

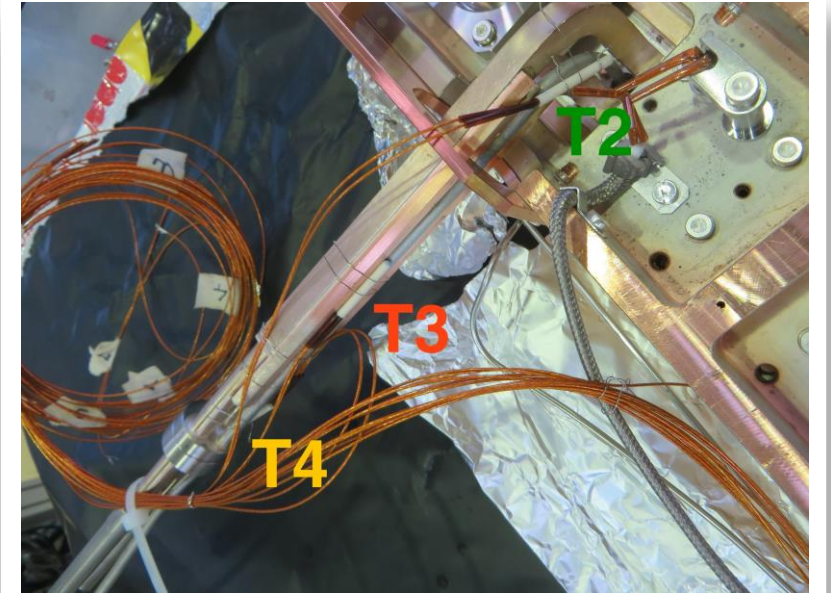
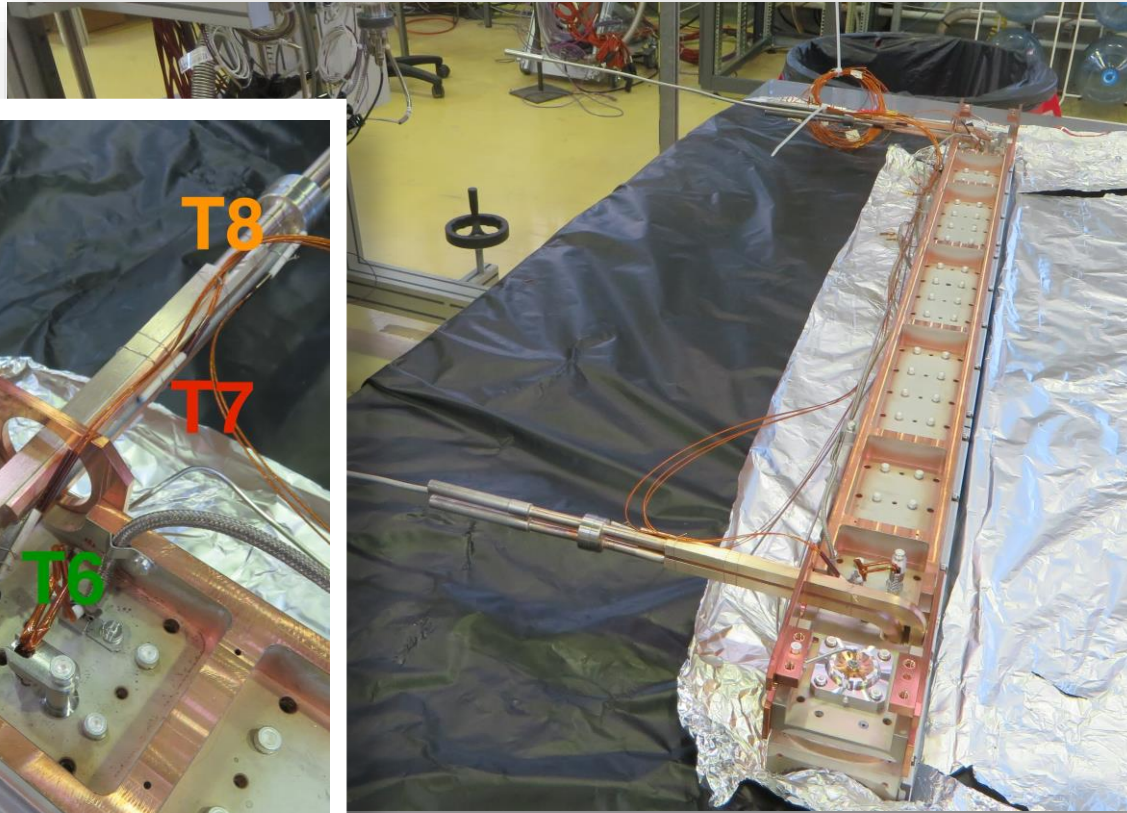
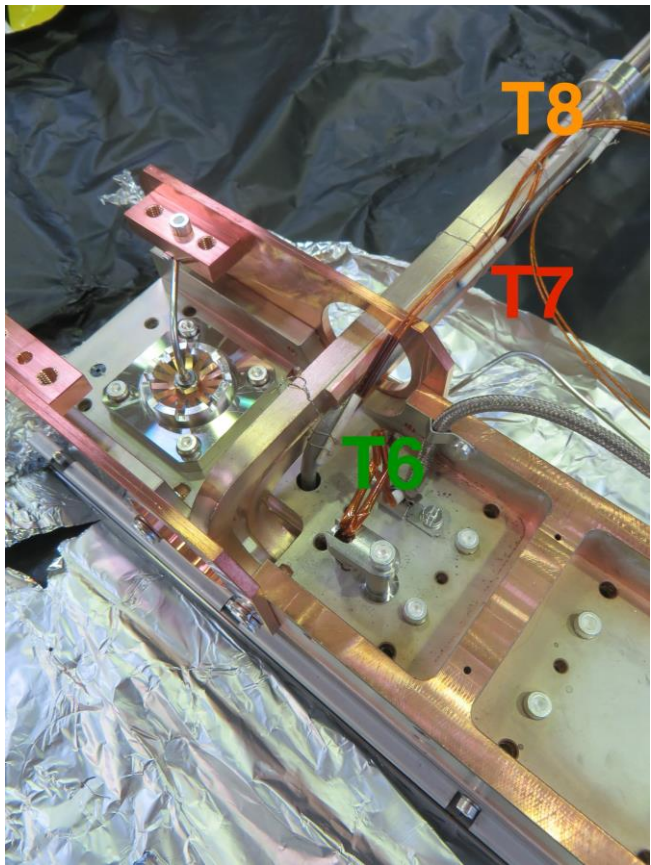
# Planned adjustment of the temperature interlock of the BBCW

Adriana Rossi @ 251st MPP meeting – 31 May 2024

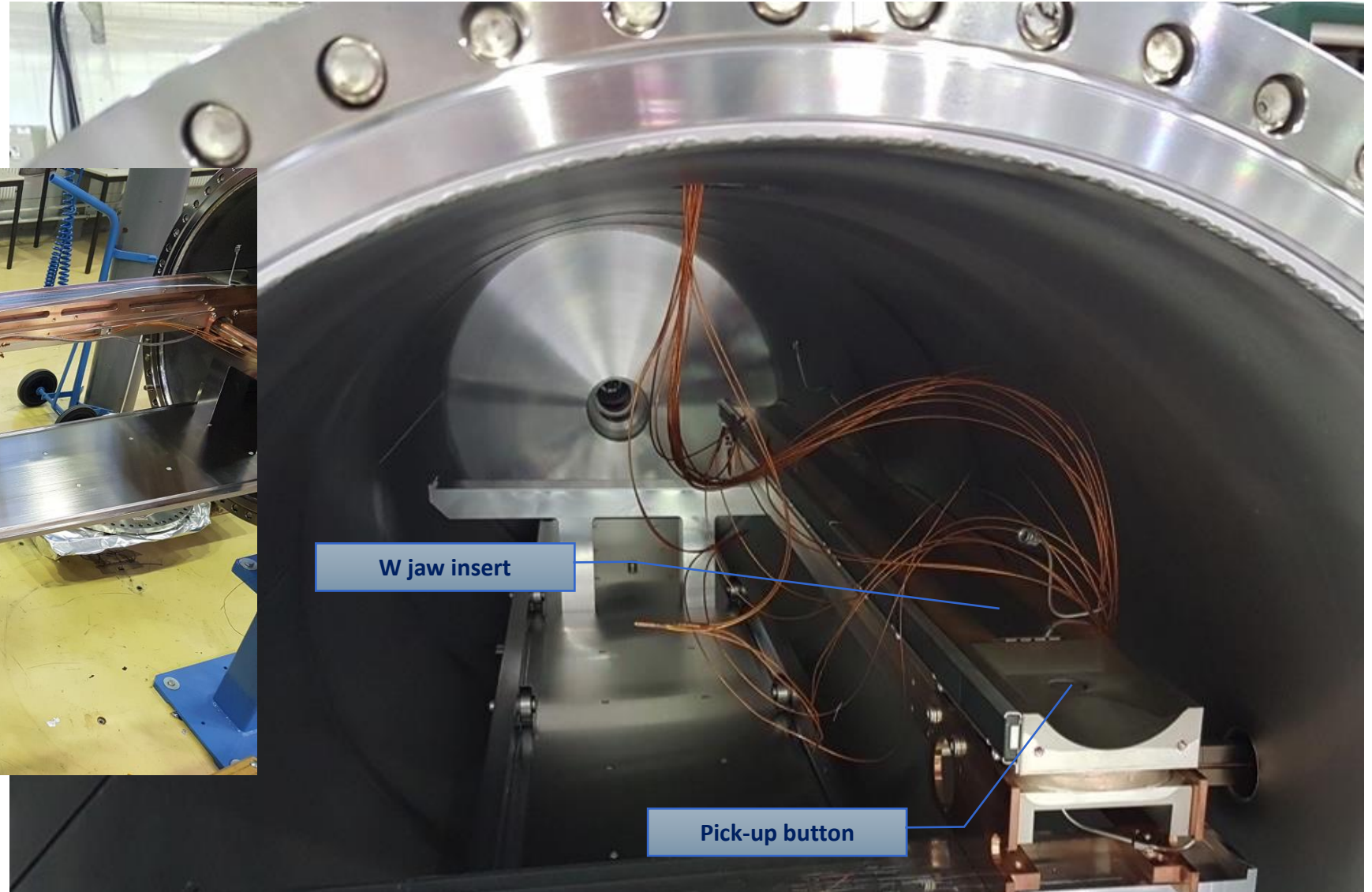
# Outline

- Recall on how the BBCW temperature interlock and the measurements made on the spare wire-in-jaw to establish the threshold value
- TCTPH.4L5.B1 wire over threshold
- Results from the tests in the machine (TCTPH.4L5.B1 and TCTPH.5R5.B2 for comparison)
- Outlook

# Spare wire-in-jaw equipped with T sensors



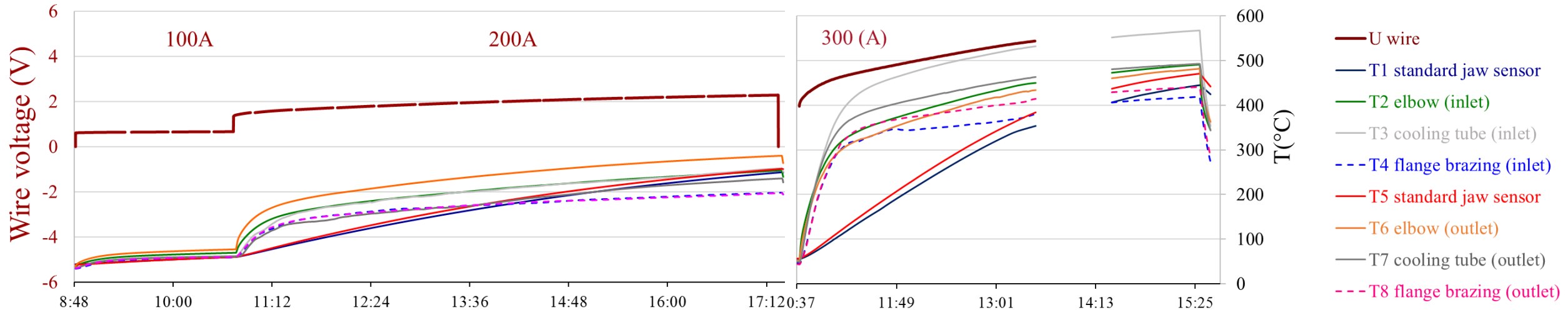
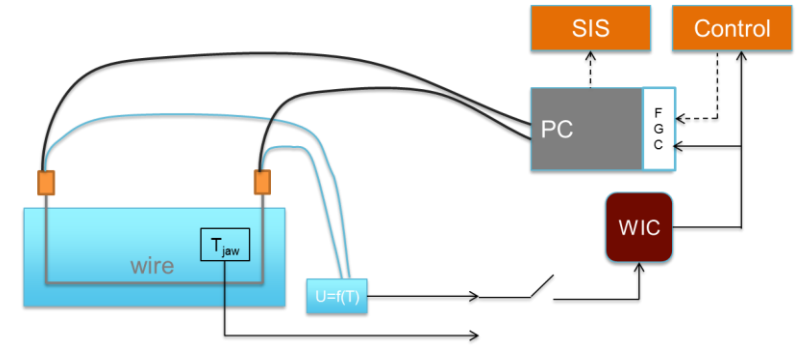
# Spare wire-in-jaw equipped with T sensors



W jaw insert

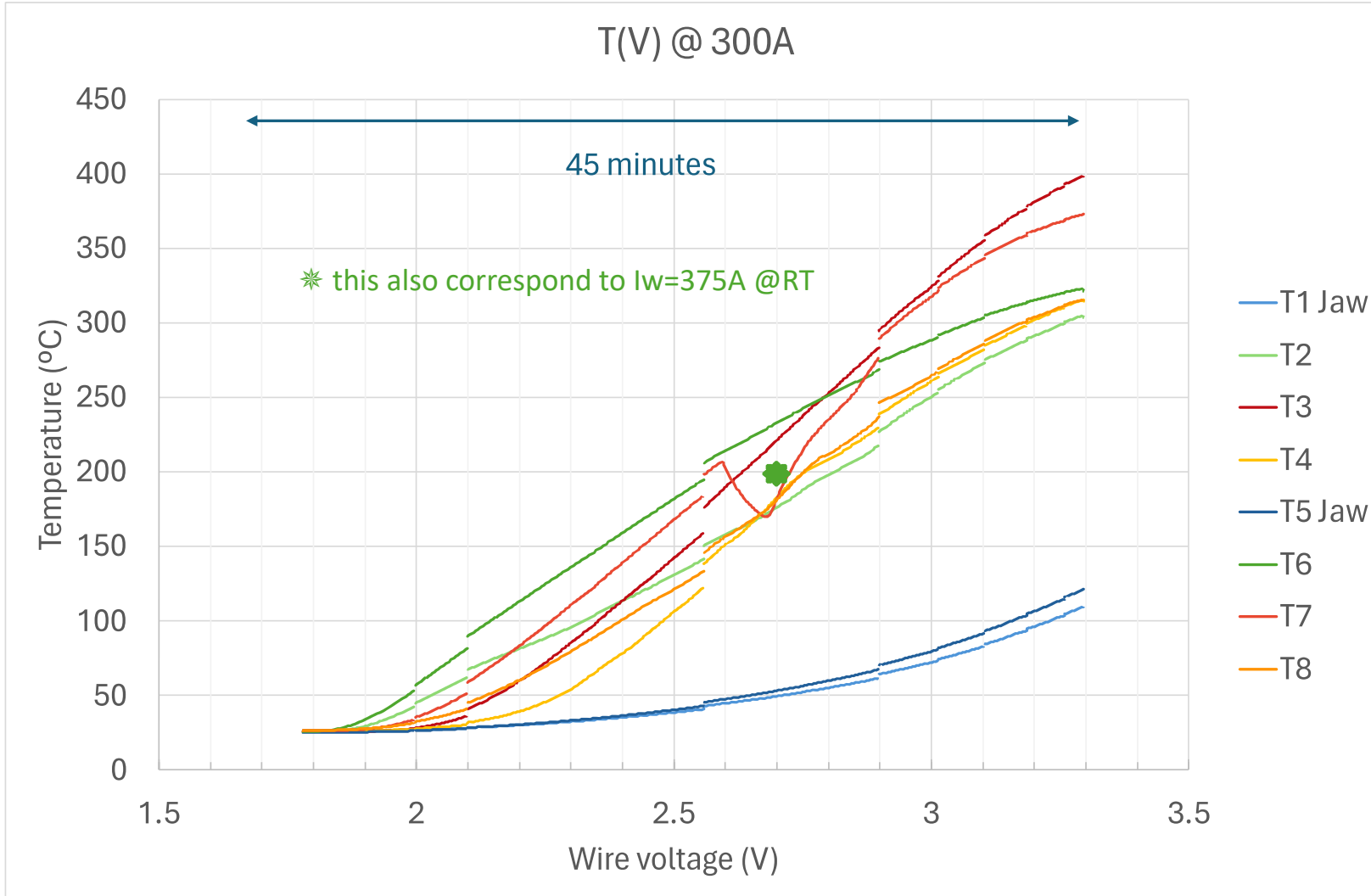
Pick-up button

# Wire interlock threshold determined with measurements under vacuum / without cooling



Note the time evolution of several minutes

# Wire interlock threshold

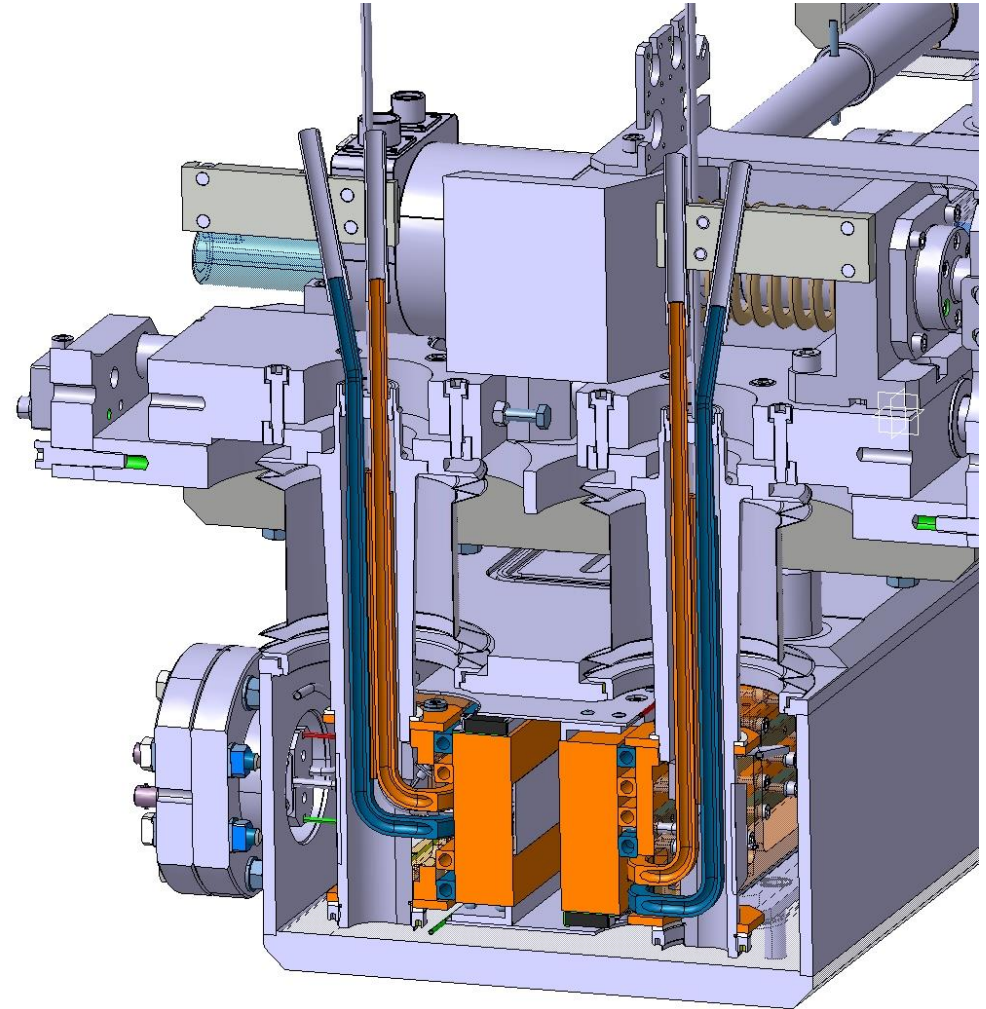
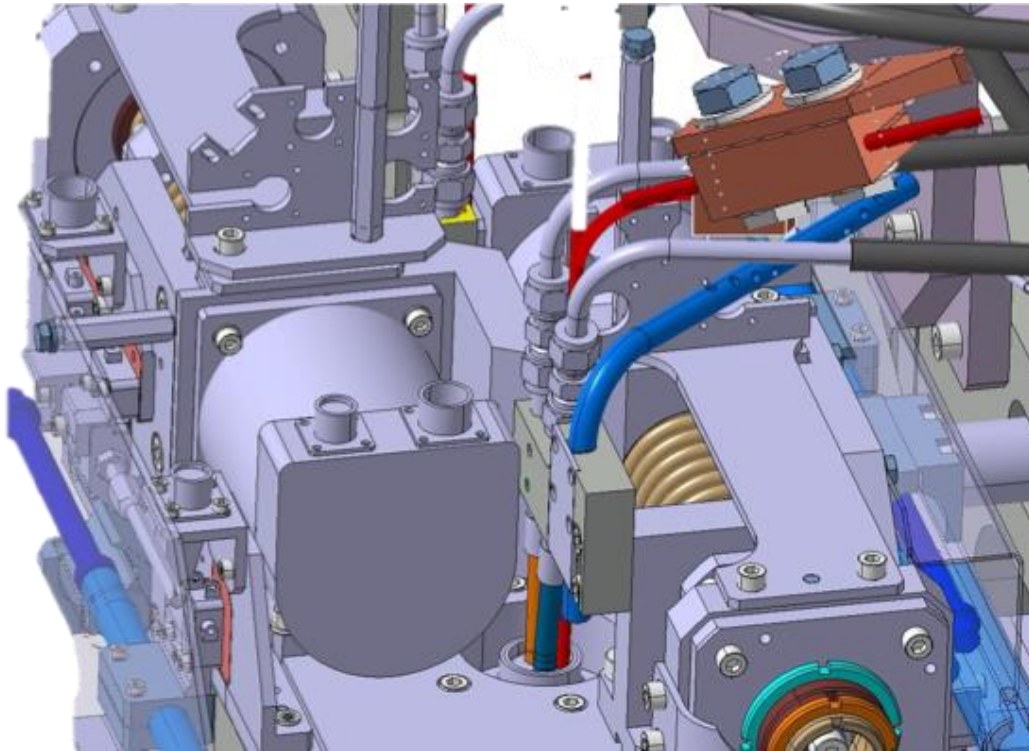


- Wire resistivity  $f(T)$
- If wire voltage  $> 2.6V^*$   
= if hottest point @ 300A inside vacuum  $\sim 200^\circ C$ , WIC cuts the PC
- WIC dumps at the  $\sim$  same time
- **Long time constant of system**, no constraints on collimator HW

# T interlock triggered on TCTPH.4L5.B1

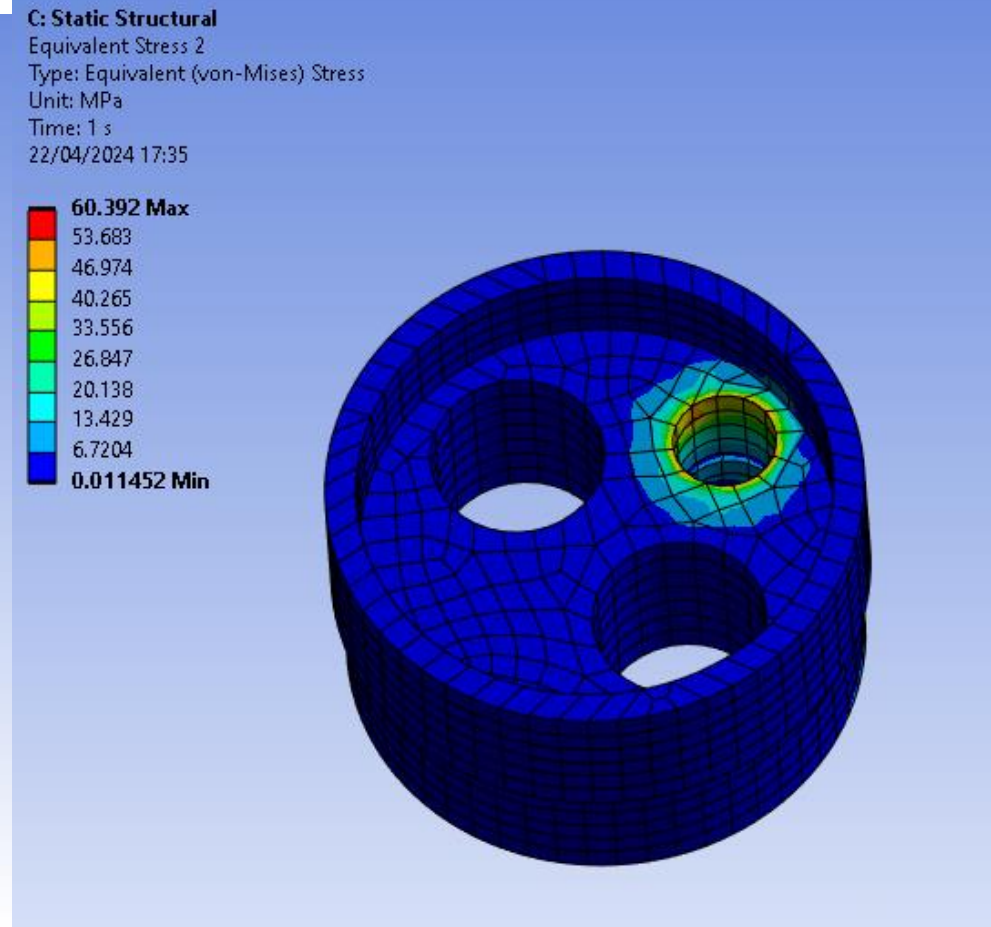
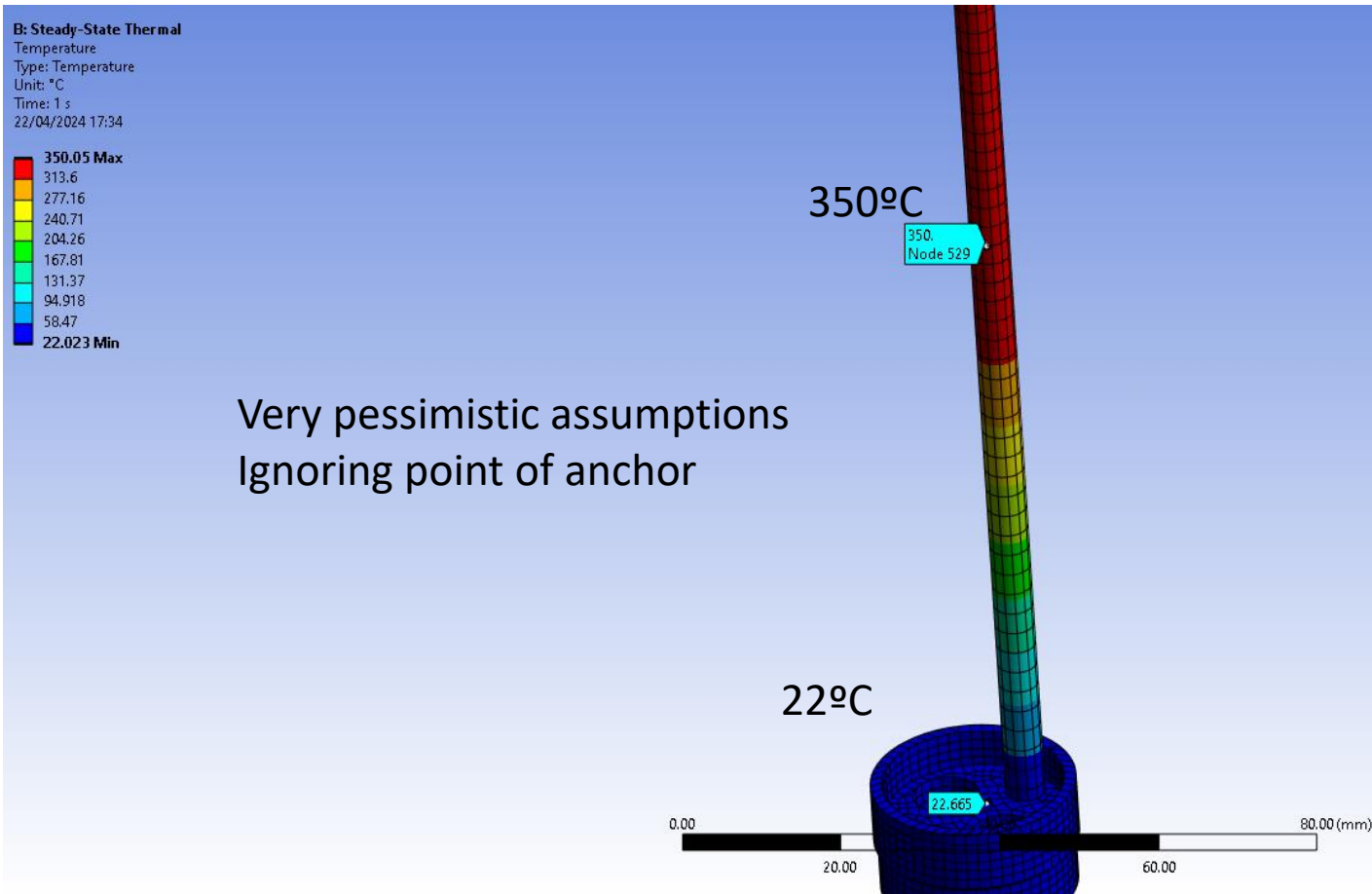
- Interlock tested @ 375A
- Wire temperature measured in situ for 20-25 min @ 350A
- Around Easter, interlock triggered after ~ 40 min @ 350A only on this collimator
- Operation resumed after rMPP @ 315A

# Wire after repair (courtesy of L. Gentini)

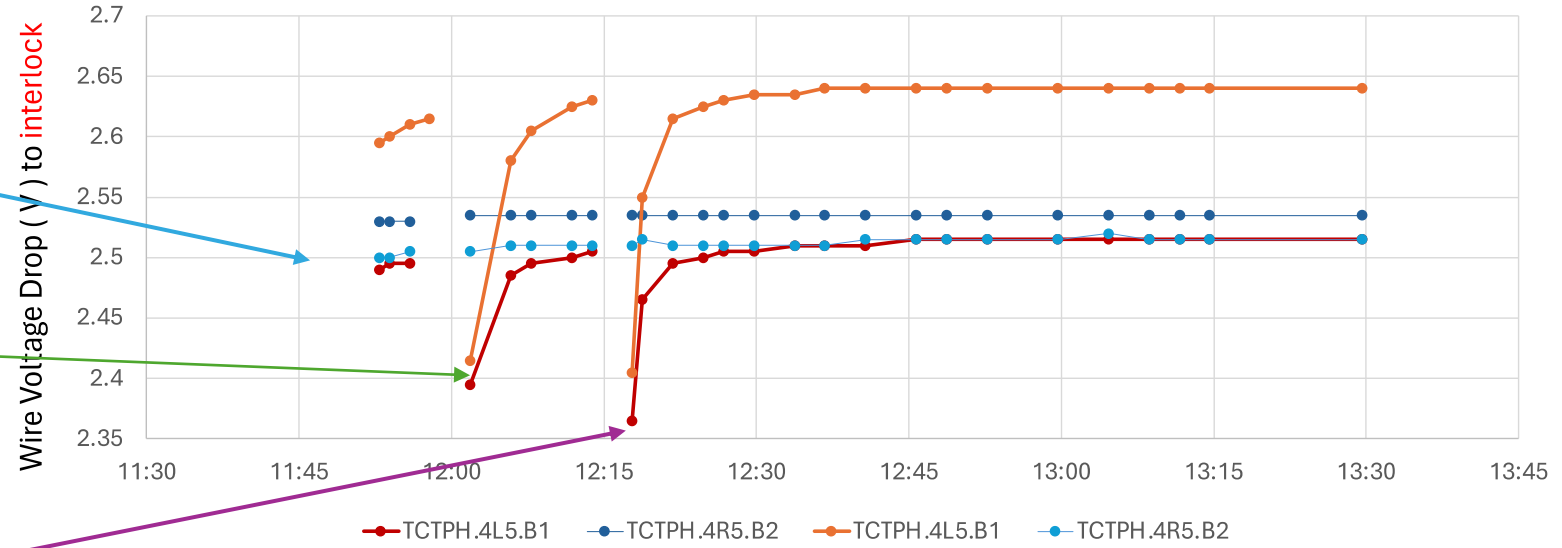




# T simulations (courtesy of F. Carra)



BBCW TESTS 24 April 2024

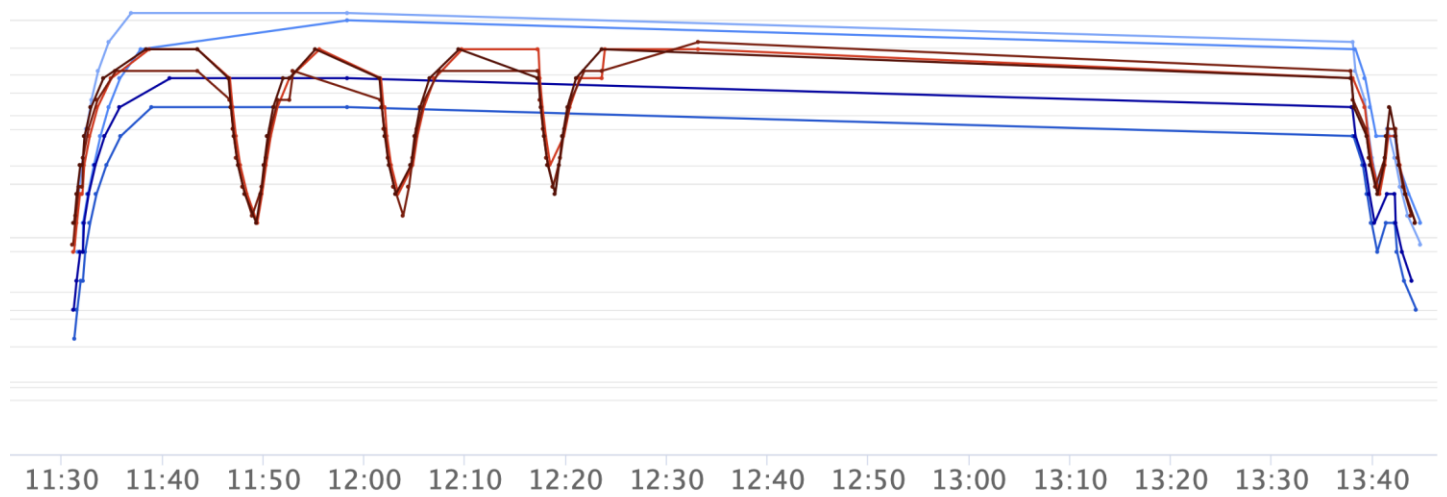


interlock triggered by moving cables

Interlock while modifying the threshold value

Interlock while just touching the voltmeter cable to thd lvl 1-1

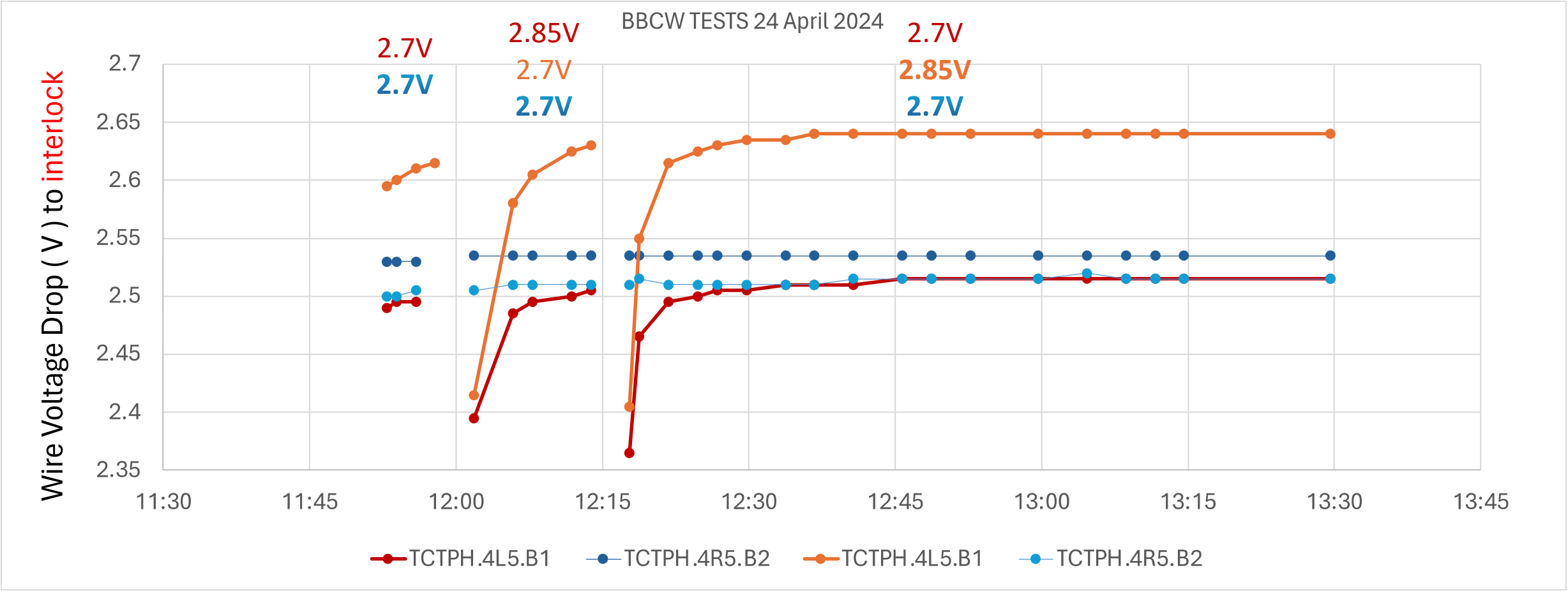
Jaw temperature (°C)



31

- TCTPH\_4R5\_B2\_TTRU.POSST
- TCTPH\_4R5\_B2\_TTRD.POSST
- TCTPH\_4R5\_B2\_TTLU.POSST
- TCTPH\_4L5\_B1\_TTRU.POSST
- TCTPH\_4L5\_B1\_TTRD.POSST
- TCTPH\_4L5\_B1\_TTLU.POSST
- RPMC.USC55.RBBCW.L5B1:I\_MEAS
- RPMC.UL557.RBBCW.R5B2:V\_MEAS
- RPMC.UL557.RBBCW.R5B2:I\_MEAS

# Threshold values (each wire has a reading + card)



# Conclusions and outlook

- Tests show that the wire temperature inside the collimator reaches equilibrium around 30°C, both on TCTPH.4R5.B2 and TCTPH.4L5.B1
- One wire-in-jaw exceeds threshold at 350A
- If rising the threshold (by < 6%), the voltage measured across the wire goes to equilibrium, indicating that there is no temperature run away
- The T externally to that wire was measure > 300°C: could it be the clamp not tighten as elsewhere?

## **TS1**

- ➔ Tighten the connection suspected to cause the problem
- ➔ Repeat tests @ 350A over 1h or more measuring the temperature outside (still to see how)

