Preliminary wire heating plots SPS wire breakage 41678V 22.04.2023

J. Emery, F. Roncarolo, N. El-Kassem

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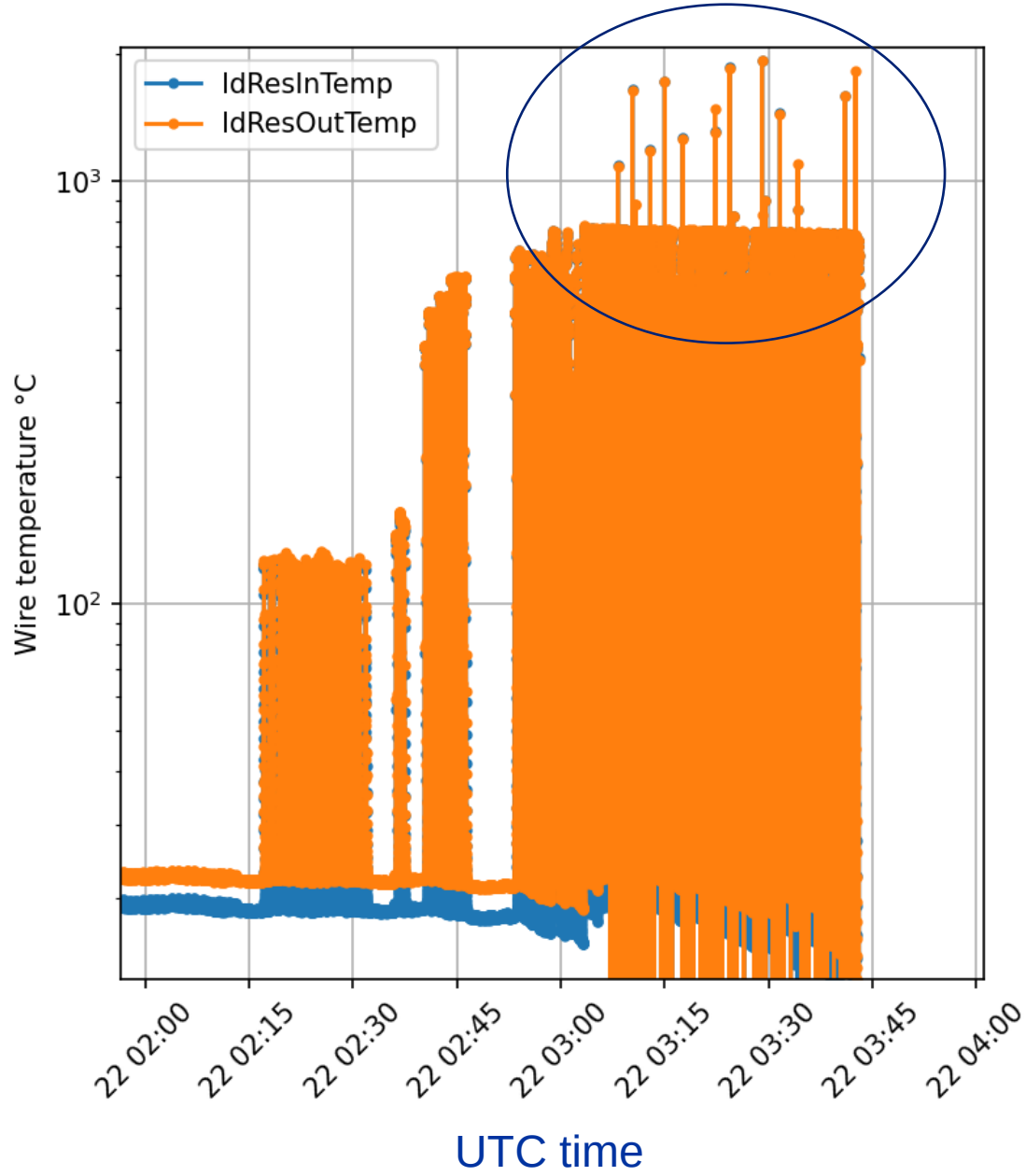
Preliminary wire heating plots

Multiple approximations:

1. ADC bin -> current/voltage/resistivity
2. Resistivity -> temperature
standard thermal coefficient of carbon graphite.
assume that resistivity changes equally along the wire.
3.

we see that between 5:05 and 5:40 (03:05 -> 03:40), there was about 15~20 peaks, not systematic.



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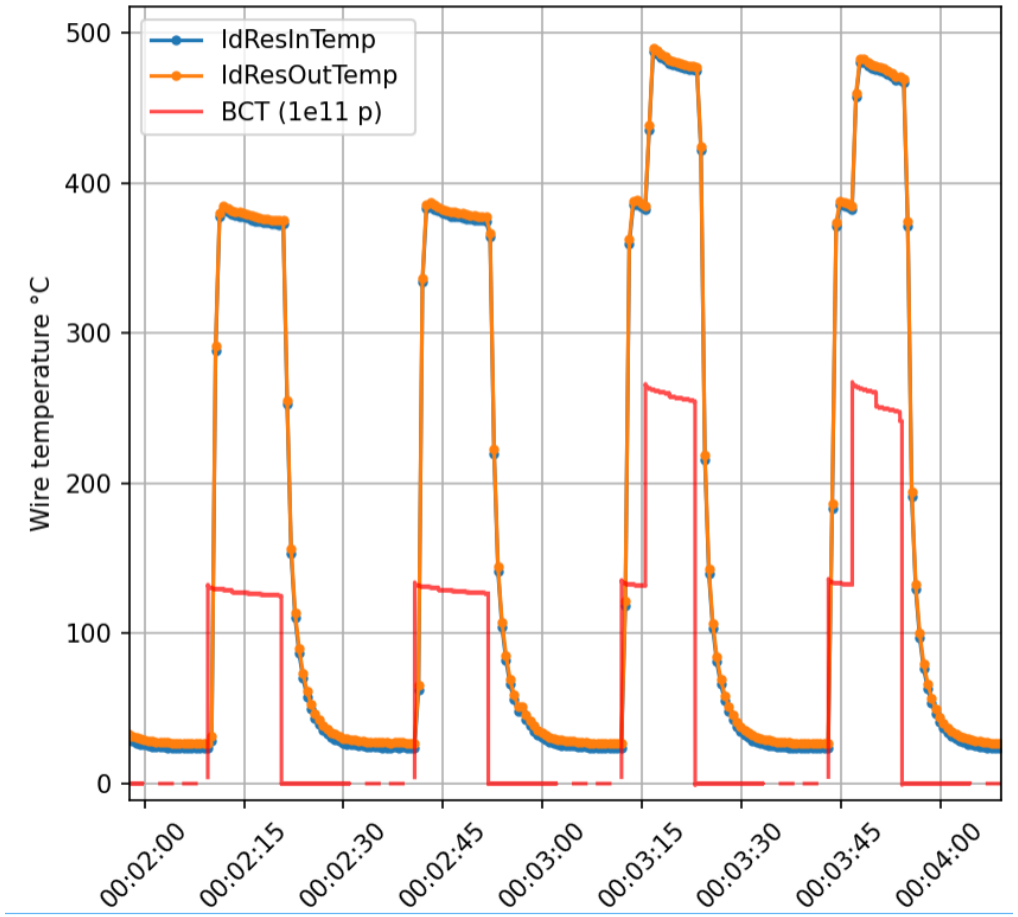


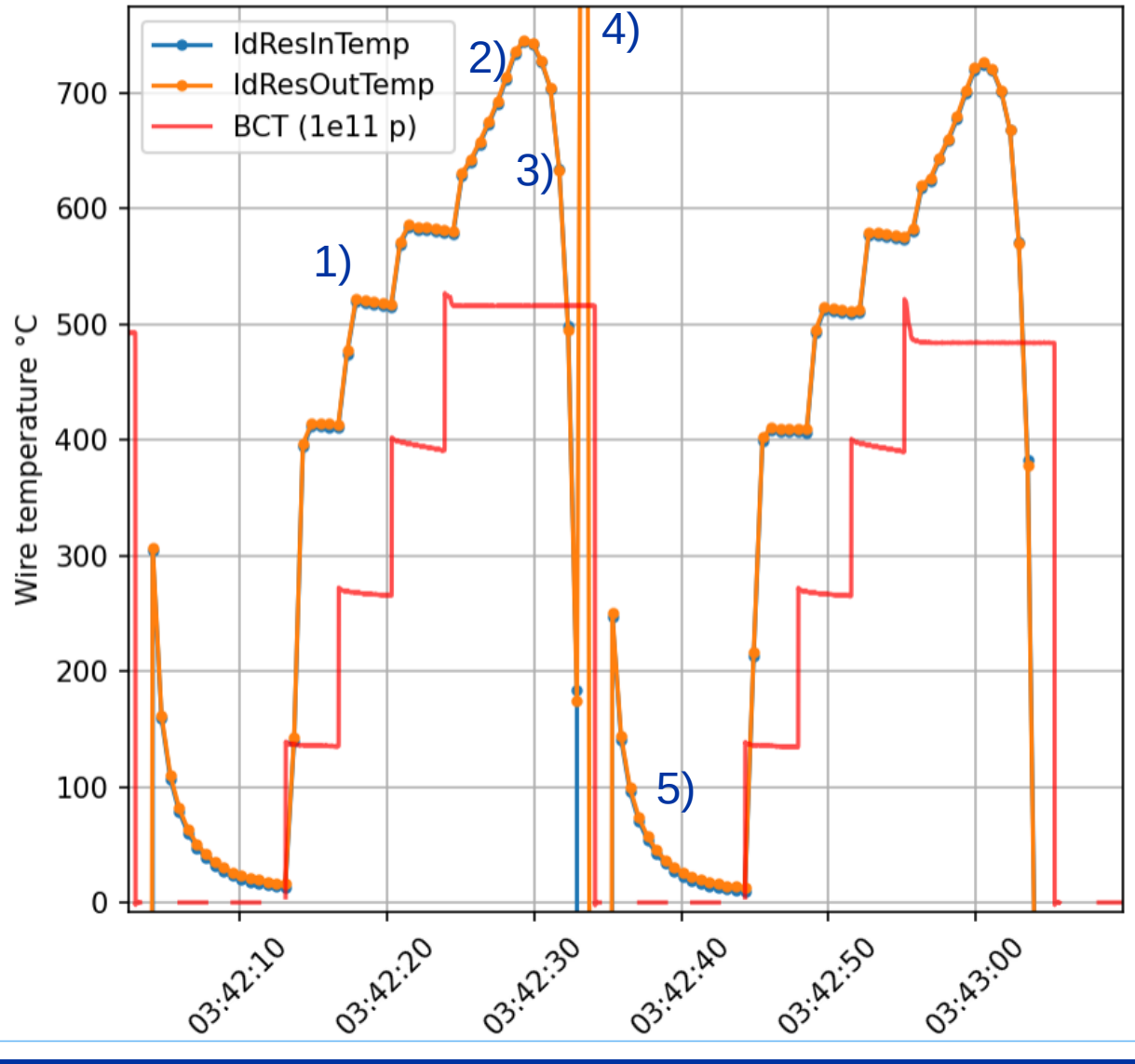
Preliminary wire heating plots

Observations:

1) 4 steps of temperatures, step size are getting smaller while injection intensities steps are constant.
2) slow rise that reach a maxima
=> bunch length change?
3) faster rate of temperature falling
=> other thermal effect (thermionic or EMI)
4) sometimes a peak at high temperature
5) temperature falls with a long time cst

•Is the heating process going from uniformly distributed along the wire to heating only on the sides?

Is there some kind of EMI perturbating the wire measurements?



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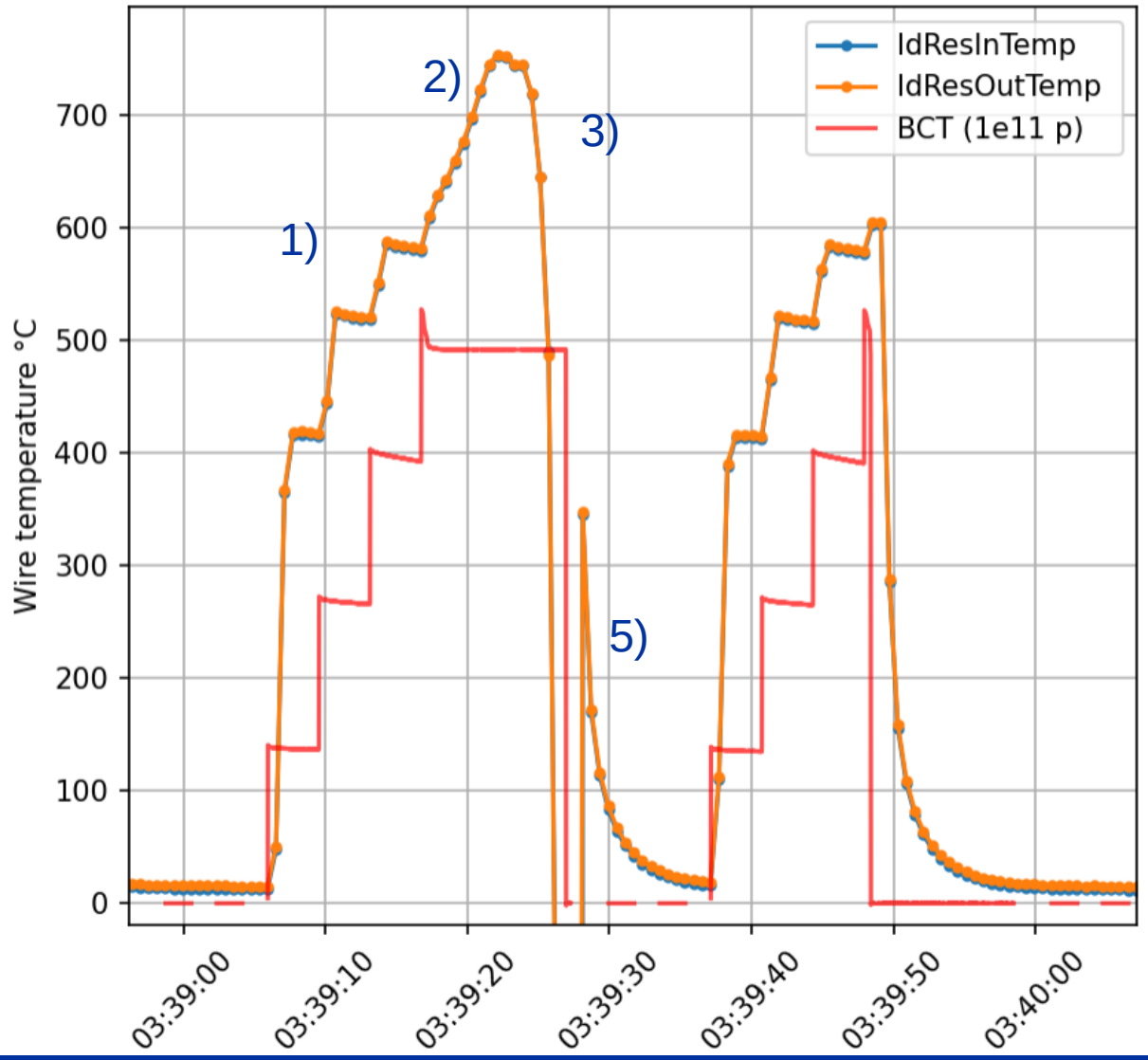

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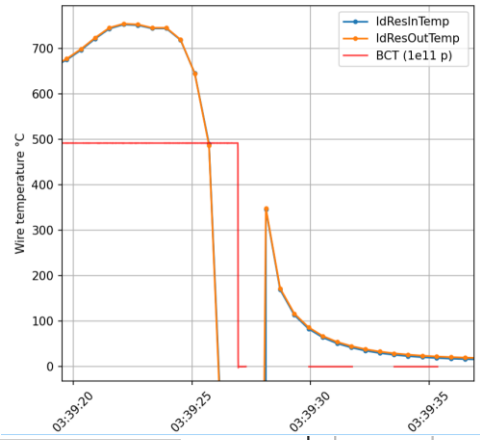
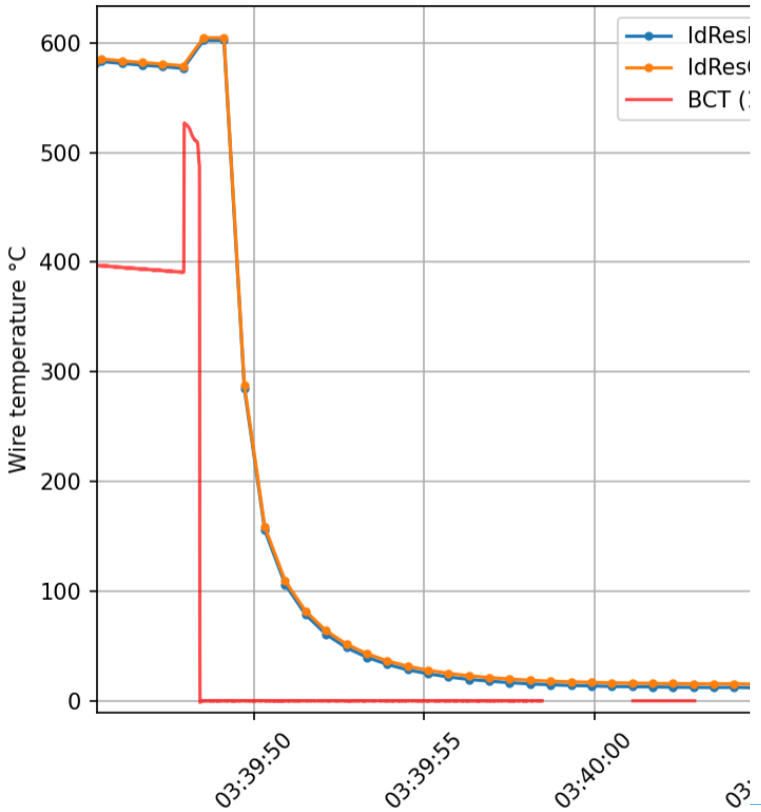
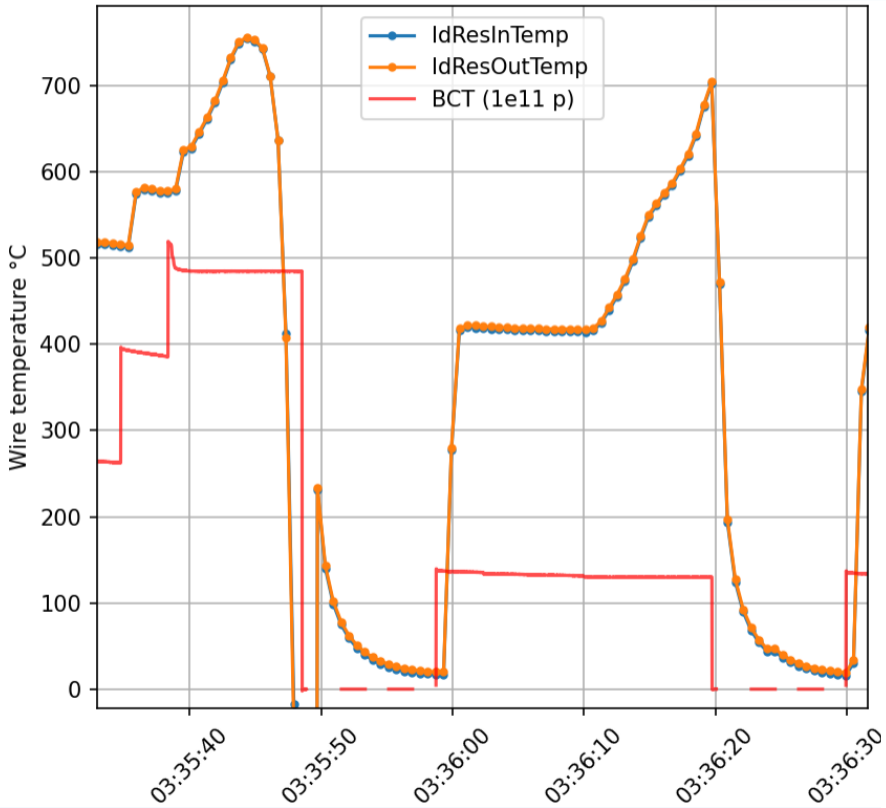
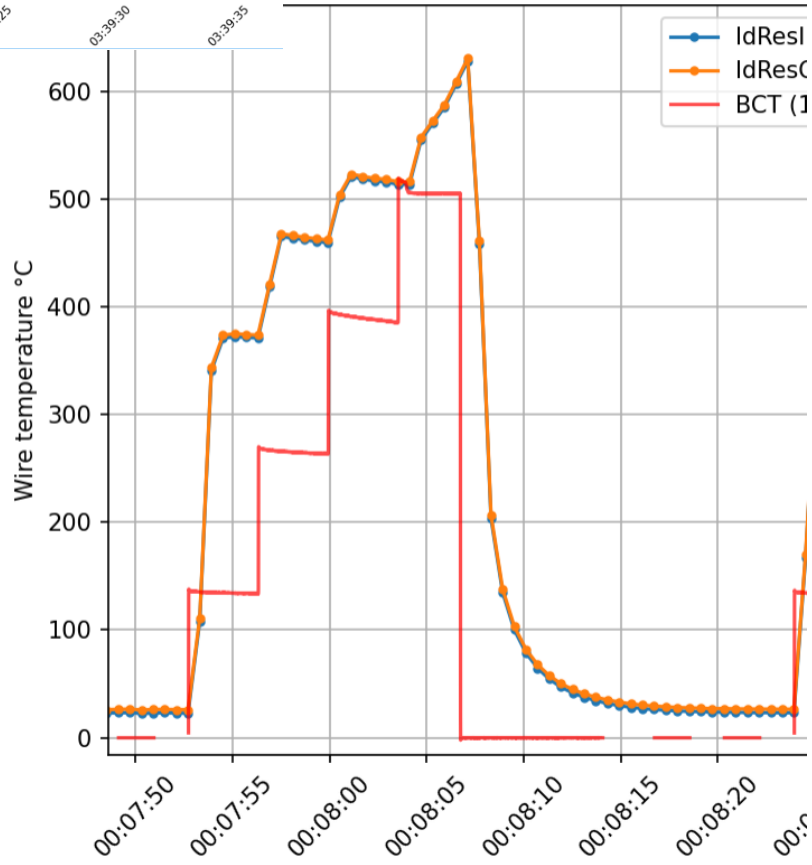
Time constant when the beam is extracted could be compatible with a thermal process.









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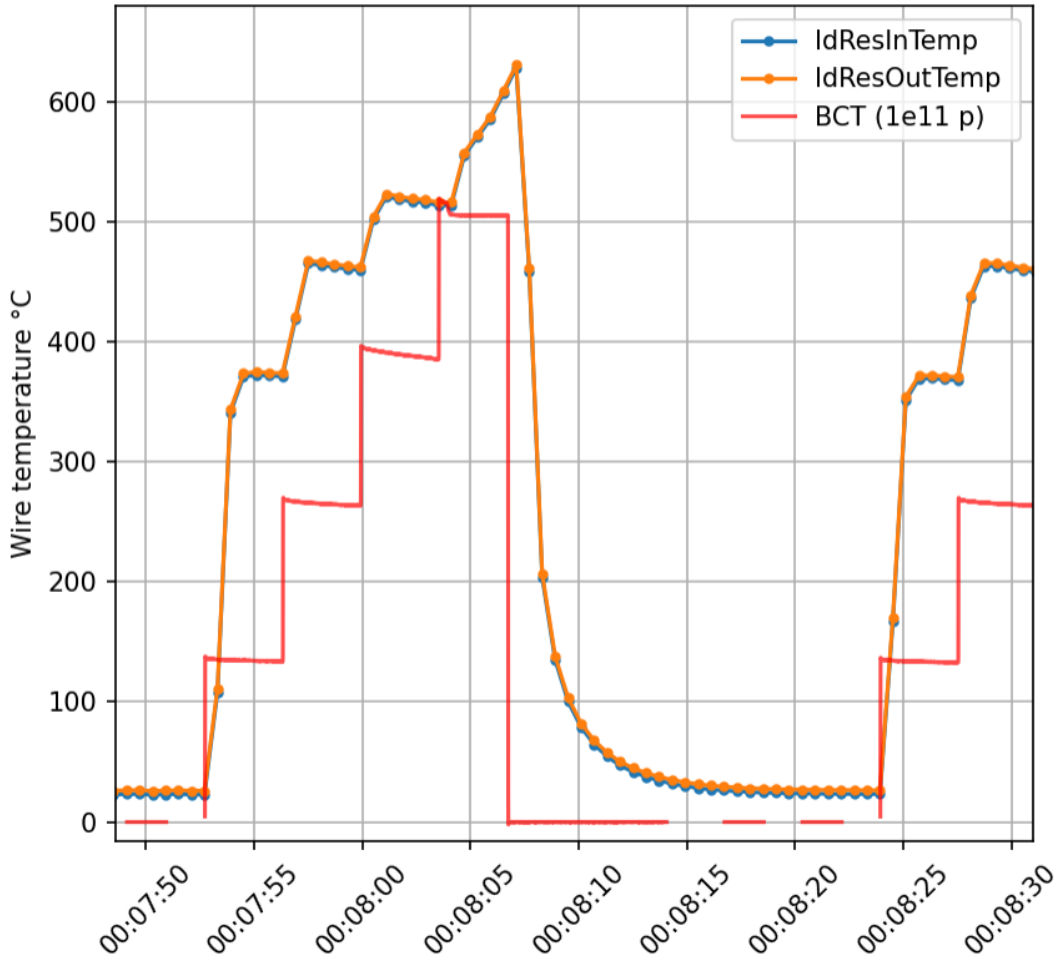

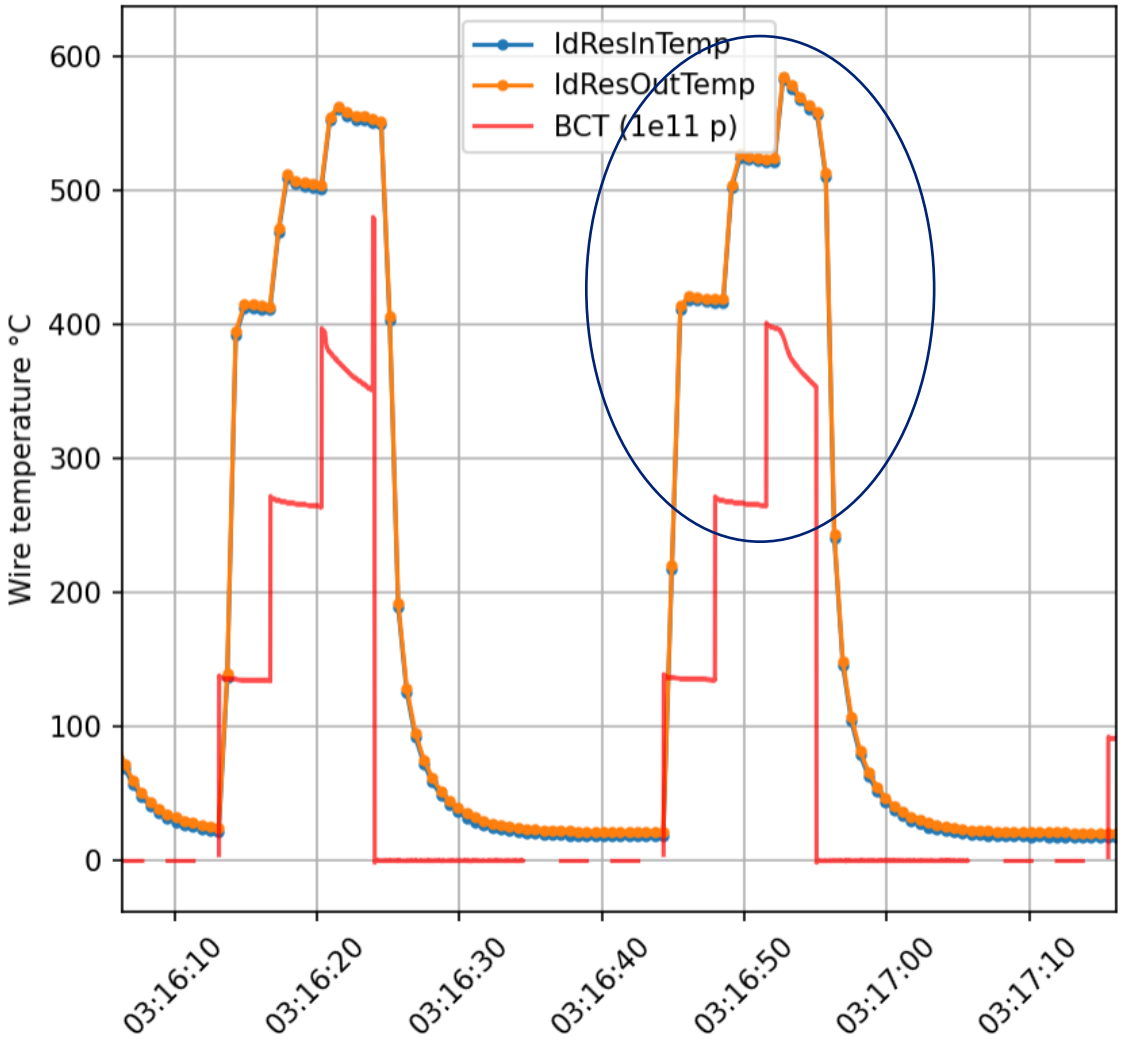

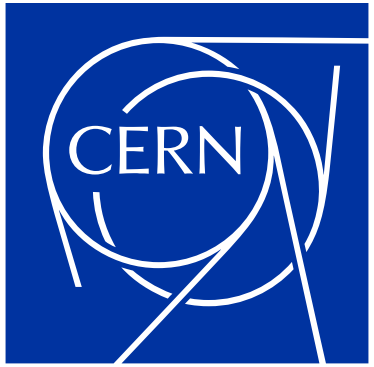

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