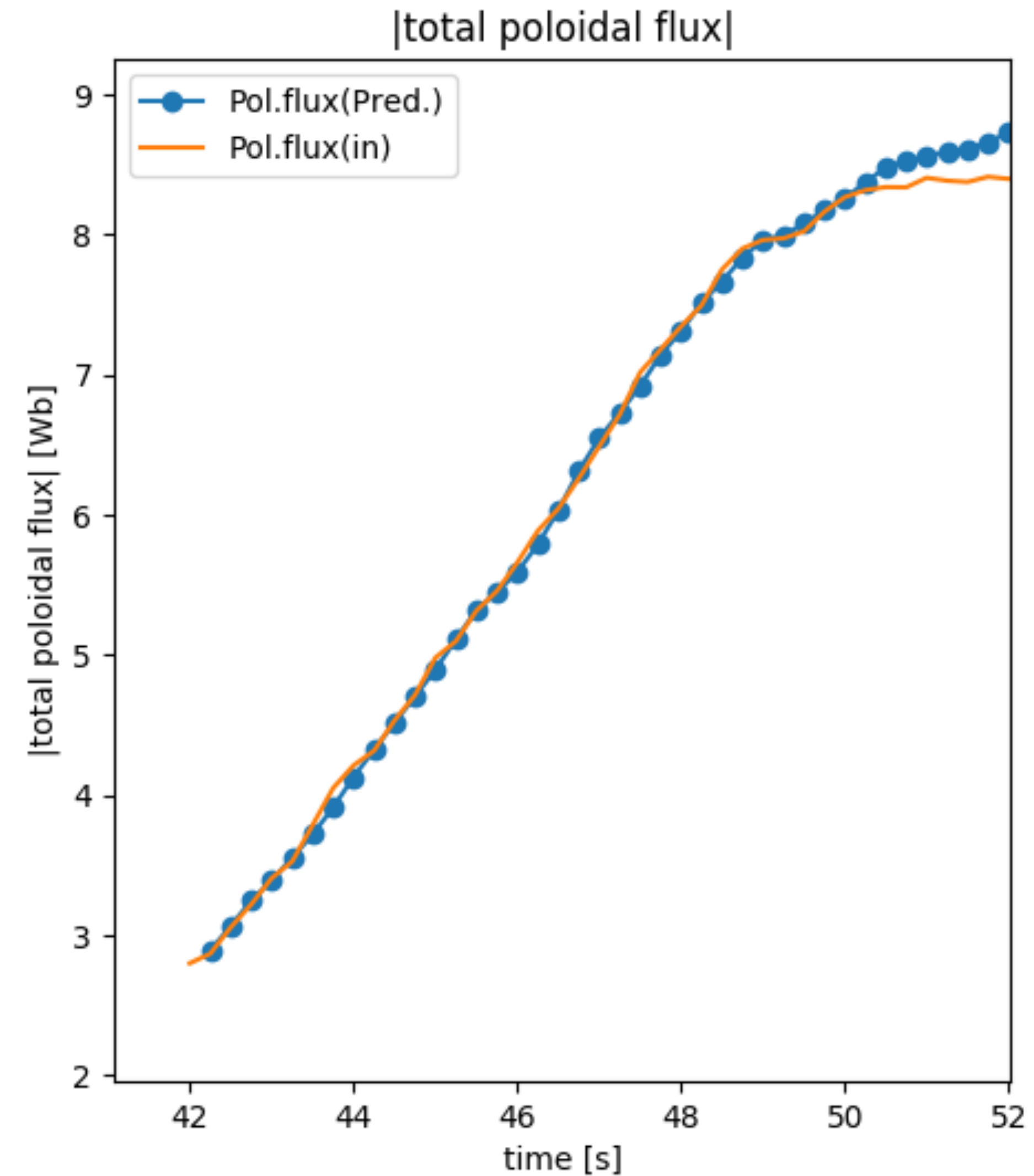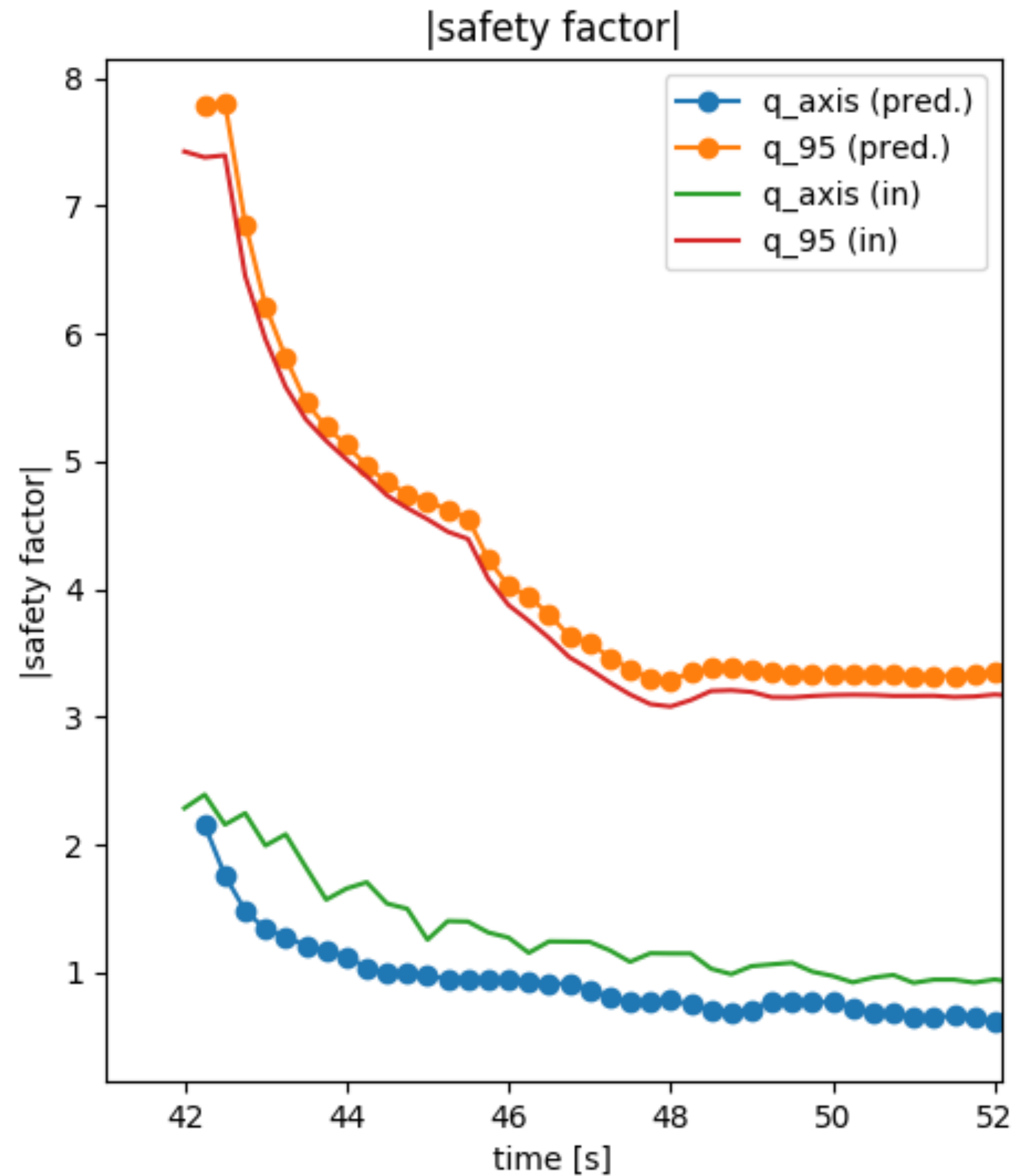
δ<1%

vol. (out)
vol. (in@out)
vol. (in)

ETS-6 - q evolution and total poloidal flux

ETS-6 - q evolution and total poloidal flux

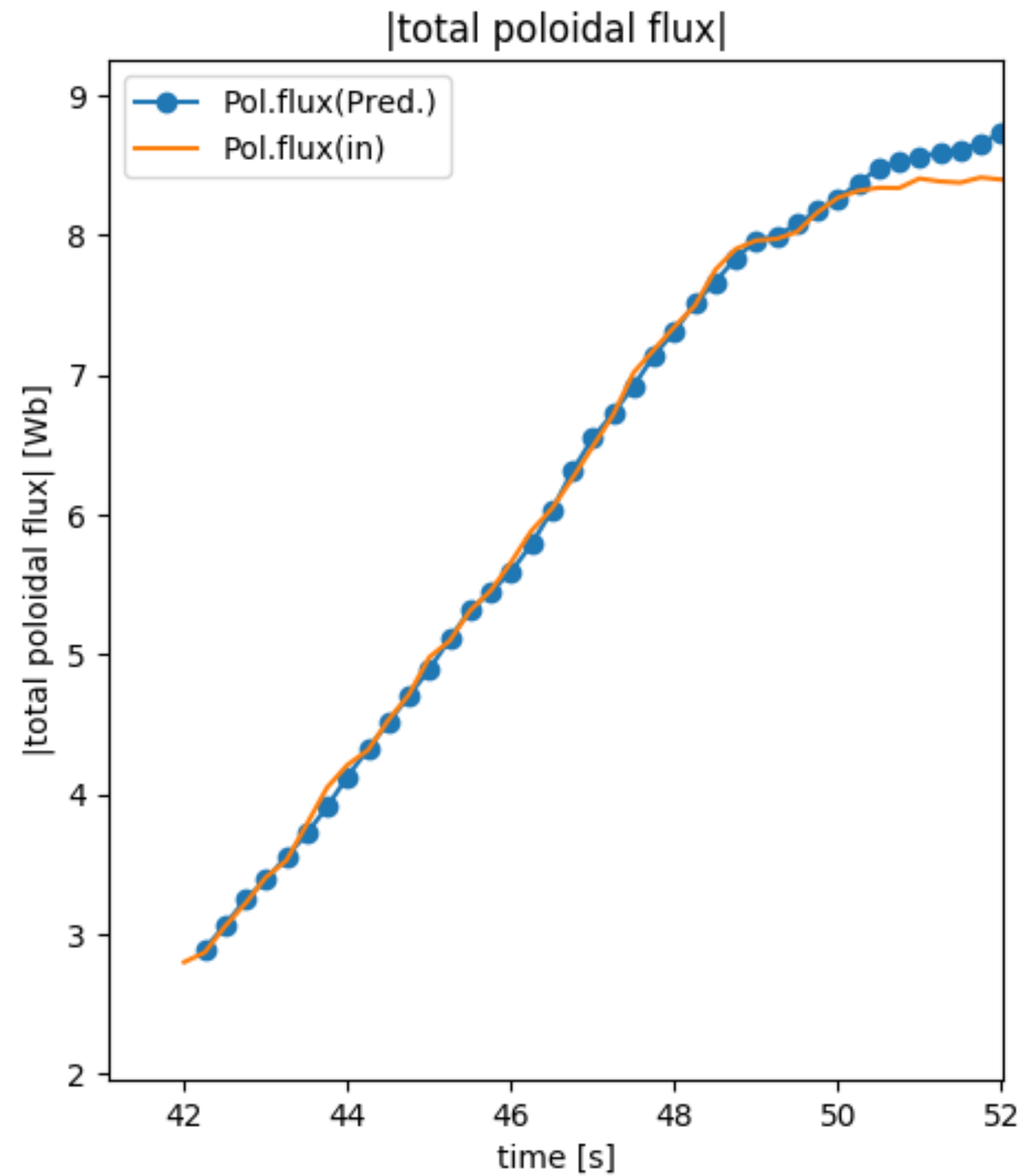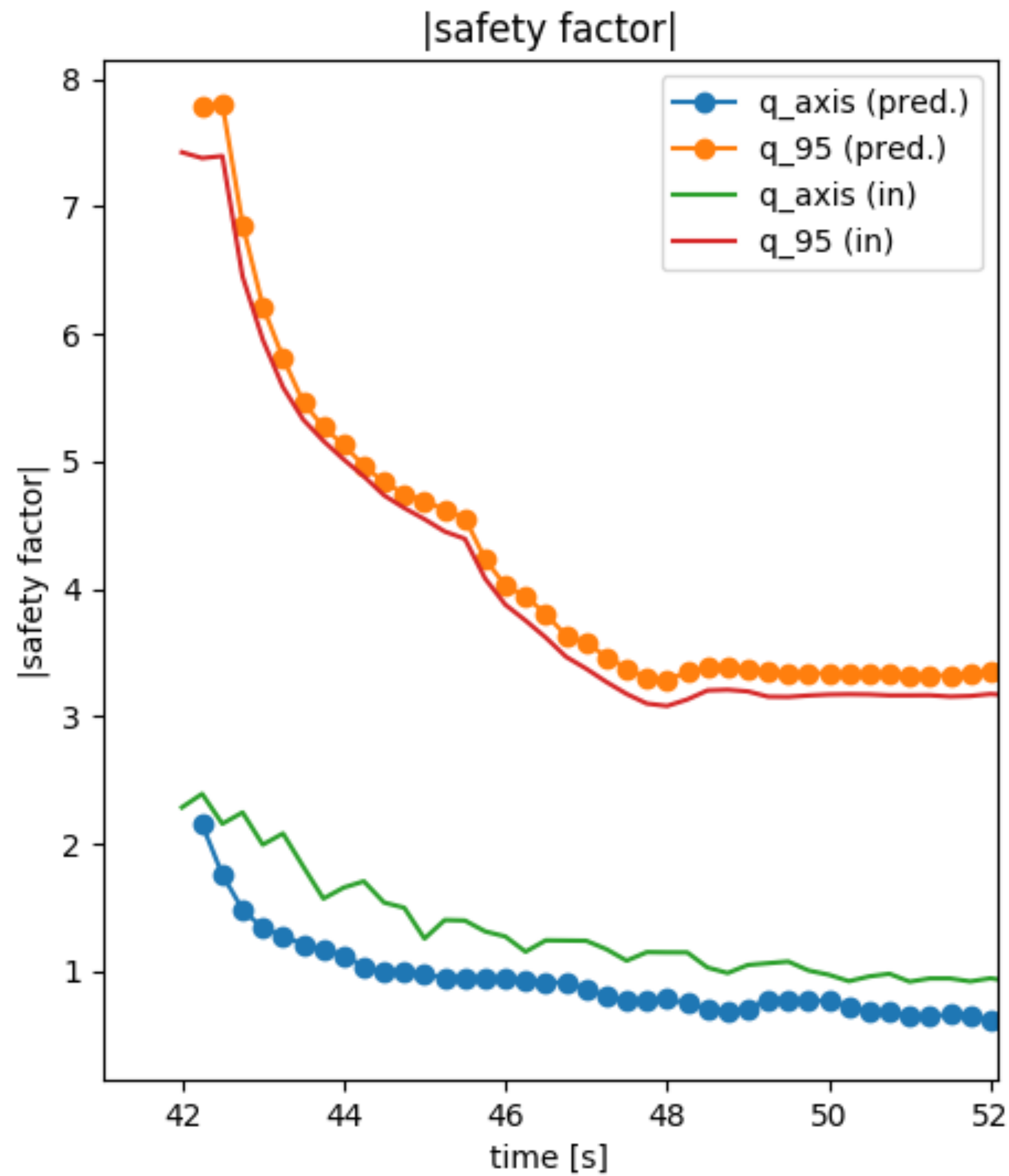# ETS-6 - q evolution and total poloidal flux
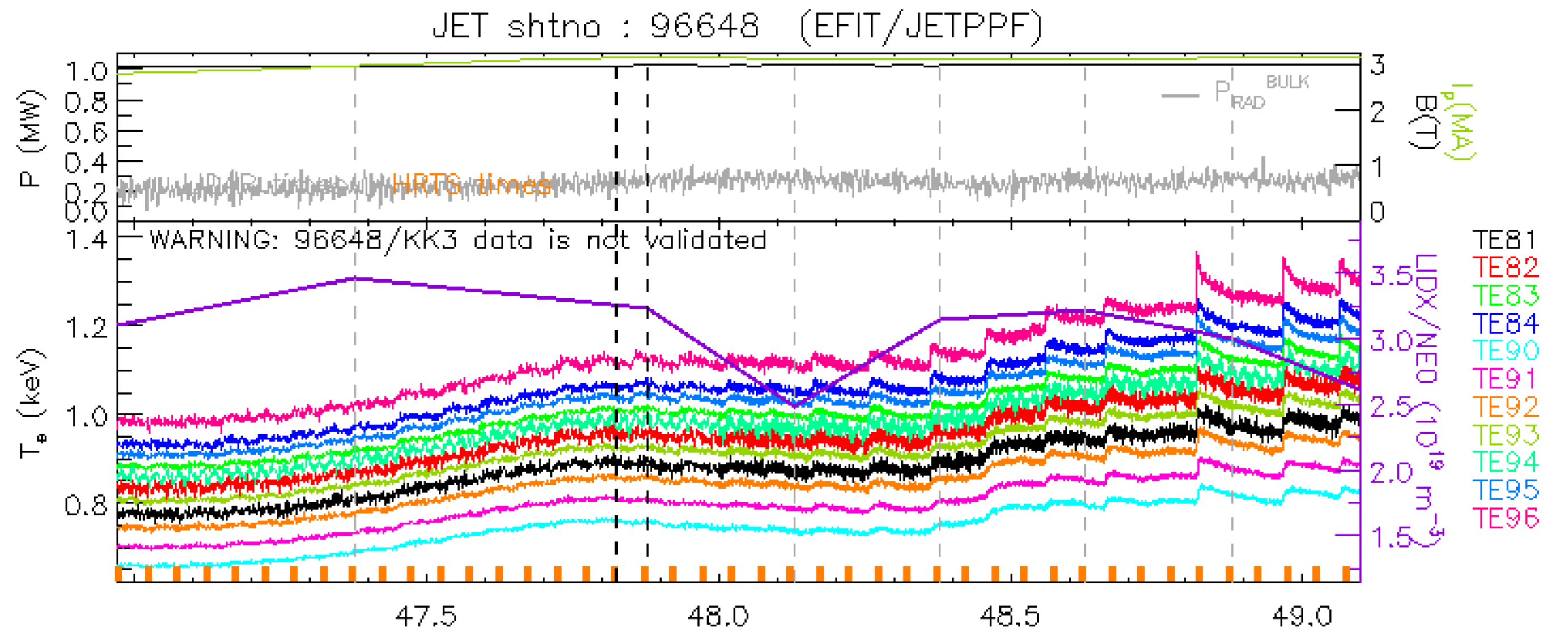
ETS-6 - q evolution and total poloidal flux

ETS-6 - q evolution and total poloidal flux

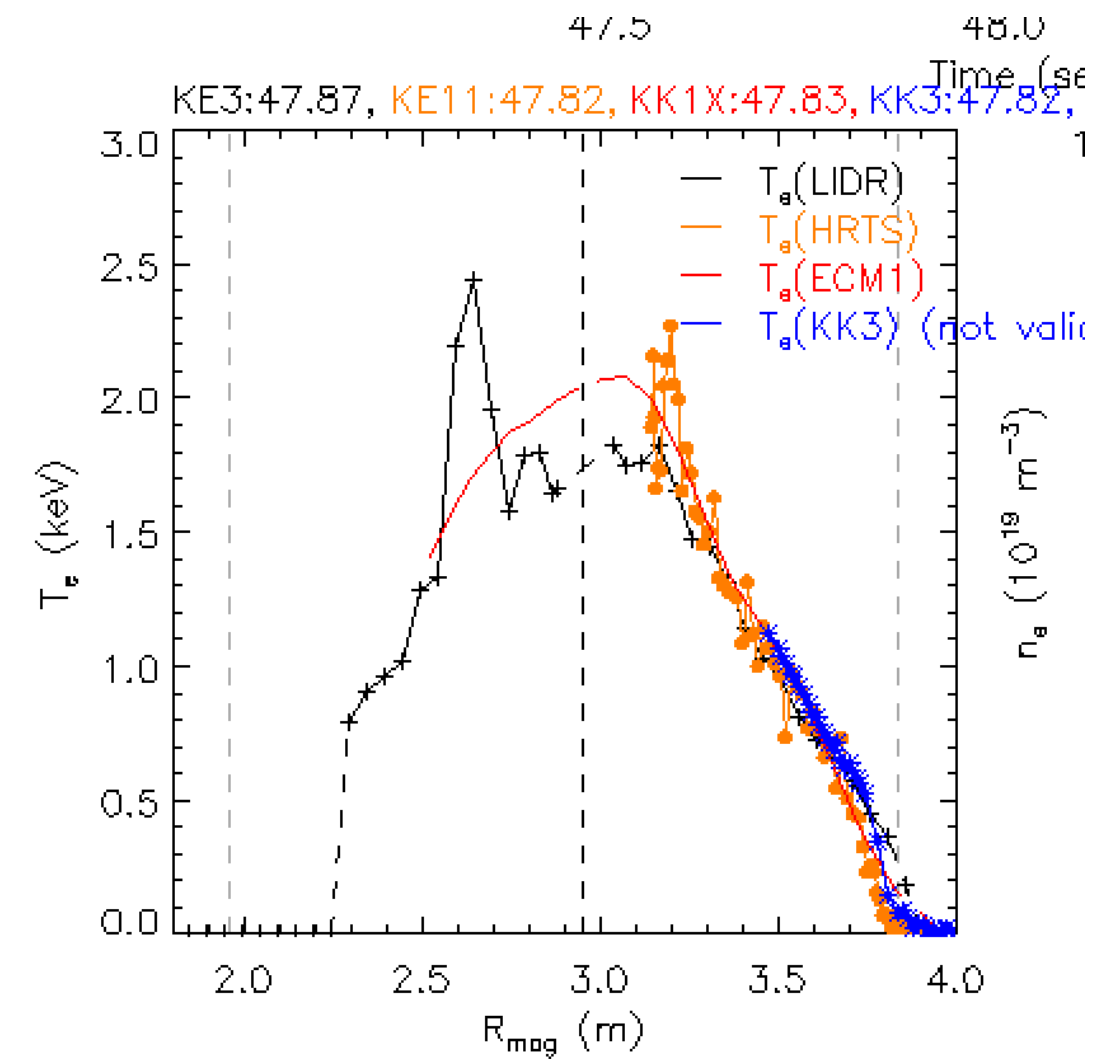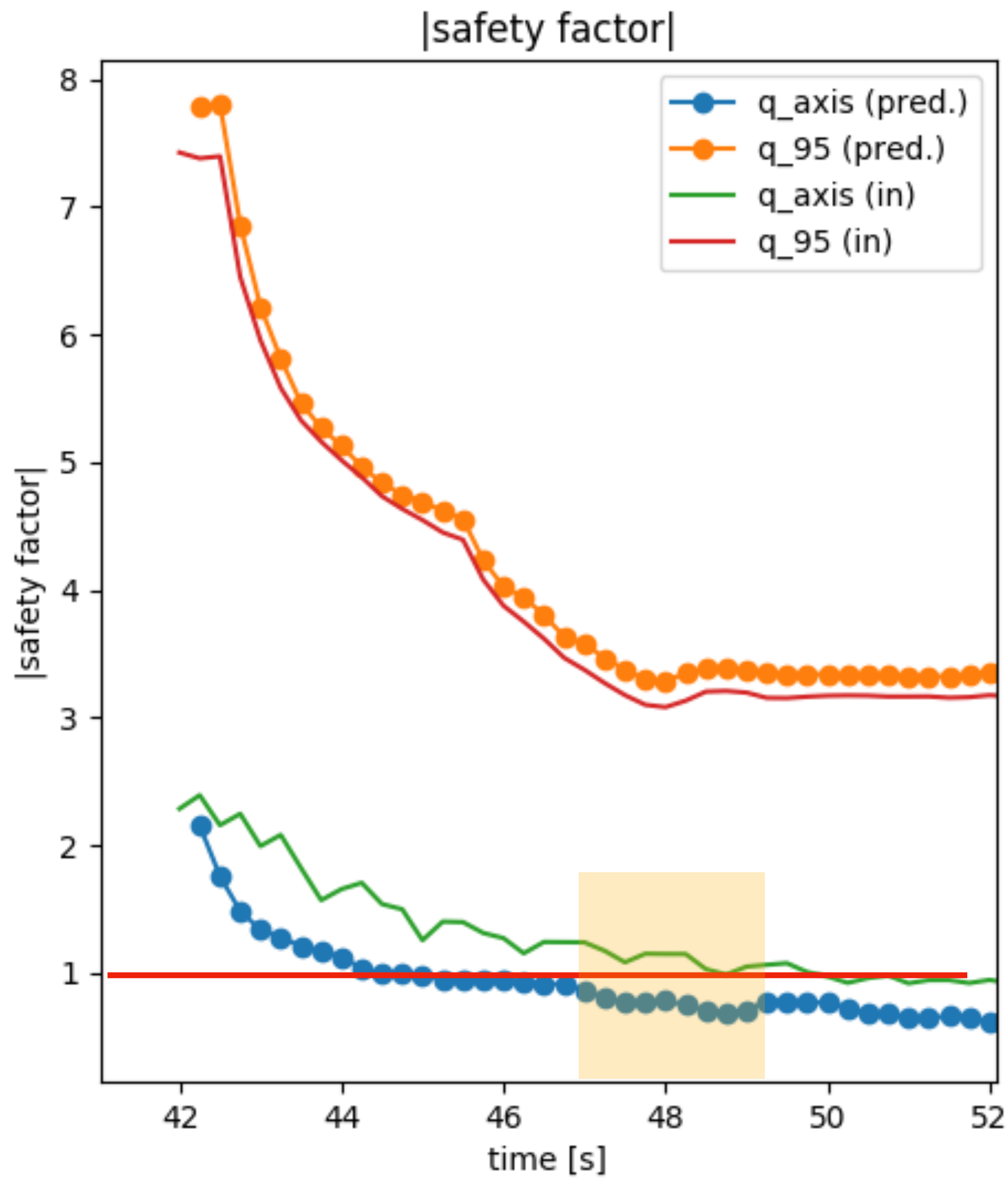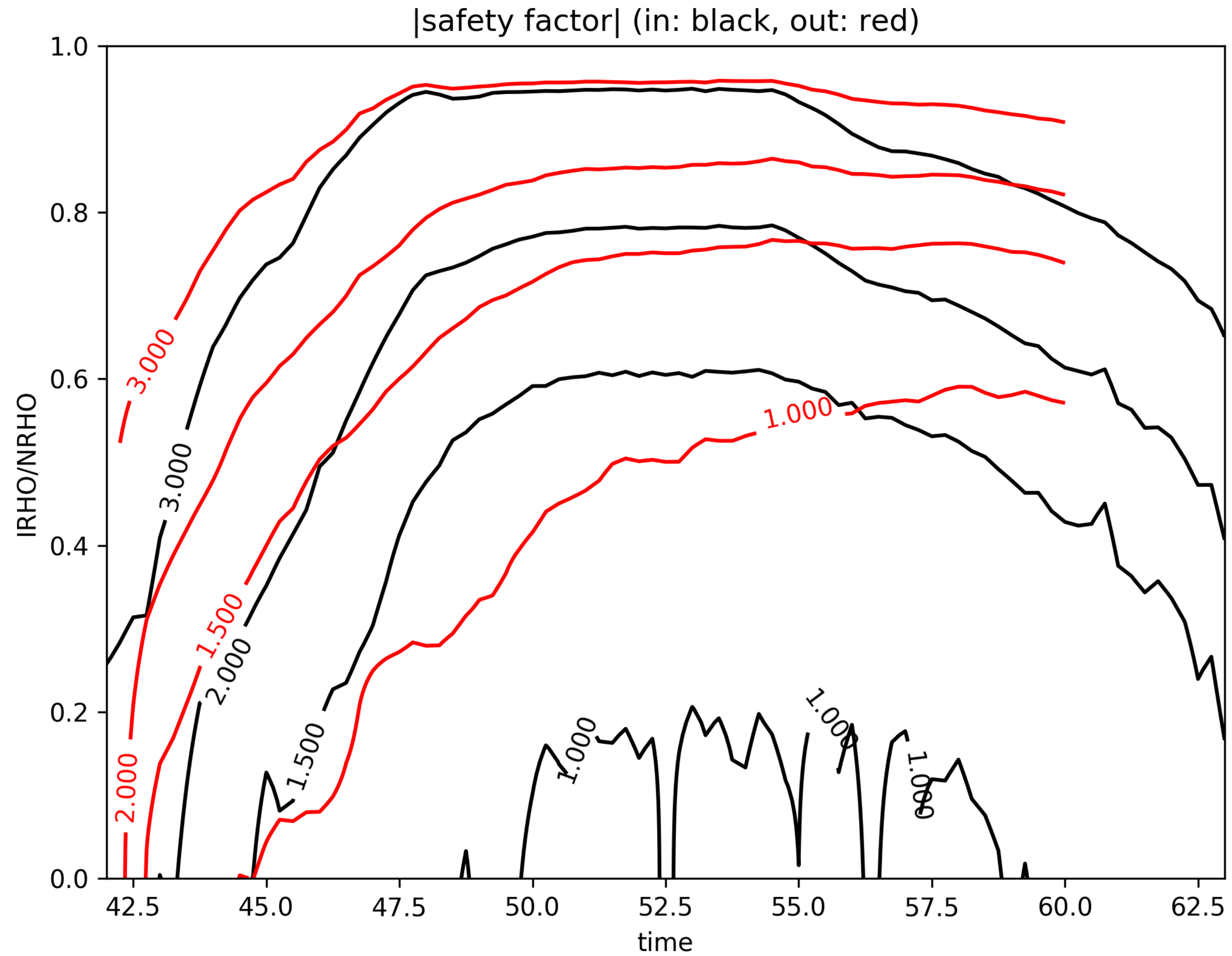# ETS-6 - q evolution

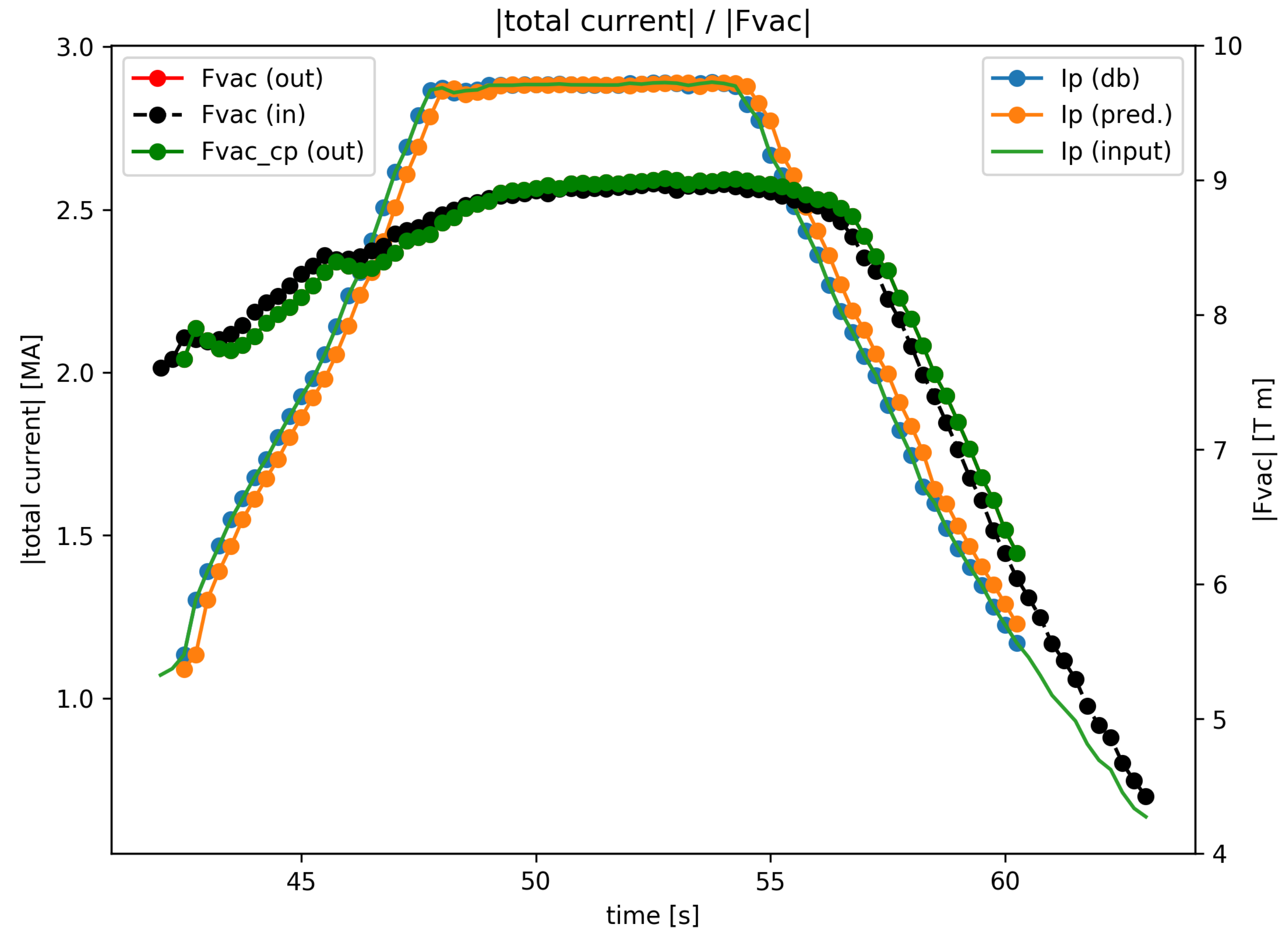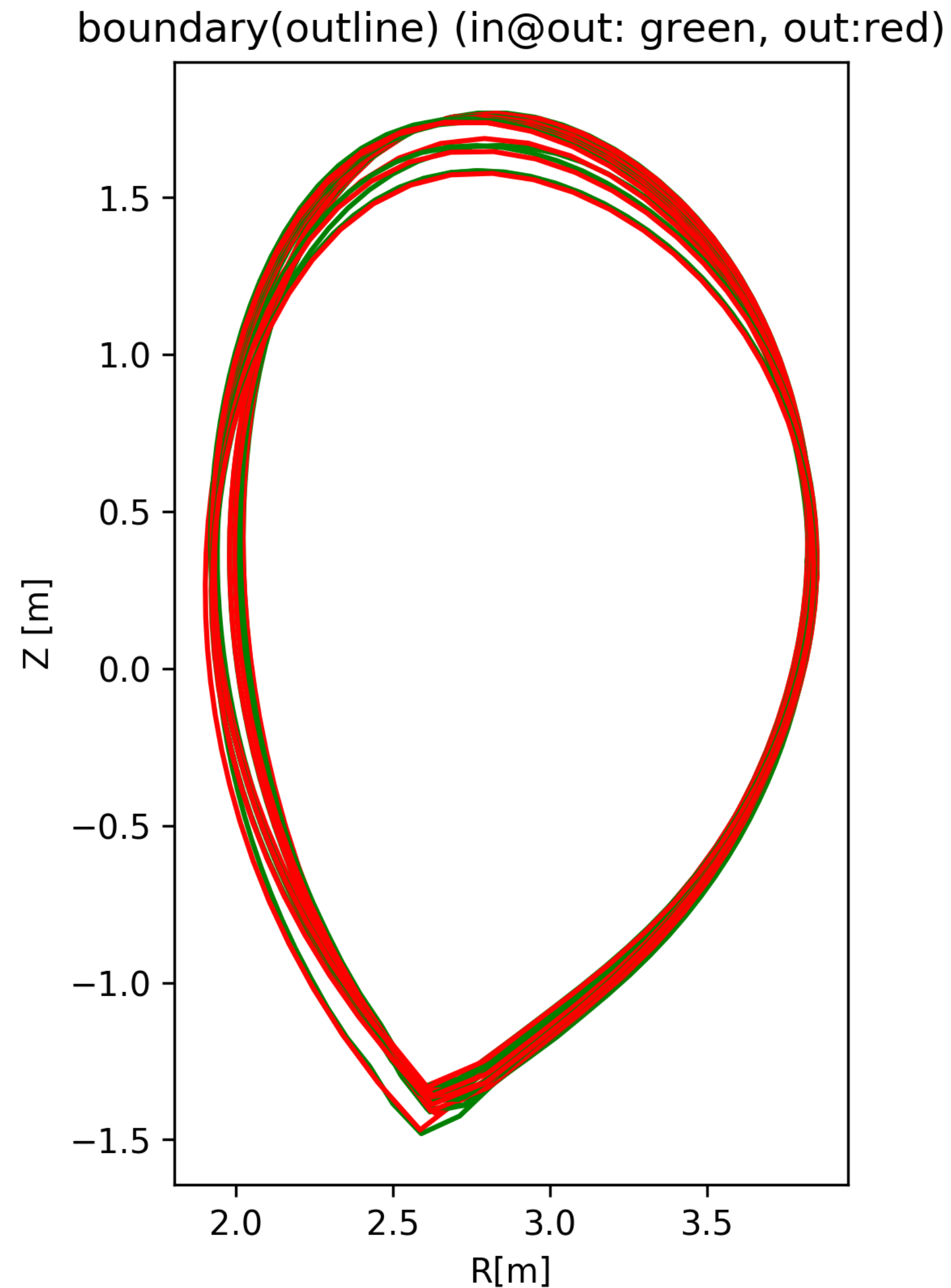|safety factor| (in: black, out: red)

ETS-6

But …

ETS-6 - the "previous sample" issue in slicing

- input data sampled every 250 ms

- first timeslice:
  42.249 s
  (slices 42.000 s)
  versus
  42.251 s
  (slices 42.250 s)

- ETS Δt = 250ms

ETS-6 - the "previous sample" issue in slicing

○ First timeslice:

  42.249 s

   versus

  42.251 s

○ Δt = 250ms

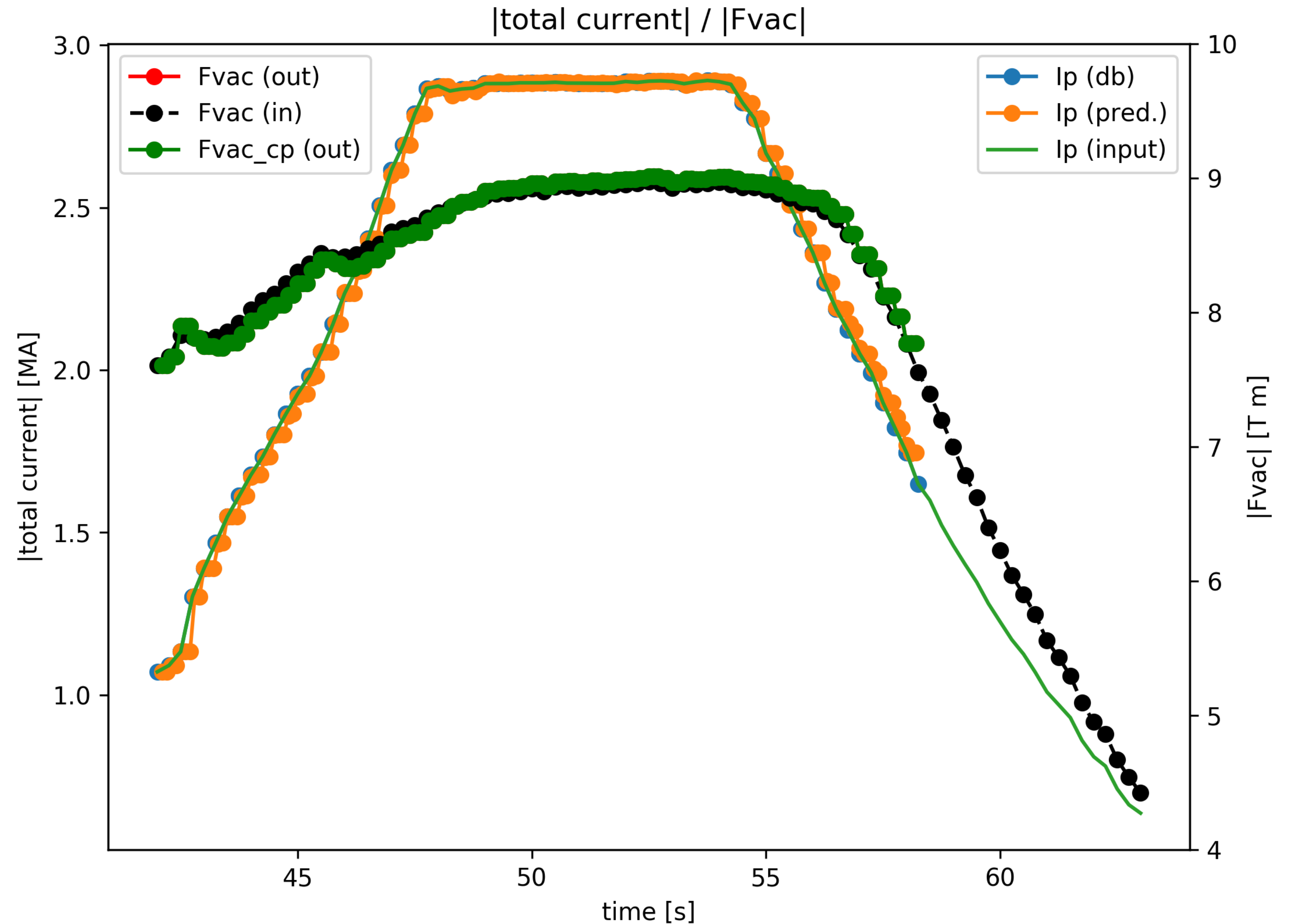

boundary(outline) (in@out: green, out:red)

ETS-6 - the "no interpolation" issue in slicing

- First timeslice:
  sync with input
  (same as the 1st case)

  but

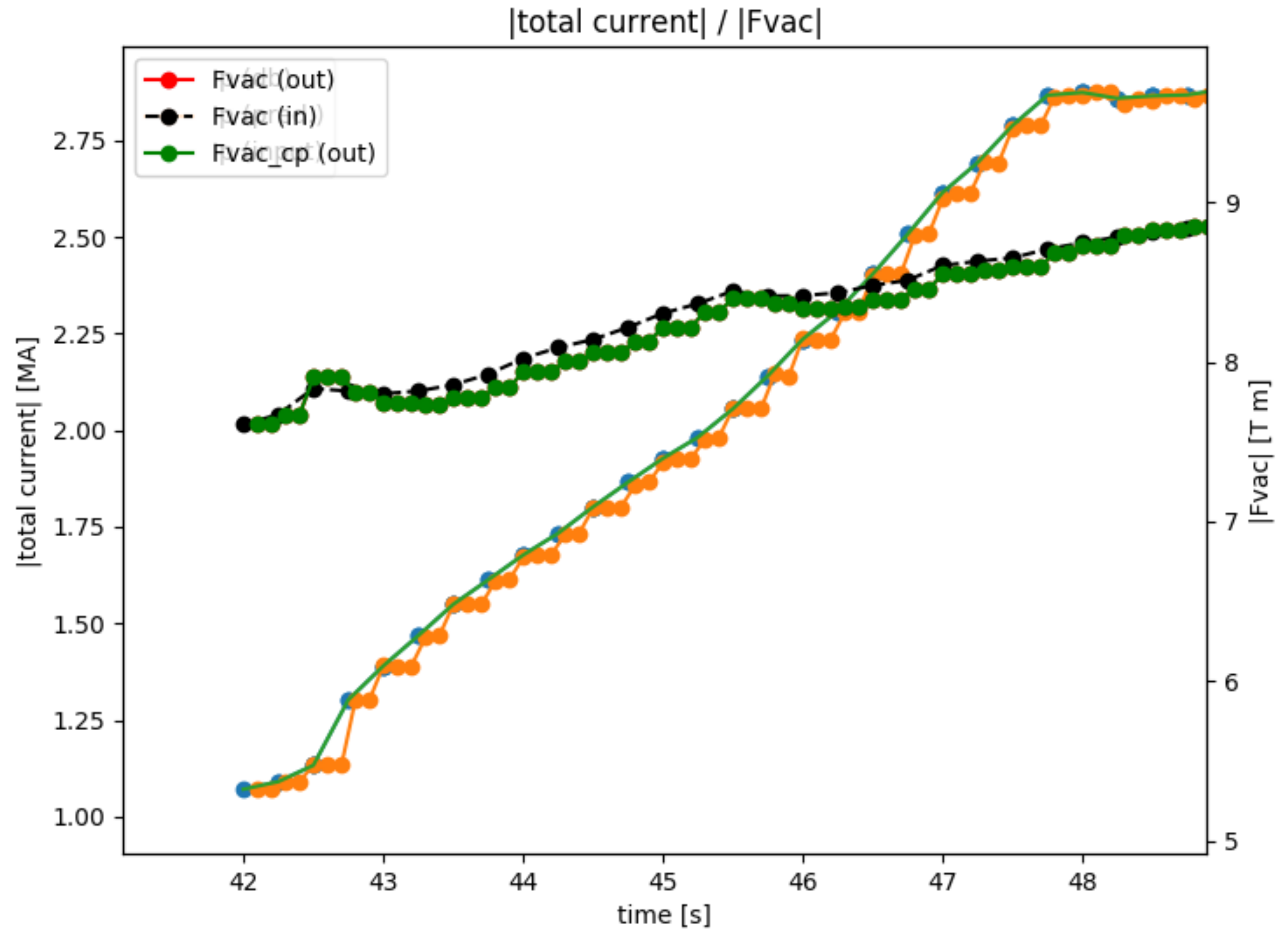- Δt = 100 ms
  (v. 250 ms for input)

ETS-6 - staircase effect

- First timeslice:
  sync with input
  (same as the 1st case)

  but

- Δt = 100 ms
  (v. 250 ms for input)

|total current| / |Fvac|

ETS-6 - full Ohmic scenario

I'll leave the technical details for another occasion.