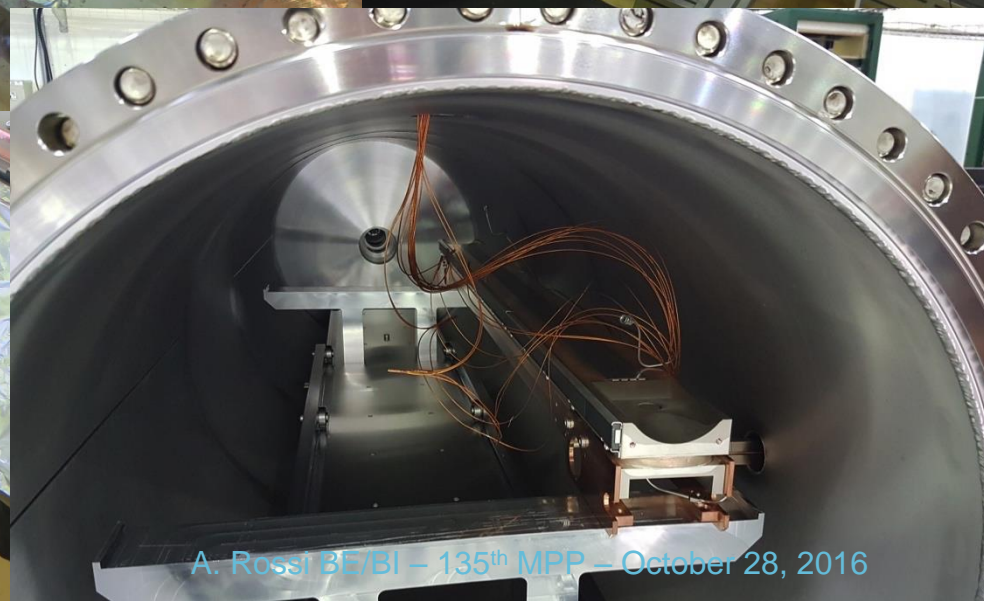
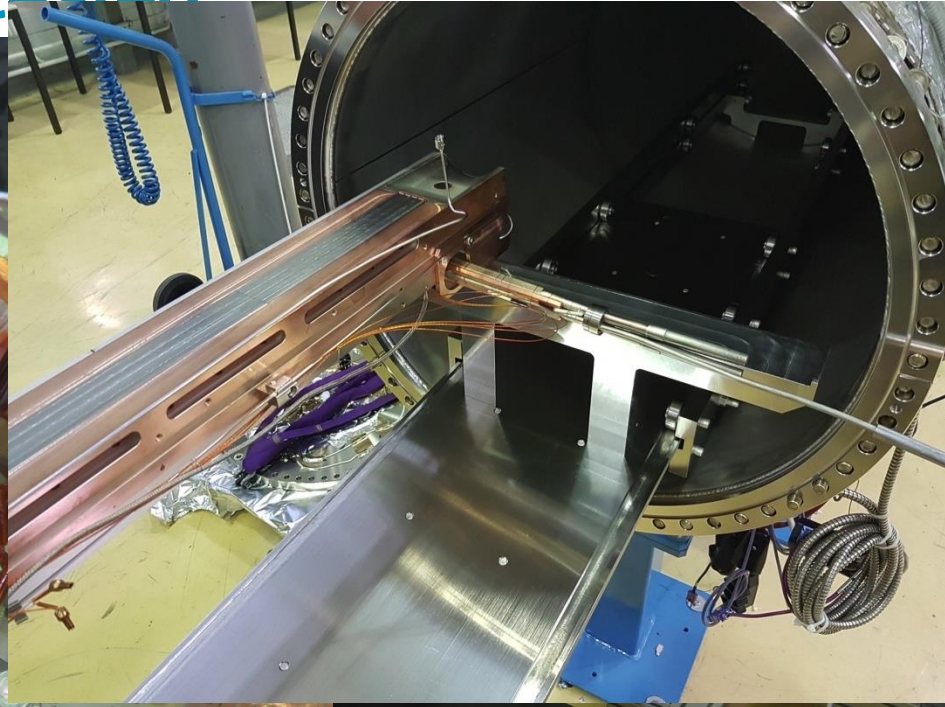
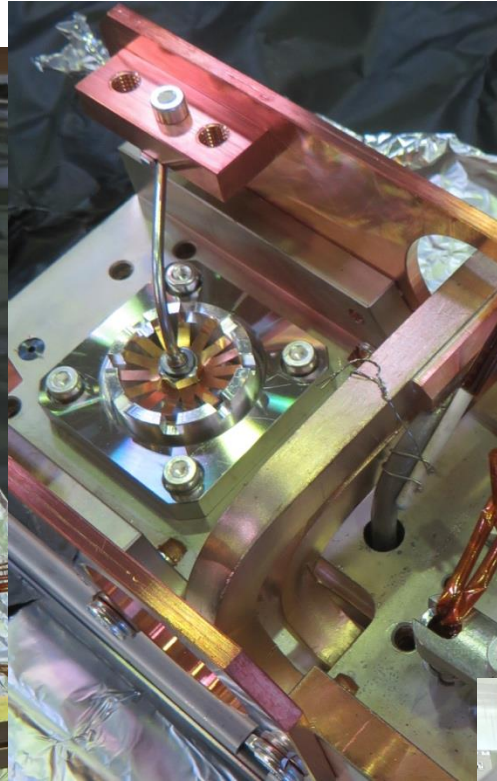
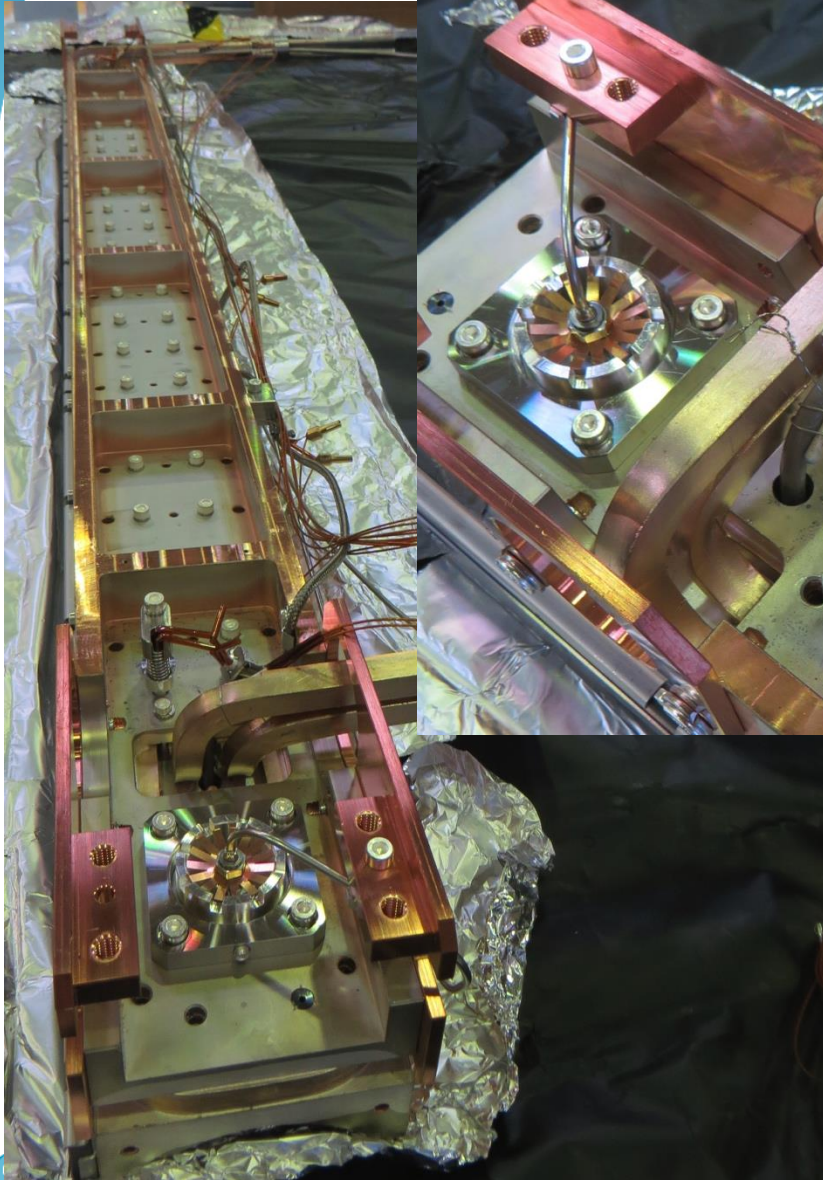


## Update of measurements on long-range beam-beam wire compensators in IP5 (TCT, TCL)

A. Rossi on behalf of the whole team:

*H. Schmickler, C. Boccard, J. Albertone, O. Aberle, F. Carra, L. Gentini, J. Lendaro, G. Bregliozzi, G. Cattenoz and more*

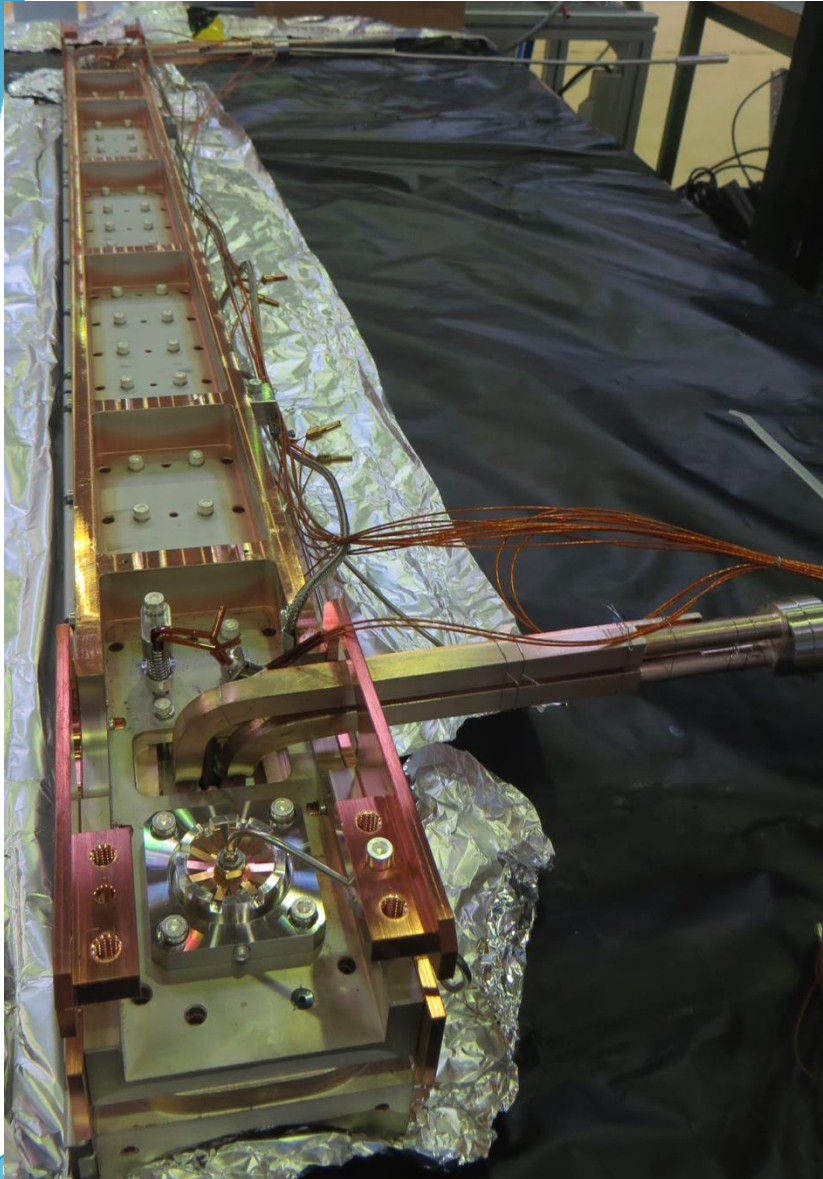
# In-jaw wire being tested



# Philosophy

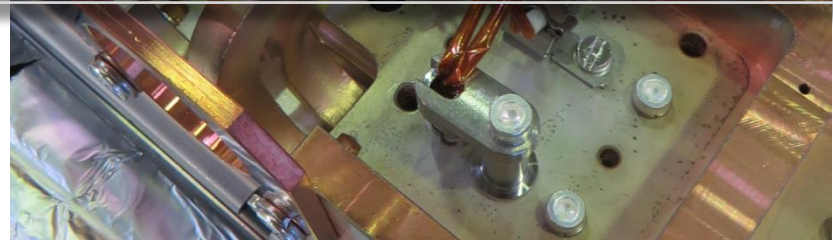
- Protection of the wire from overheat via WIC and integral temperature measurements
  - Note, T should never reach melting, and StSt casing of the copper wire will assure no vacuum degradations nor deterioration of collimator performance

# In-jaw wire tests



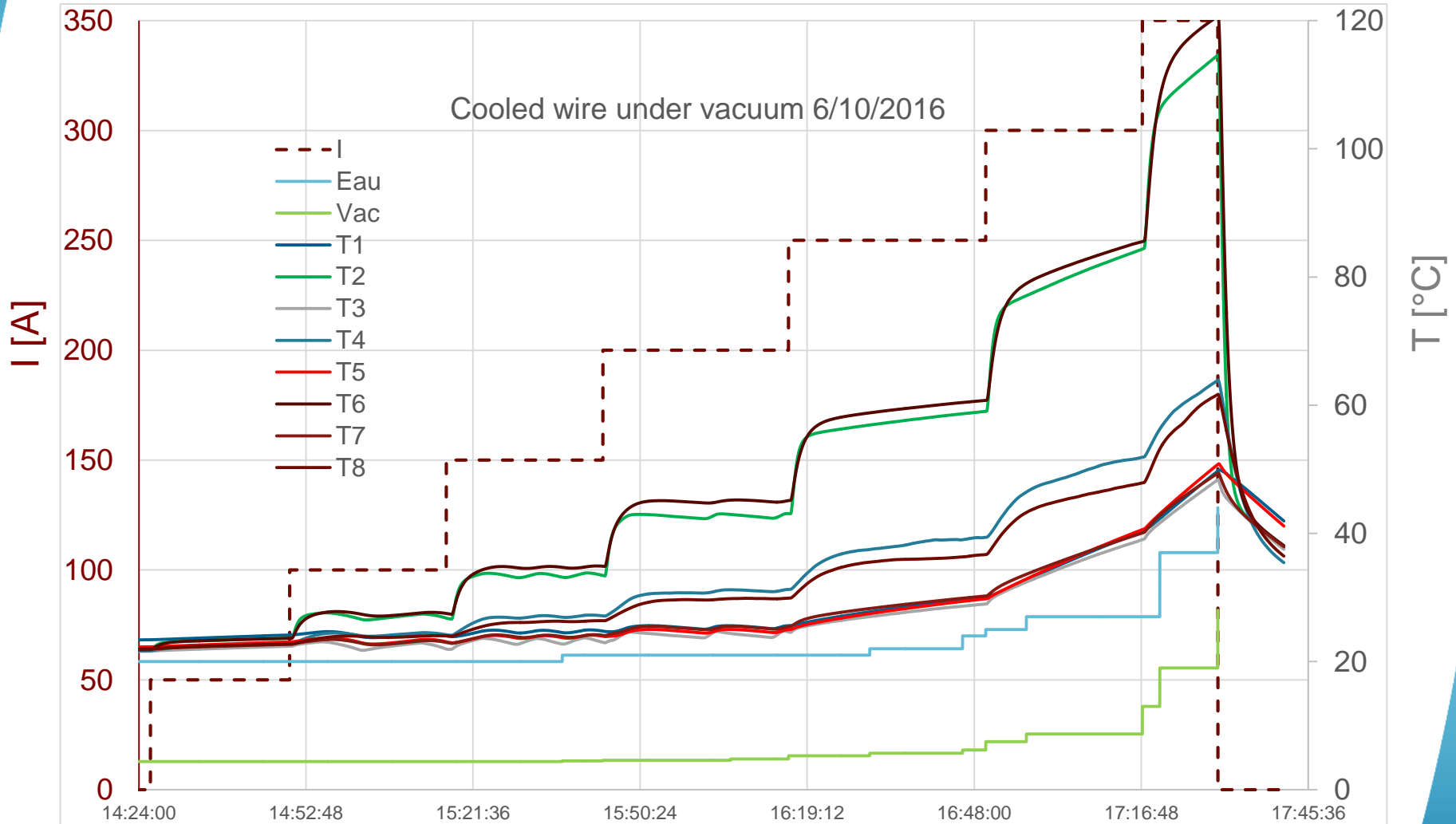
- Under vacuum ( $<1\text{E}-6\text{mbar}$ )
- 500W maximum cooling power ( $<$  than in collimator)

- T2 et T6 : sondes situées dans les coudes ou le fil quitte la mâchoire.
- T3 et T7 : sondes sur les sorties ou le fil touche les tubes de refroidissement: ce sont les mieux refroidies.
- T1 et T5 : sondes standard du TCTP sur le back-stiffener.
- T4 et T8 : sondes situées près de la brasure à l'extérieur du tank.

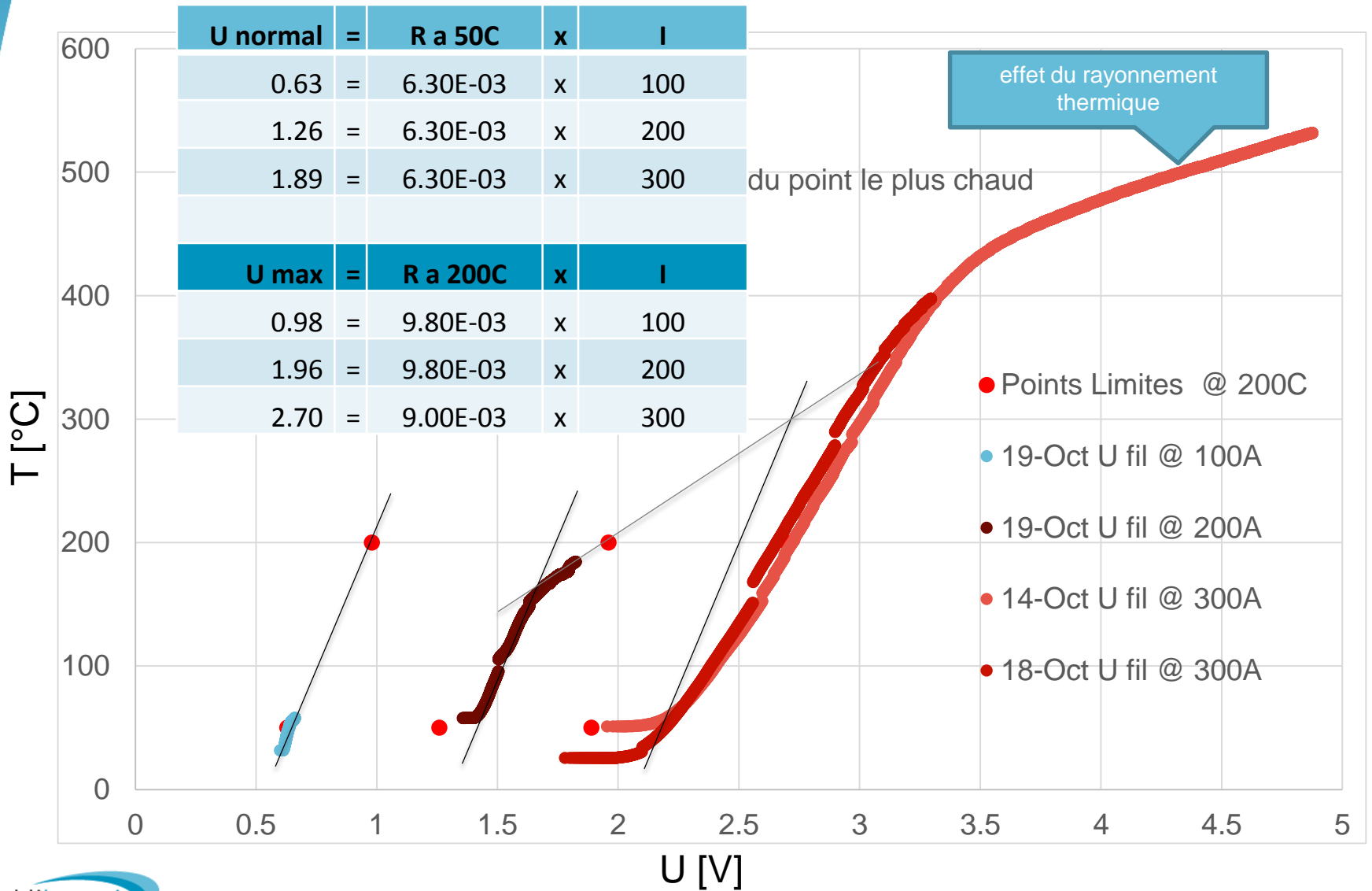


# Wire T(I) – cooling on:

behaviour as expected but cooling not sufficient at  $I > 200-250\text{A}$

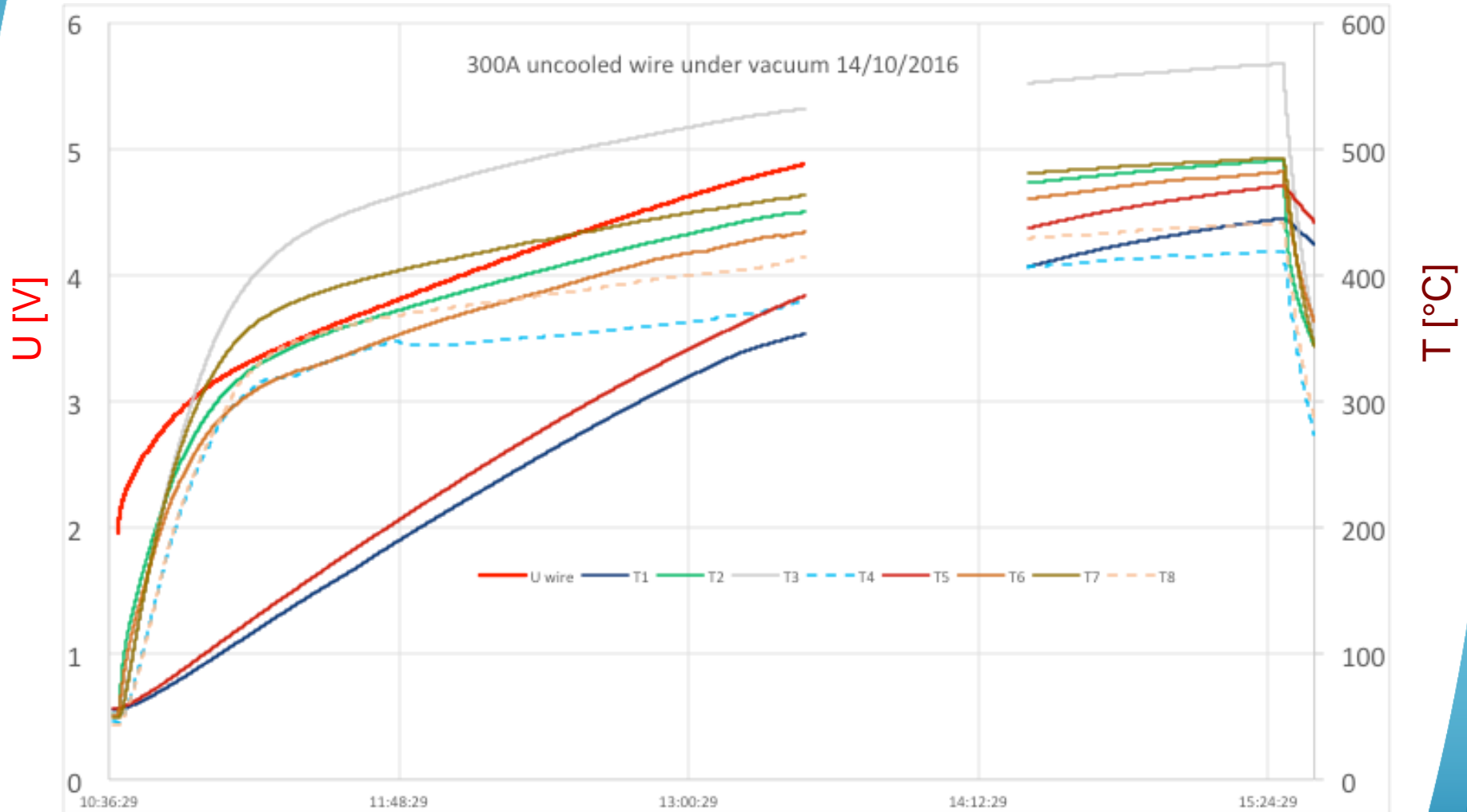


# T(V) for 3 values of current – no cooling



# All temperature at 300A – no cooling

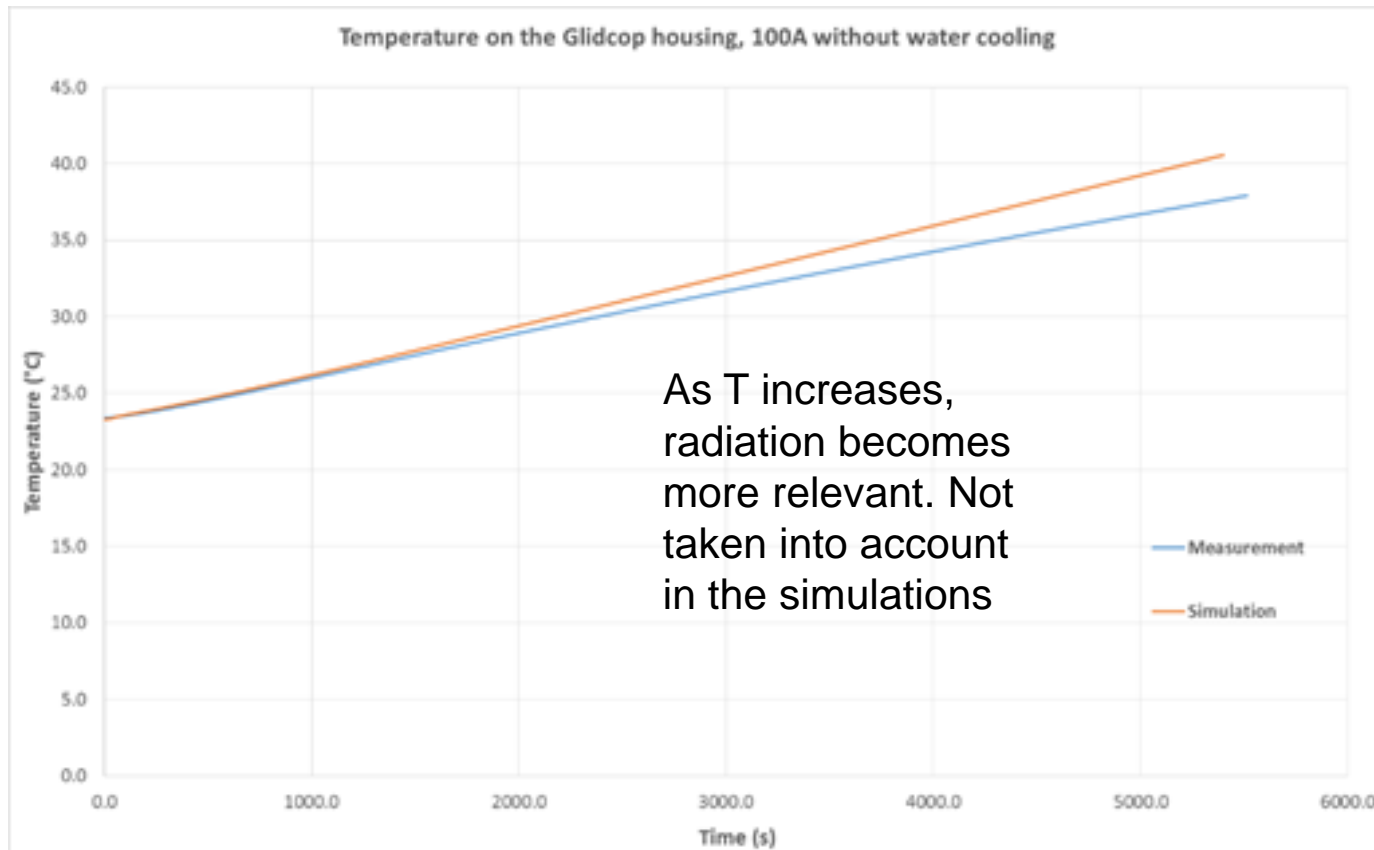
hottest part wire under vacuum, not in contact with jaw



# Simulations against measurements

For 100A without cooling:

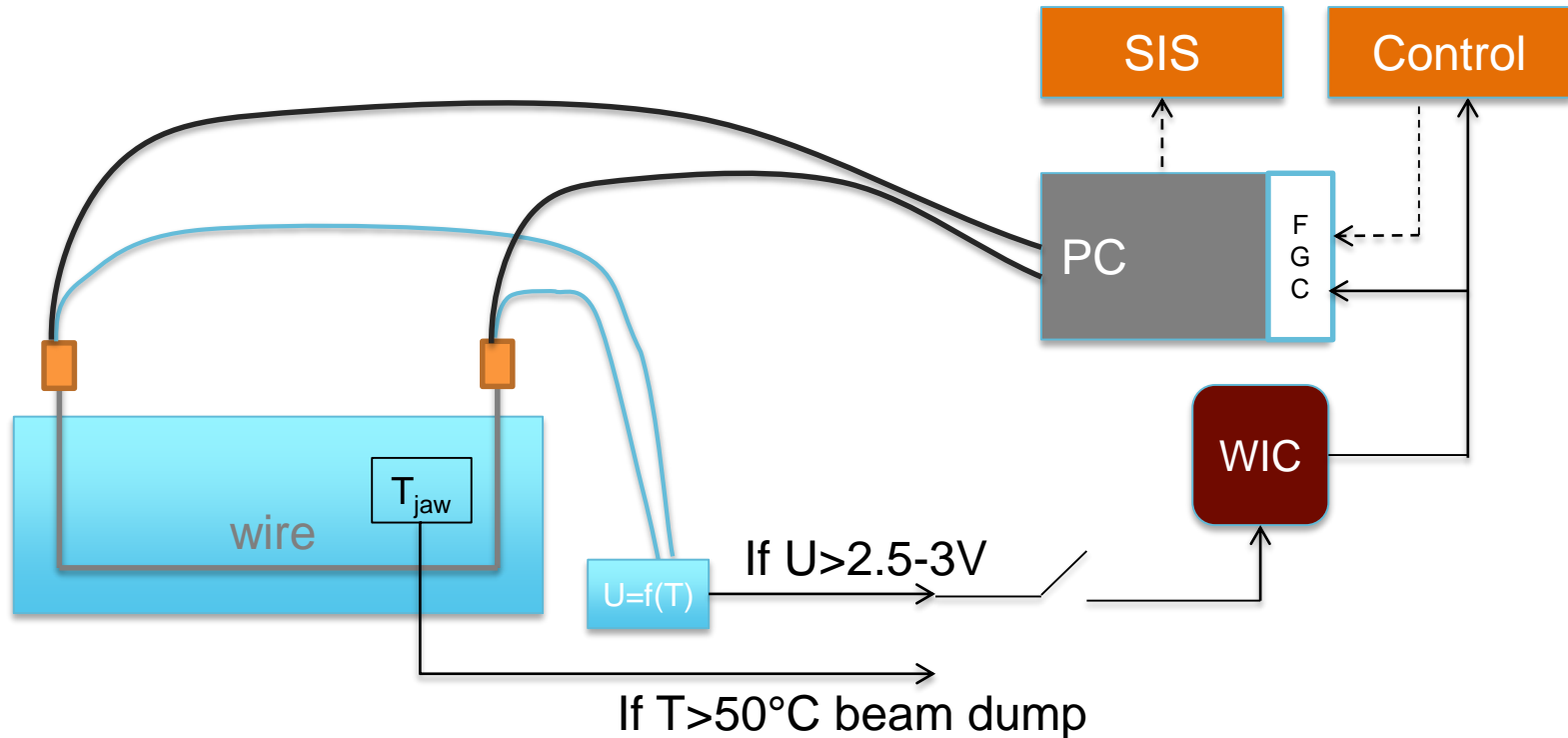
- Simulations : at RT,  $U=0.593V$ , after 1h30m  $U=0.661 V$
- Measurements : at RT  $U=0.599V$ , after 1h30m  $U=0.655V$





# Wire protection and interlocks

## Connection scheme



- PC hardware limited to 300A + 10A/s
- If  $U > 2.5-3V$   $T_{\text{max}}$  wire 200-300°C  $\longrightarrow$  PC off via WIC
- If  $T_{\text{jaw}} > 50^\circ\text{C}$   $\longrightarrow$  beam dump. PC must be switched off