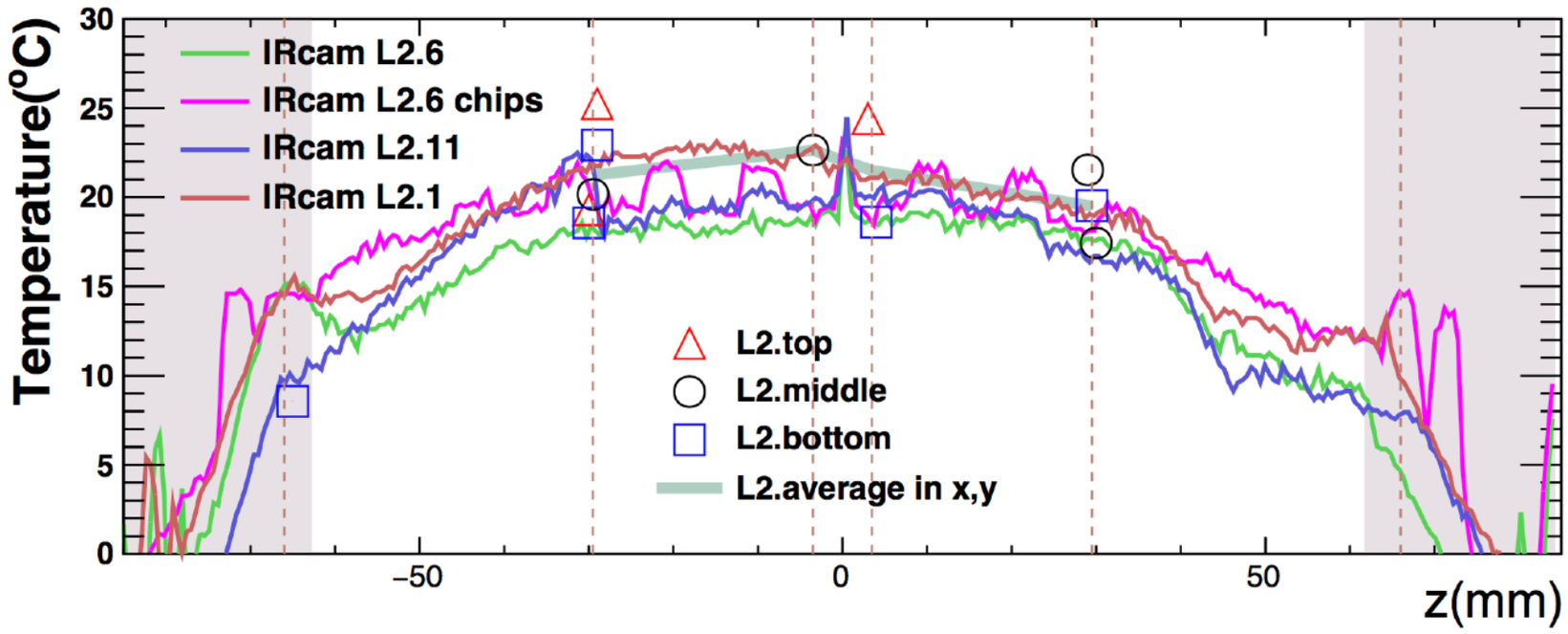
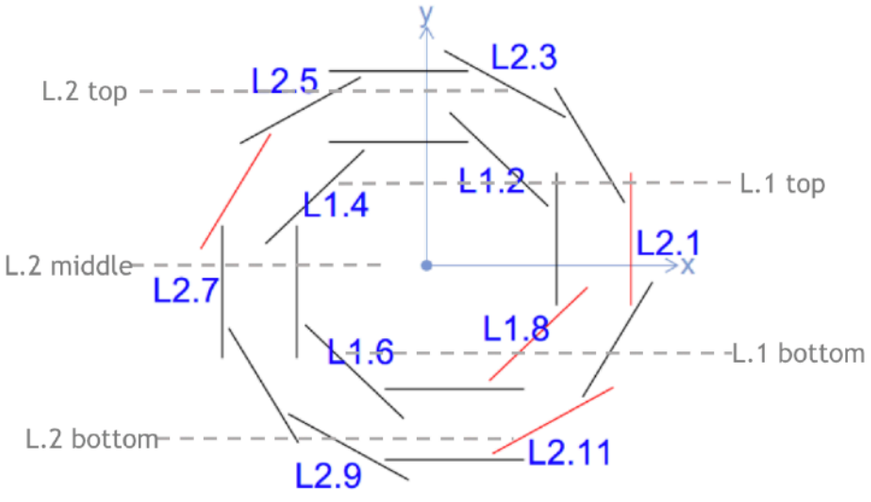
Temperature Distribution on PXD

- CO_2@-30°C; N_2 23L/min
- A plastic cylinder (ID 18cm, length 70cm) act as dry volume.

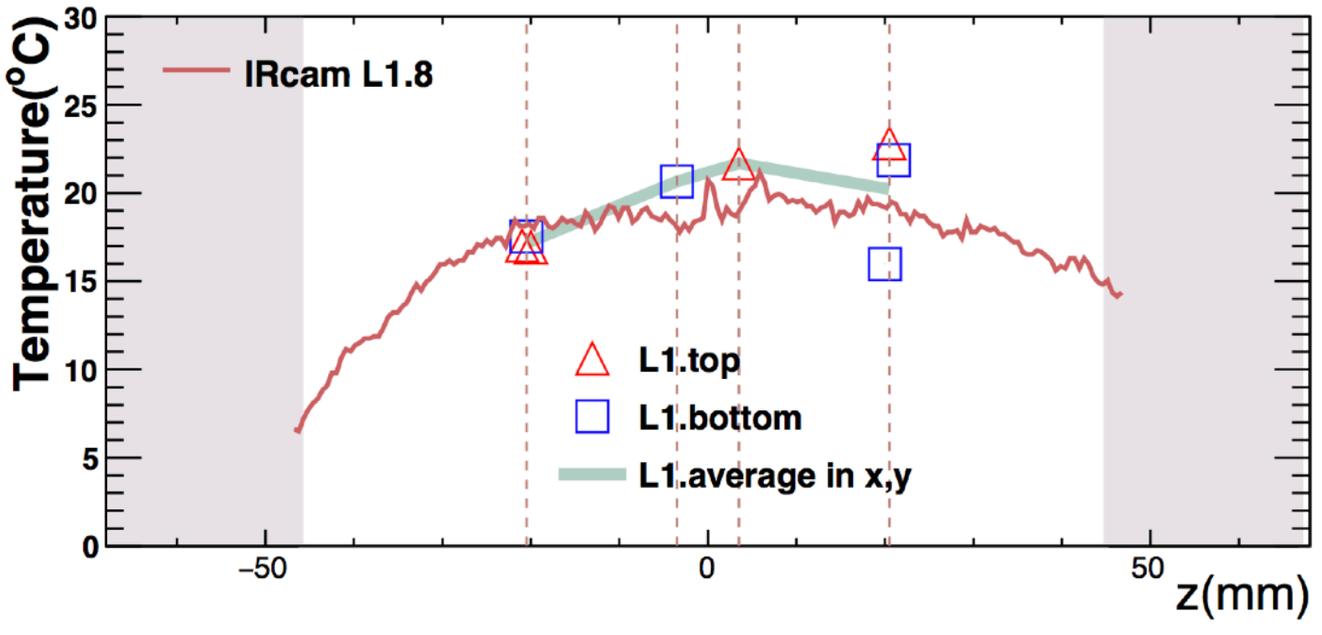
Power consumption of the previous measurements

- Switcher 0.5W
- DCD/DHP 8W





Uncoated SCBs are used in the thermal mockup.

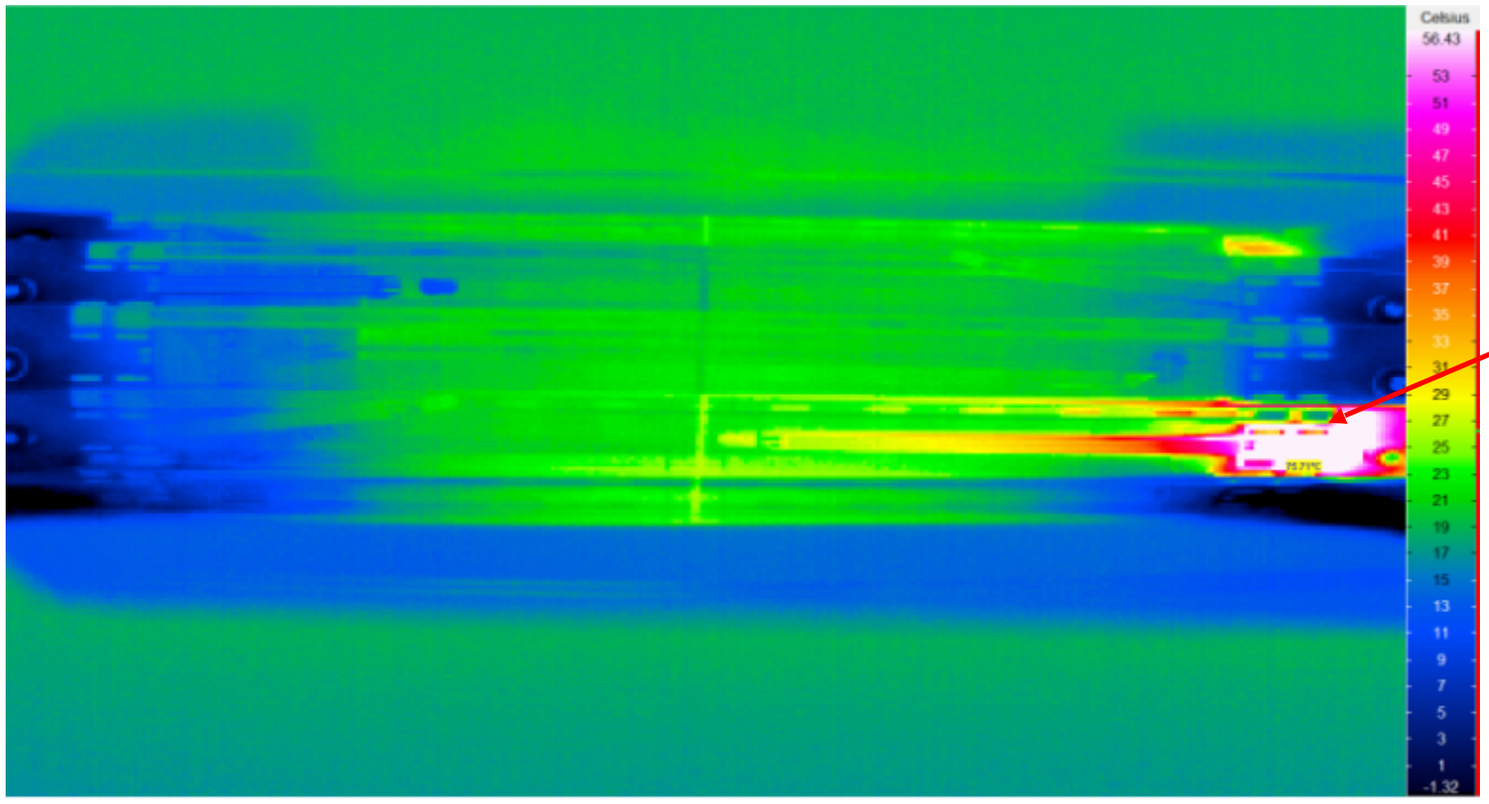


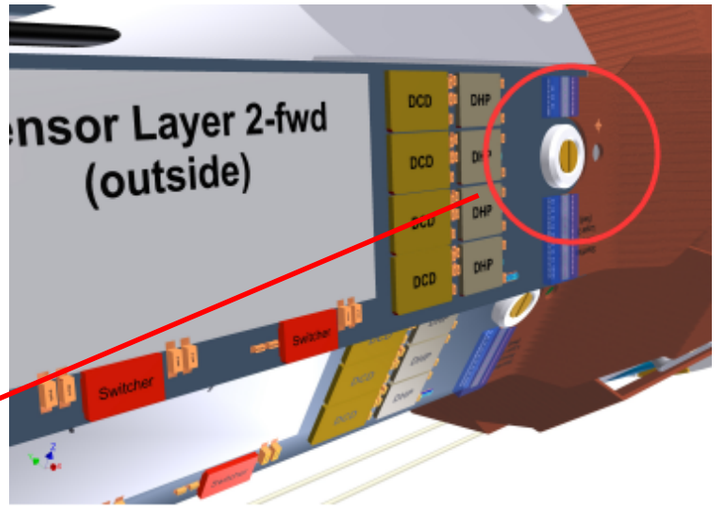
Measured in Oct. 2015

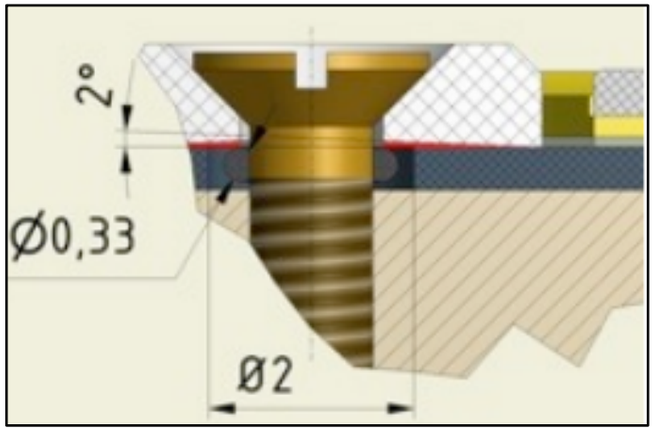
hua.ye@desy.de

Loosen screws cause hot ASICs

Inconsistency were observed between temperature got from Pt100s and IR camera in 2015, which was due to the loosen screws.







Several hot ASICs are found, due to loosen screws or blocked holes, should be tested before mounting sensors.

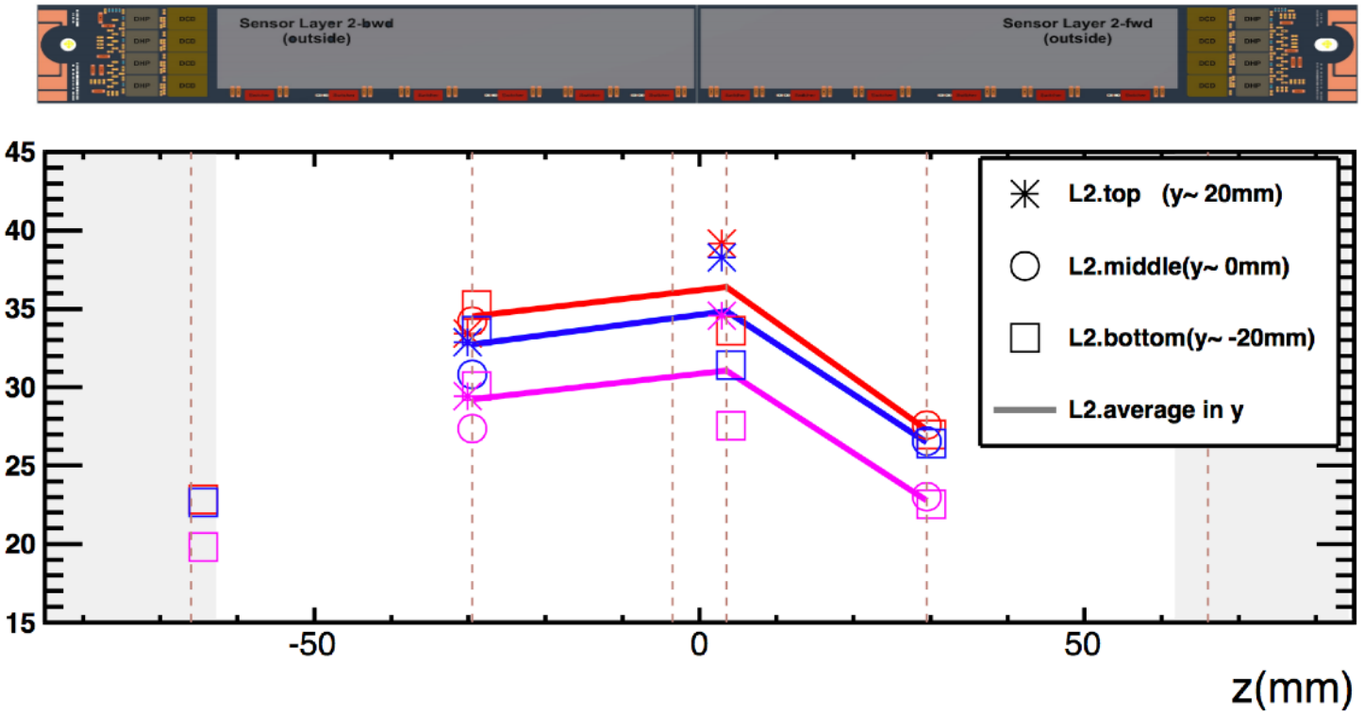
PXD thermal performance

N_2@20L/min

CO_2@-25°C, SVD on & cooling on,
CO_2@-25°C, SVD off & cooling off,
CO_2@-30°C, SVD on & cooling on,

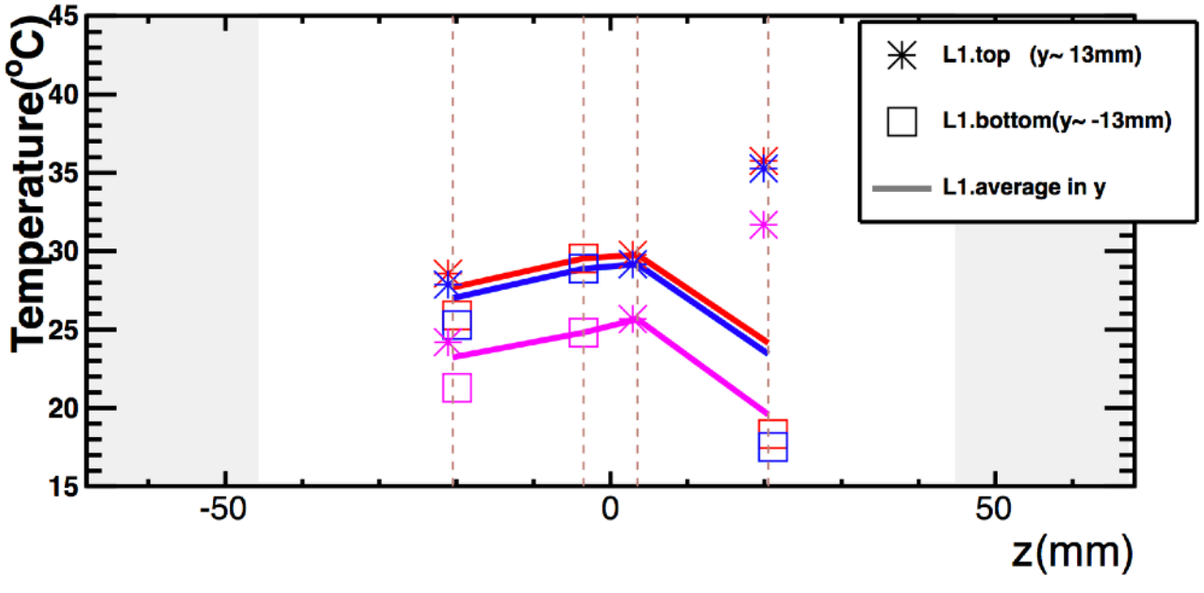
Power consumption of the finalised PXD ASICs

- Switcher 1W
- DCD 7.7W / DHP 1W



Summary

Uncoated SCBs	T(EOS) °C
T(CO_2) -30°C, DCD/DHP 8W	~10
Bad contact, DCD/DHP 8W	>70
T(CO_2) -30°C, DCD/DHP 9W (finalised)	~20
T(CO_2) -25°C, DCD/DHP 9W	~23

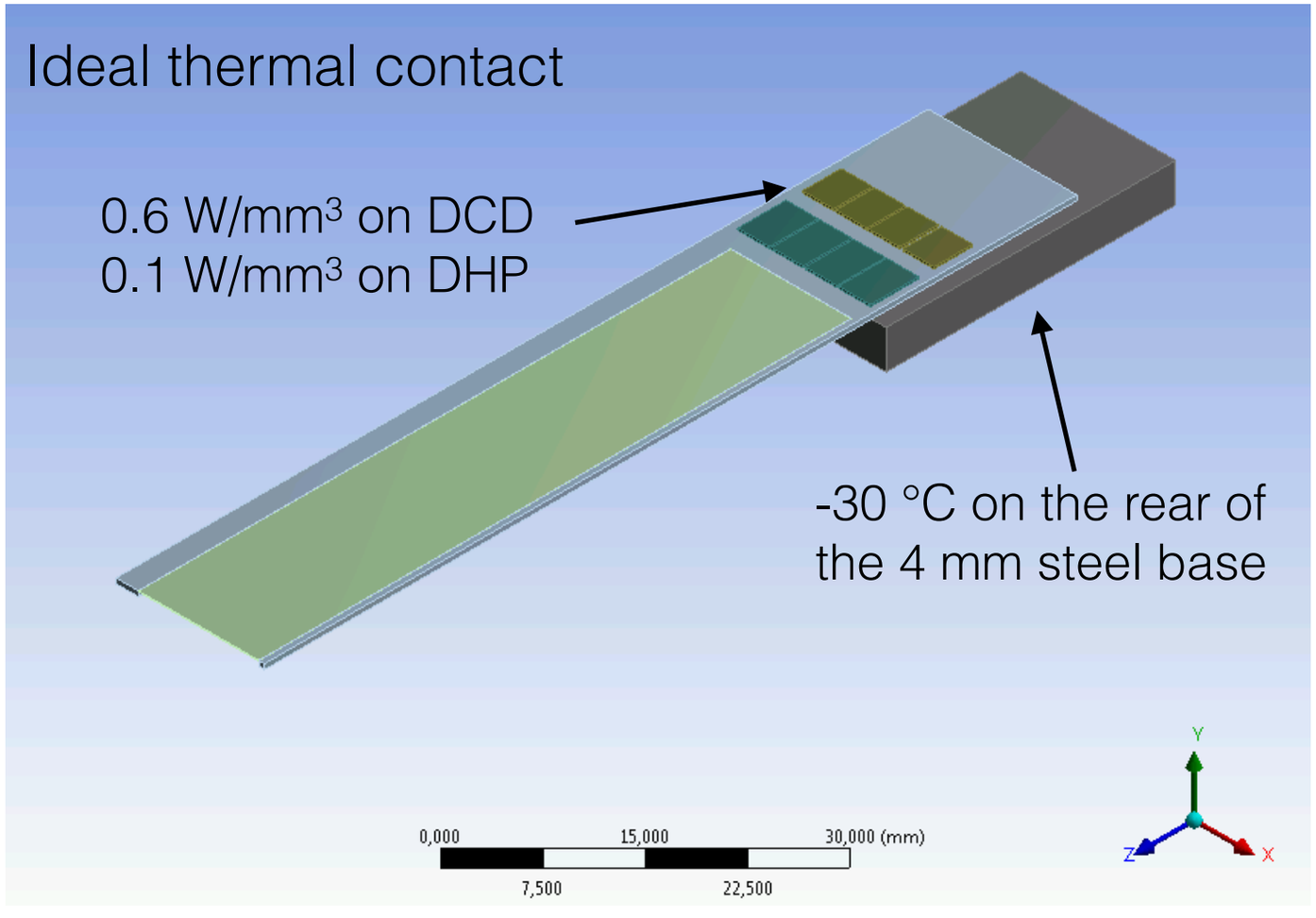


Measured in May. 2017

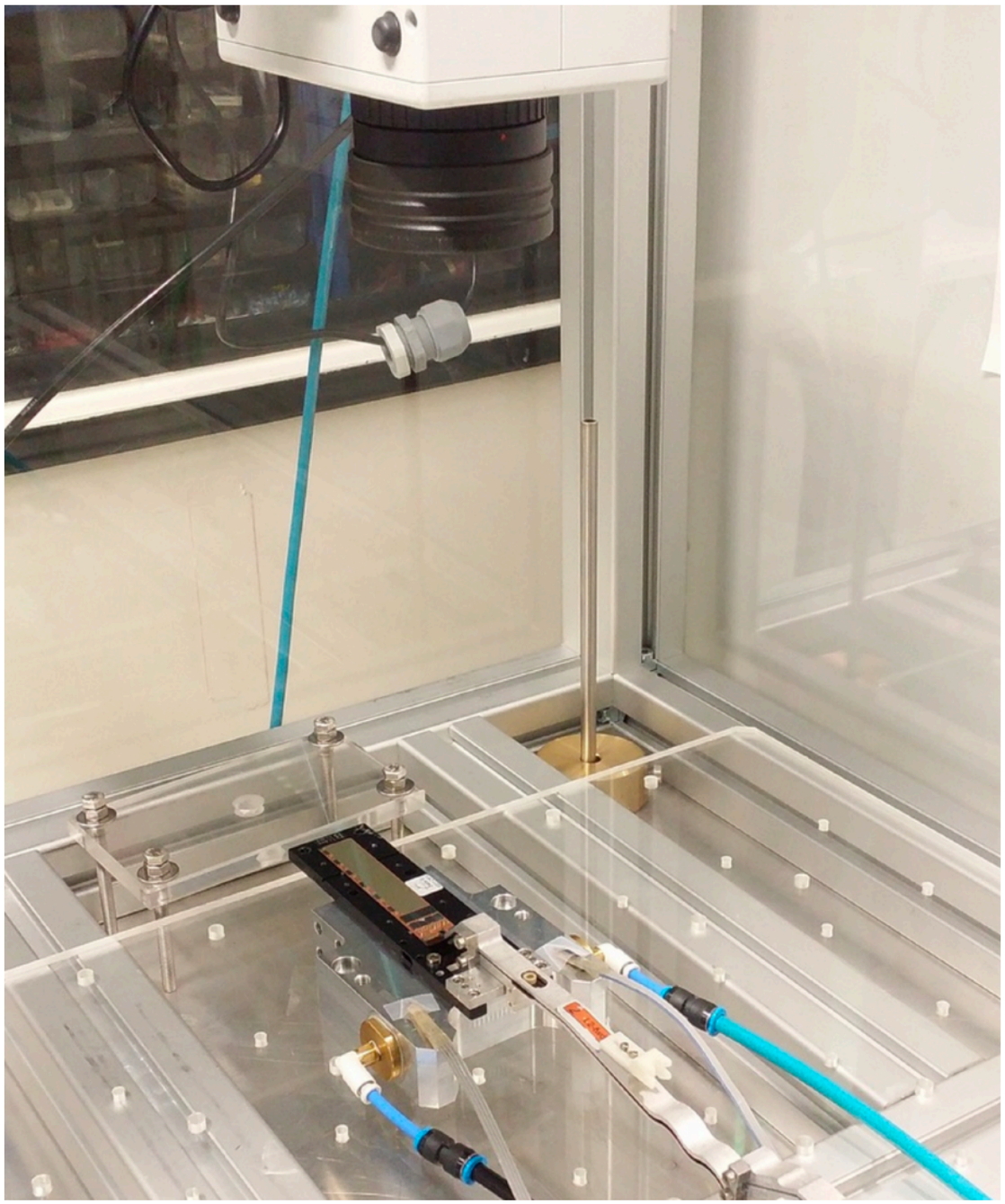
Some ANSYS simulations

Thermal conductivity	Unit W/(m*K)
Steel	60
Parylene	0.12
Silicon	120

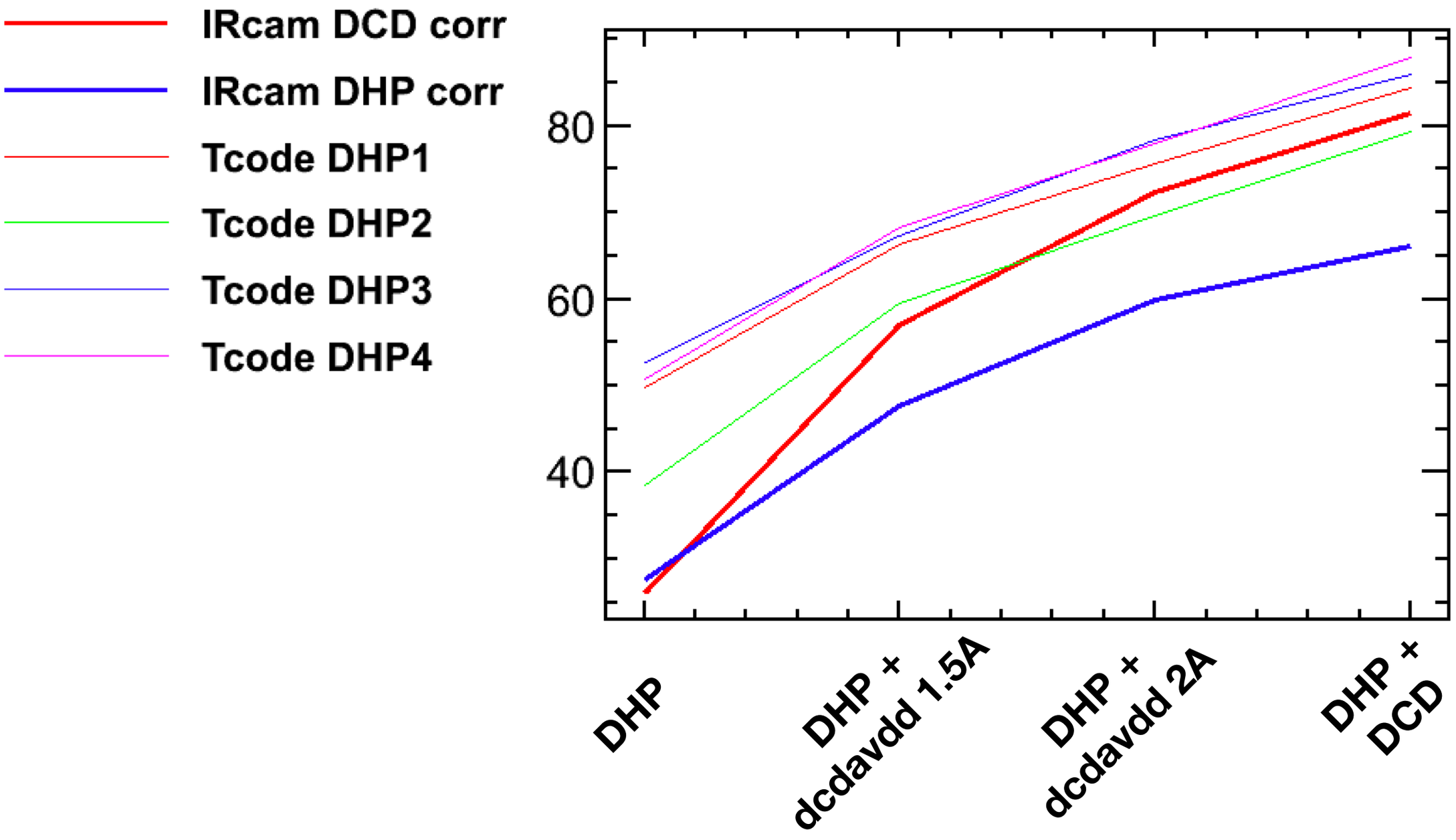
T(EOS) °C	Parylene coated	Uncoated
Heat off	-28	-29
Heat on	-13	-24



Compare the results of DHPT temperature script and IR camera

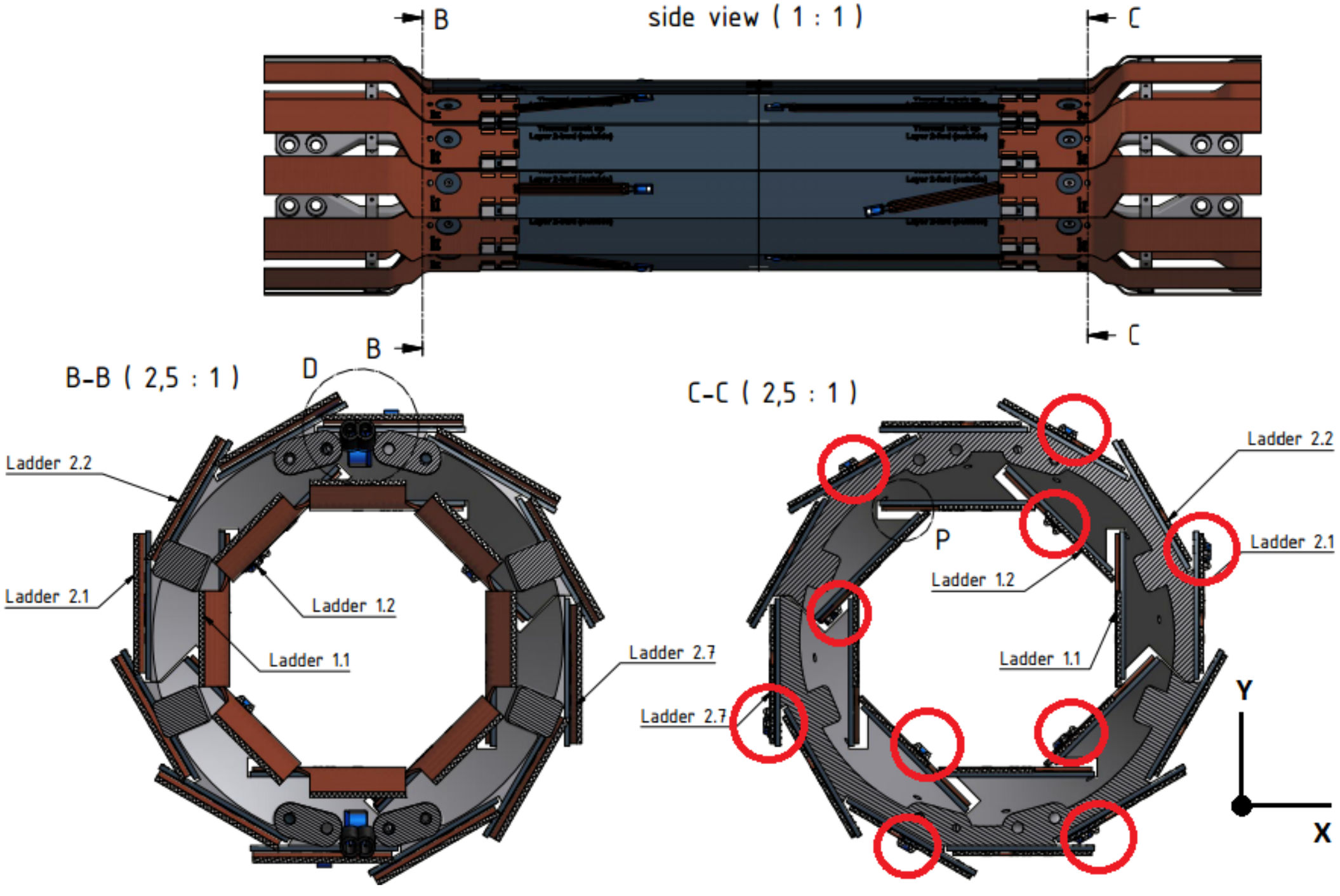


Comparison


IRcam DCD corr
IRcam DHP corr
Tcode DHP1
Tcode DHP2
Tcode DHP3
Tcode DHP4
80
60
40
DHP
DHP + dcdavdd 1.5A
DHP + dcdavdd 2A
DHP + DCD

Backup

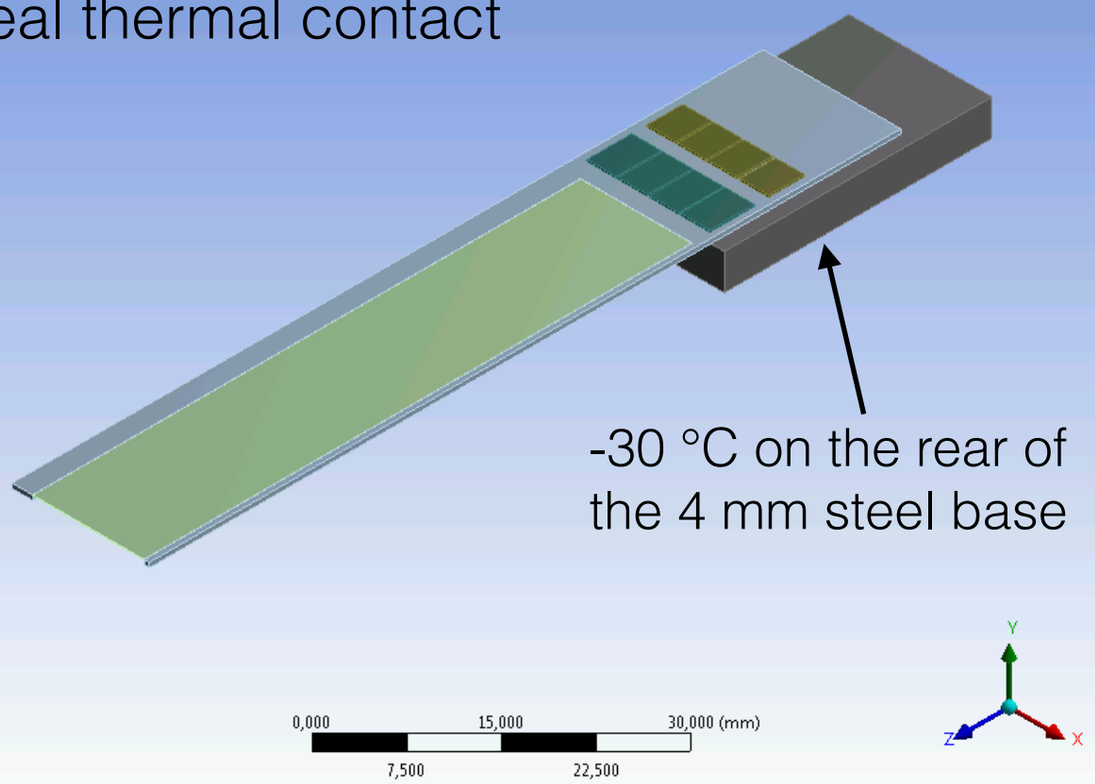
Pt100s on PXD



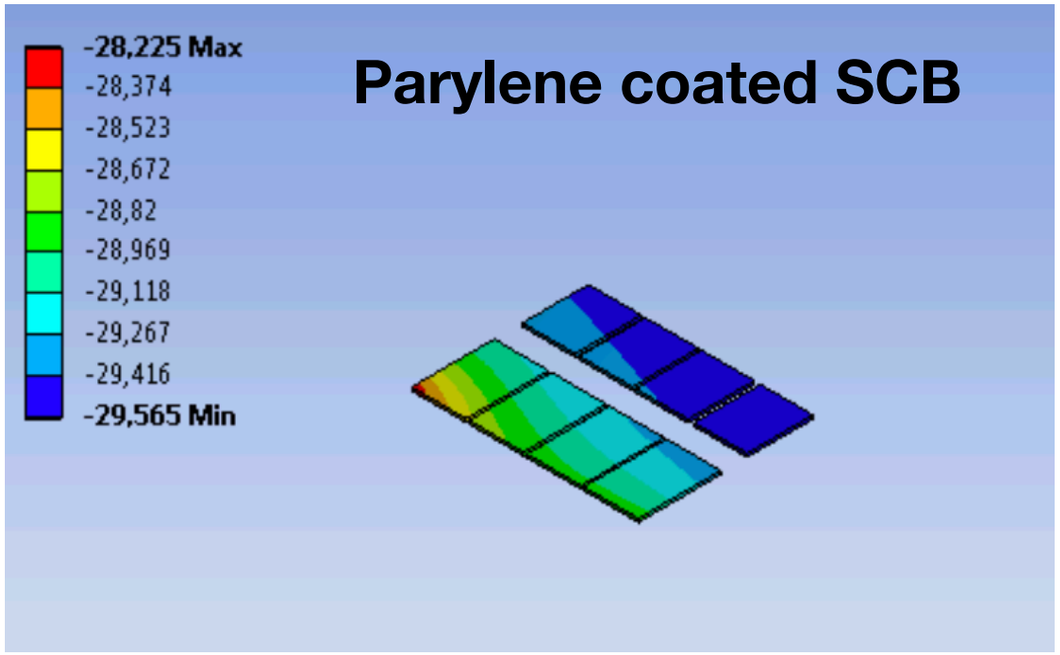
Some ANSYS simulations

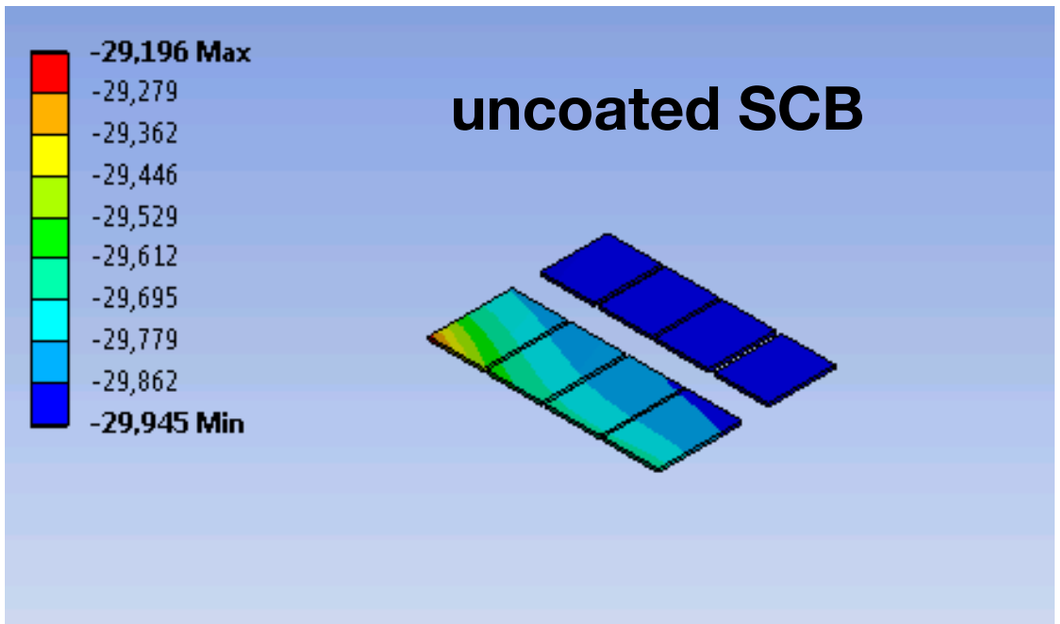
Thermal conductivity	Unit W/(m*C)
Steel	60
Parylene	0.12
Silicon	120

Ideal thermal contact



No heat load

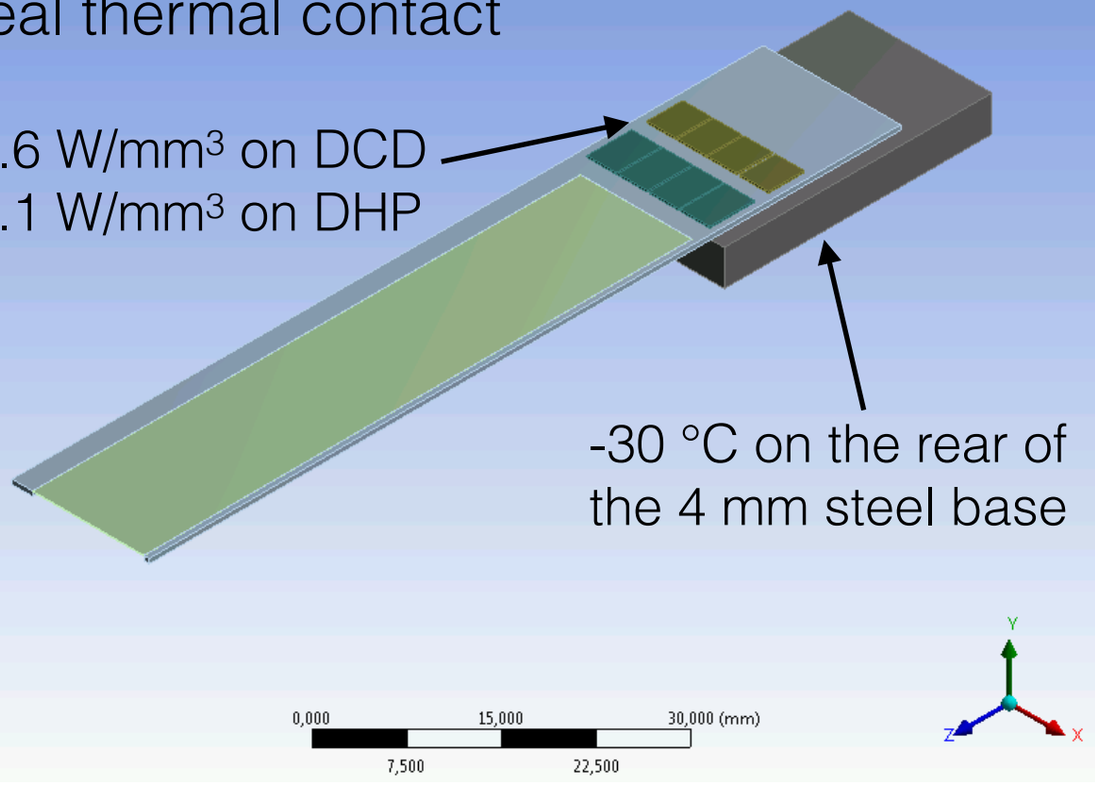




Some ANSYS simulations

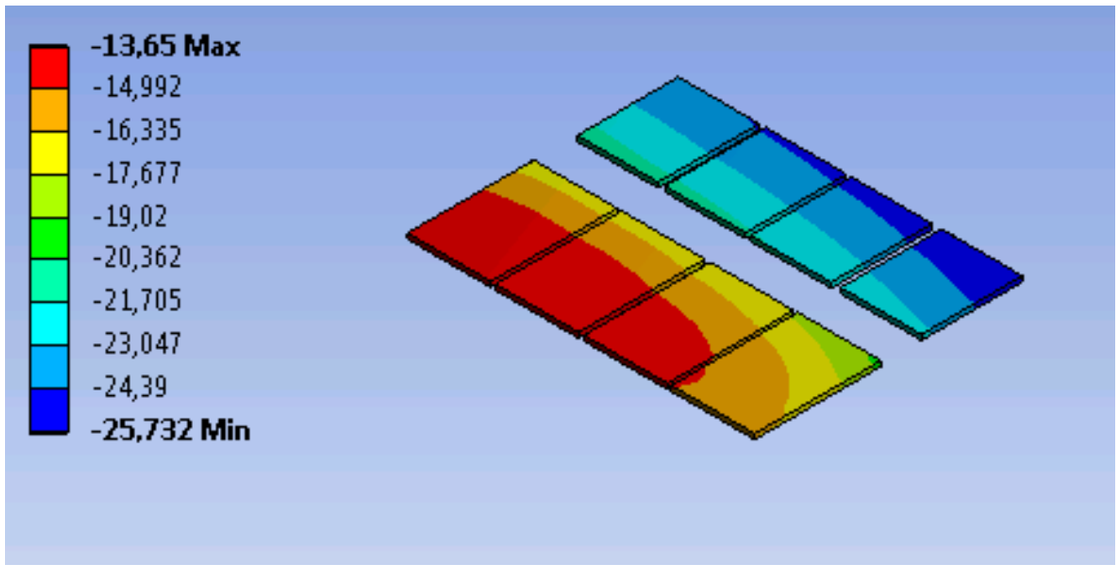
Thermal conductivity	Unit W/(m*C)
Steel	60
Parylene	0.12
Silicon	120

Ideal thermal contact



Heat load @ DCD: 8W, DHP 1W

Parylene coated SCB



uncoated SCB