

Status of FOS

Activities for Beast II.

Ringberg, May 30th 21st Depfet Workshop

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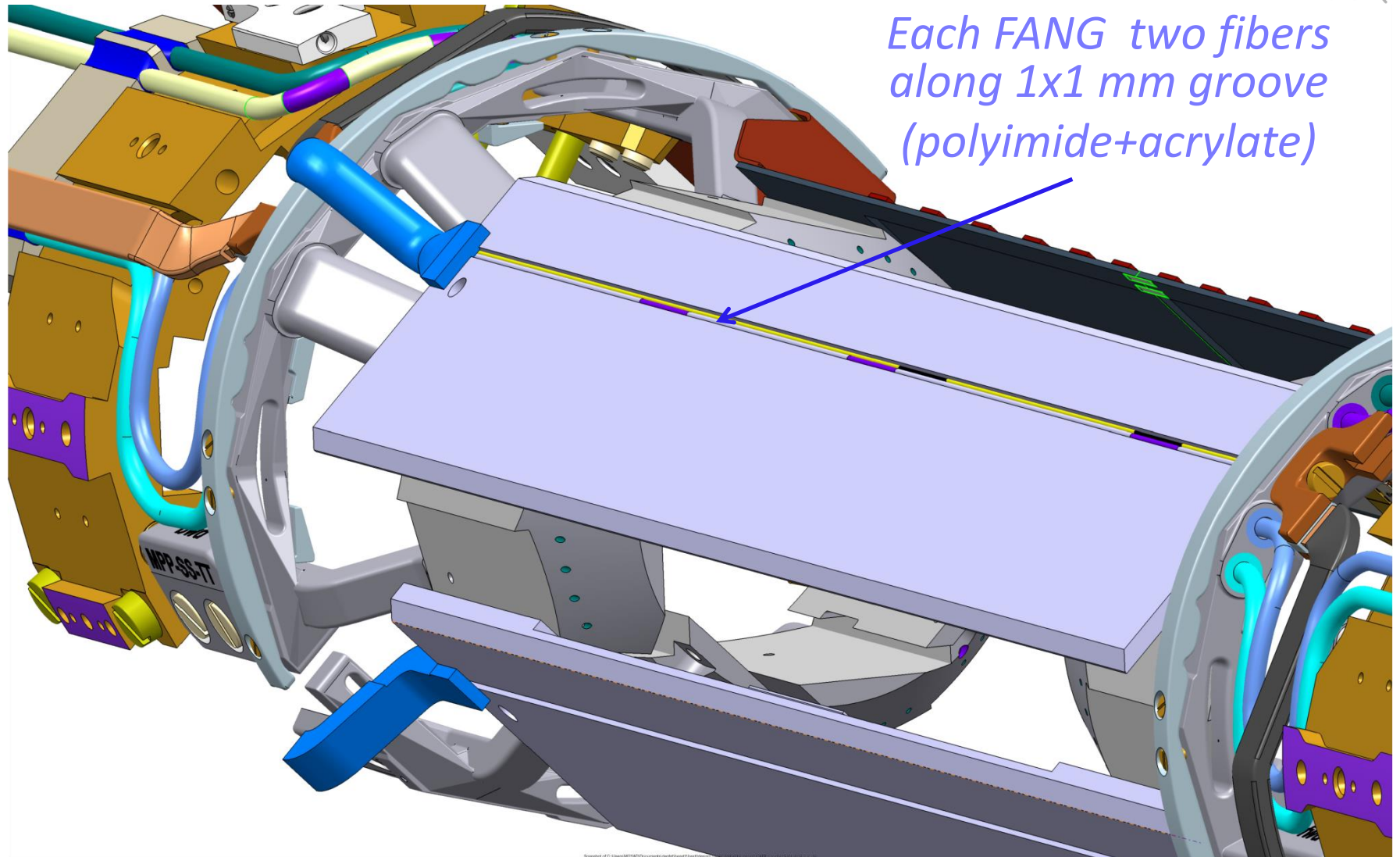


Outline



- Beast II FBG system introduction
- 2017 Beast II TB temperature and humidity monitoring results
- Beast II FBG monitoring system preparation.
- Outlook

FBG monitoring system for Beast II

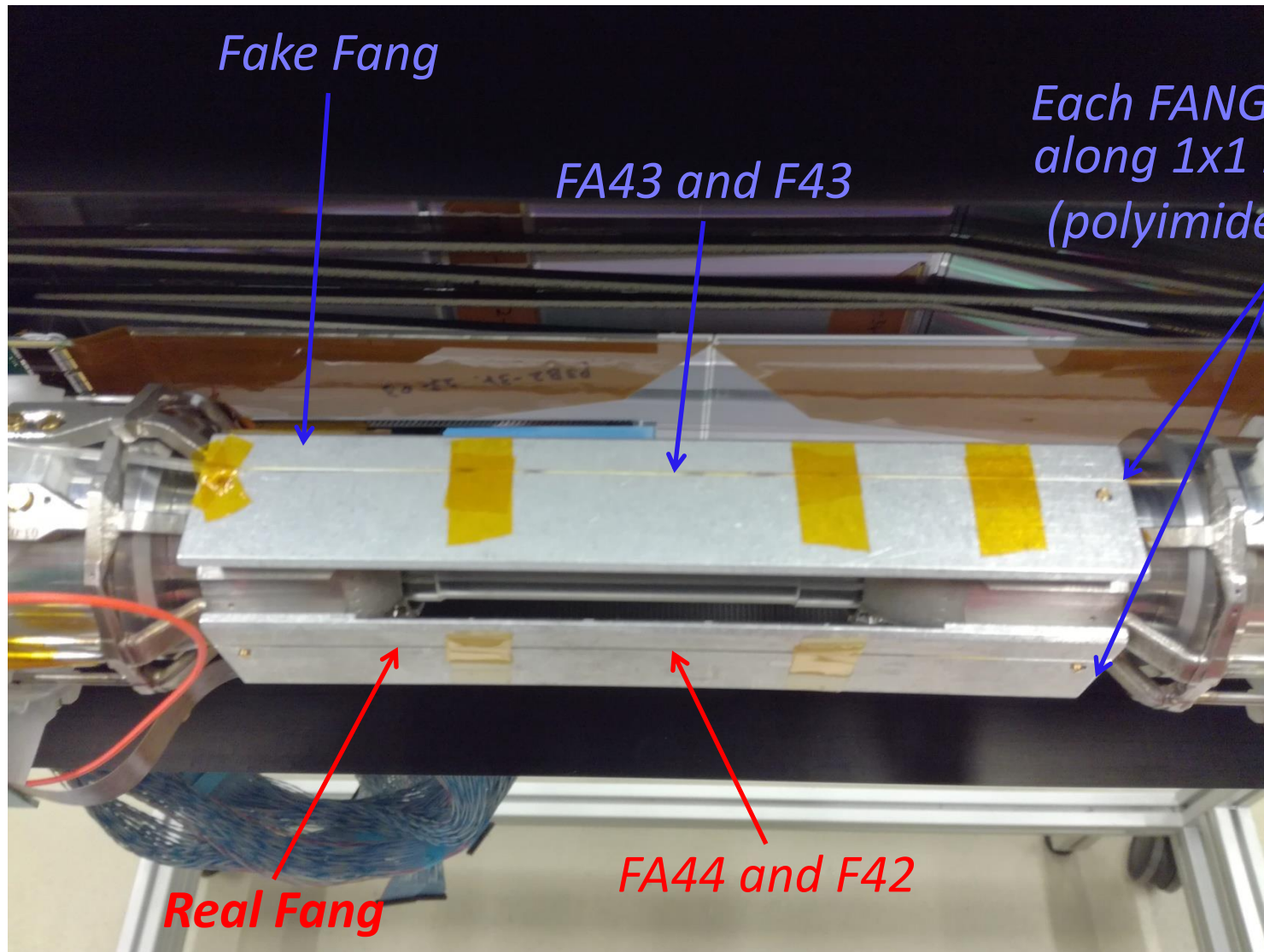


Fibers for Beast II TB 2017

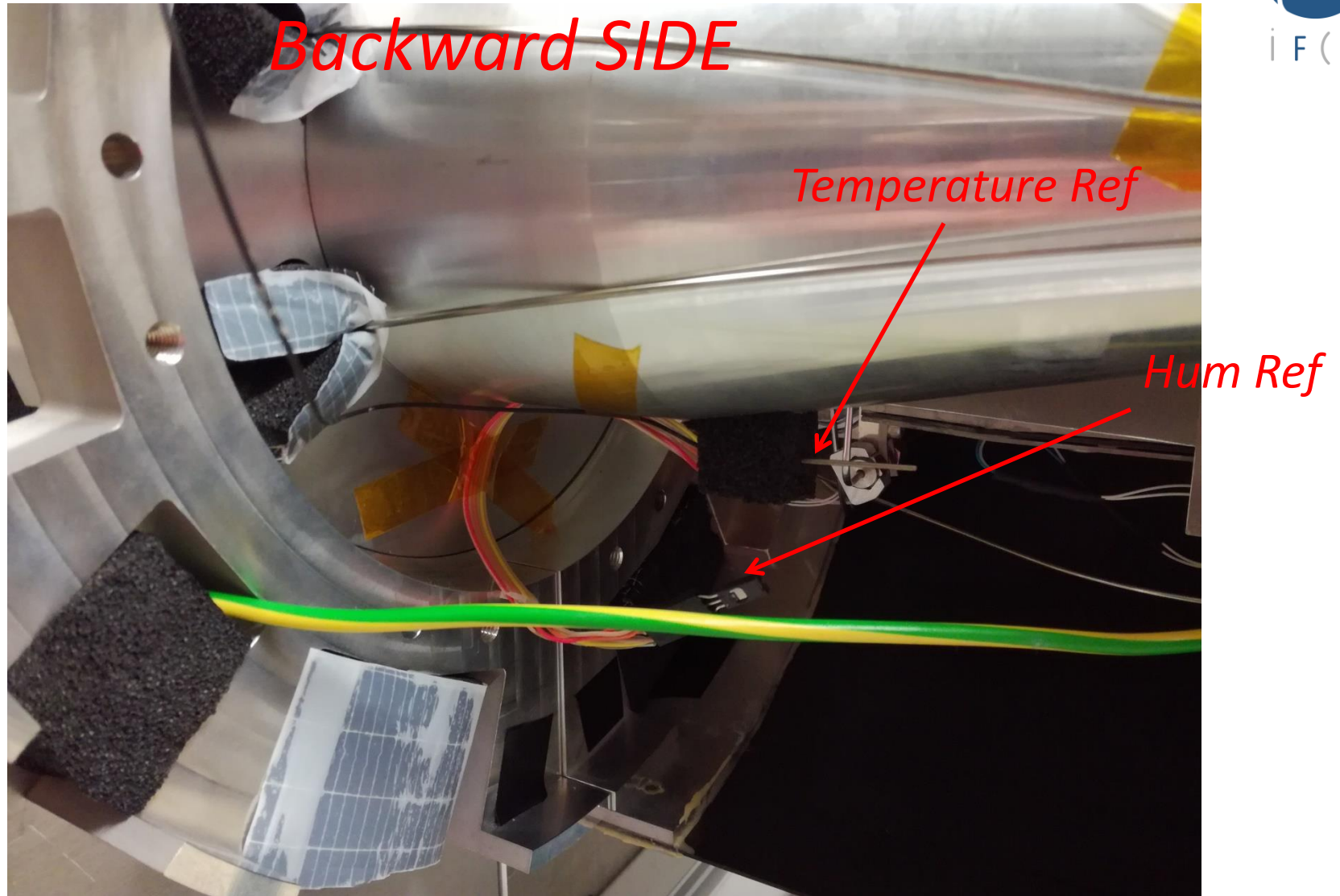


Fiber	Coating	Sensitive	Nº of sensors	Cable length
FA43	acrylate	T	3	3 meters
FA44	acrylate	T	3	3 meters
F43	polyimide	T +RH%	2	0.7 meters
F42	polyimide	T +RH%	1	0.7 meters

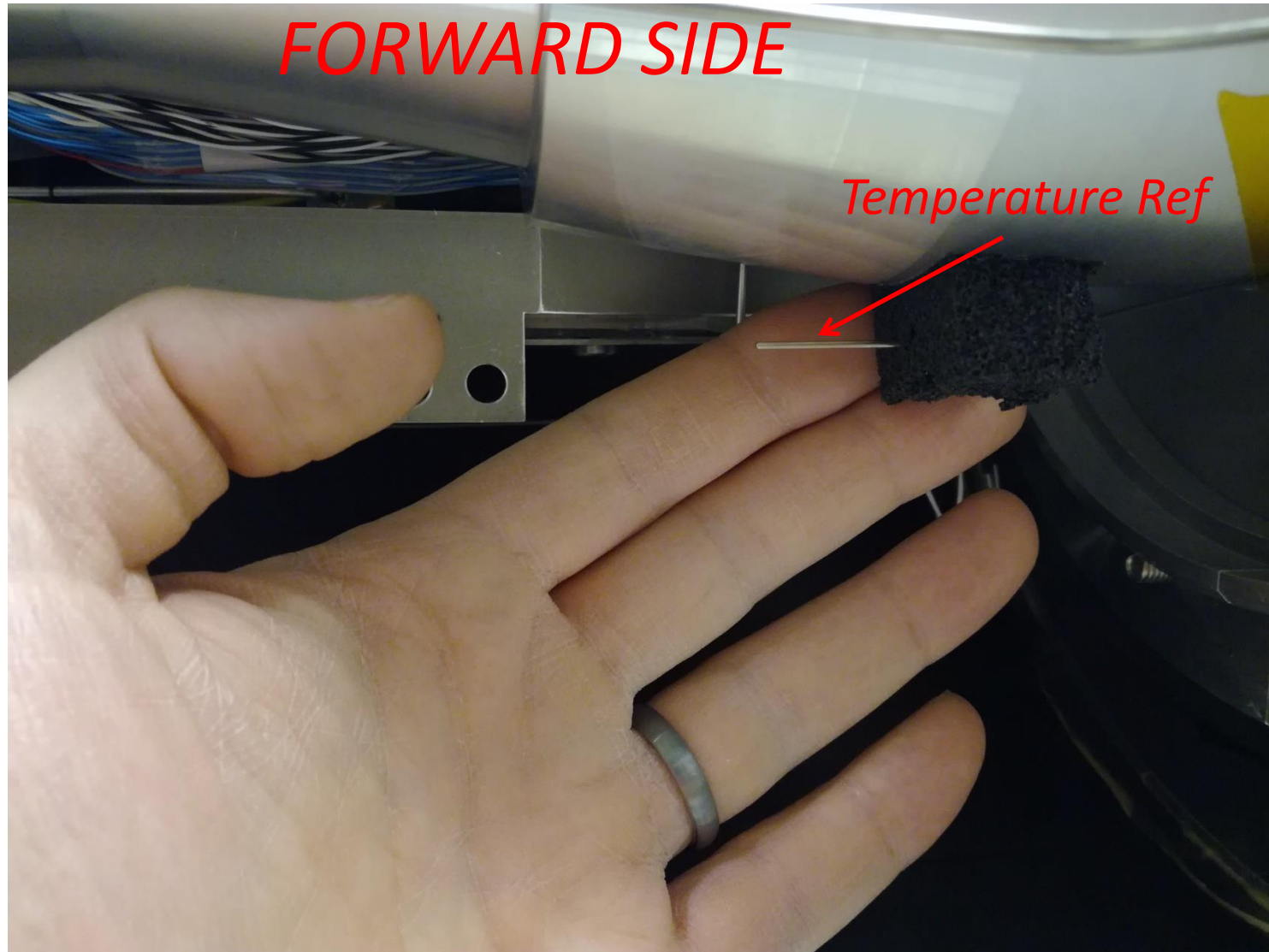
TB2017 FBG monitoring system



TB2017 FBG monitoring system



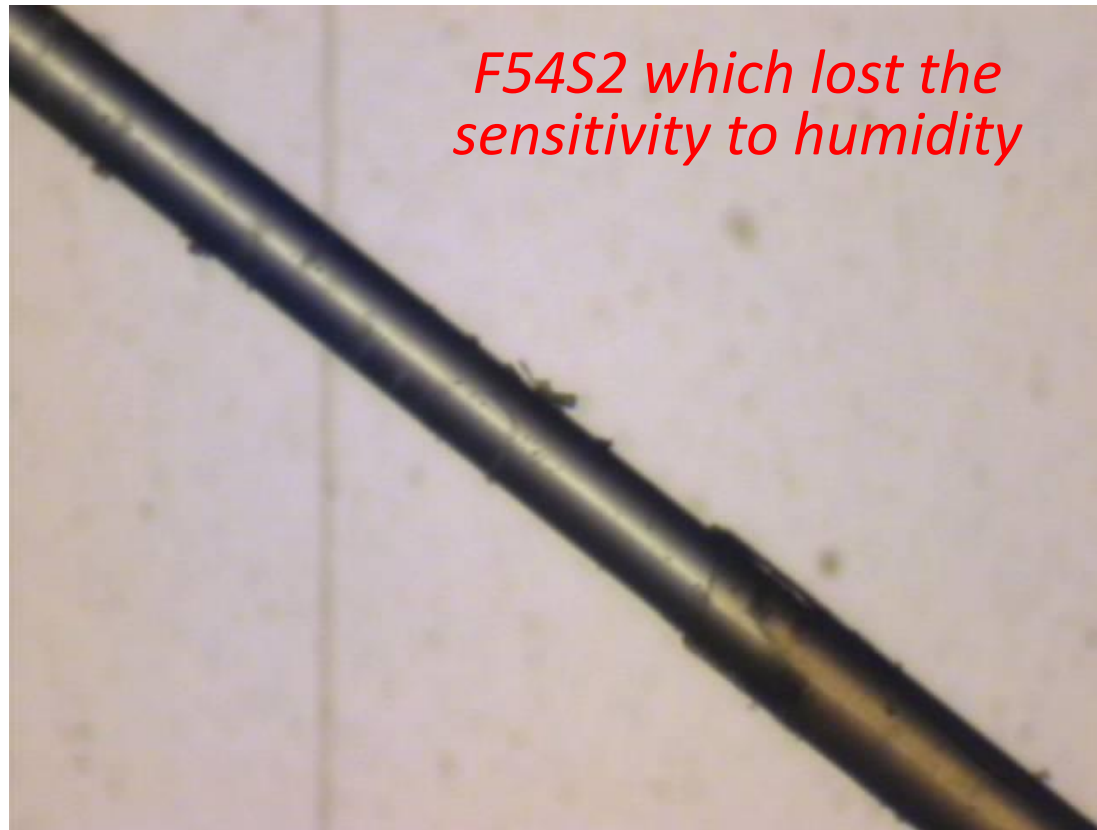
TB2017 FBG monitoring system



Fibers for Beast II TB 2017: coating damage



- Some problems with Humidity sensors. Coating damaged during fiber cutting inducing changes in the sensitivity.



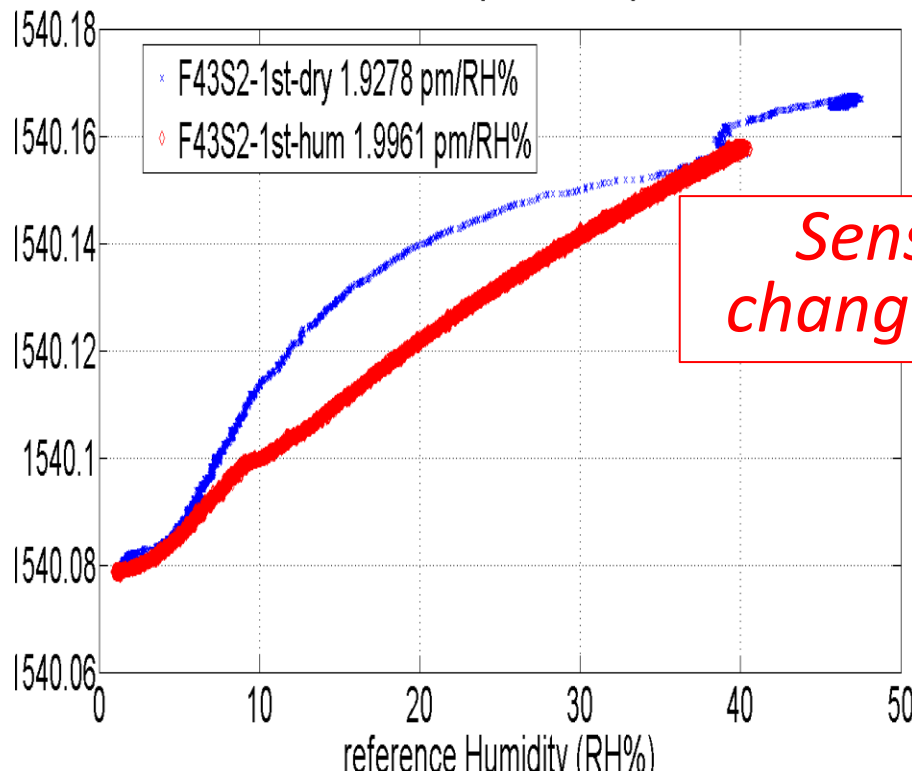
Fibers for Beast II TB 2017:coating damage



- Comparison between humidity calibration before and after coating damage.

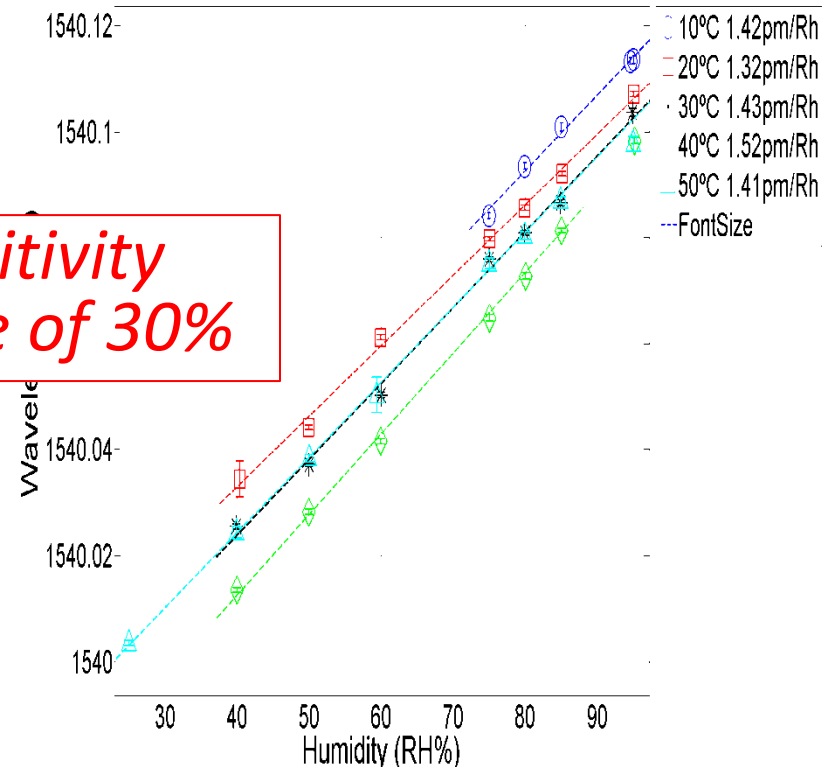
Before polyimide damage

Fiber 43 sensor 2 sensitivity to humidity normalized 19.2°



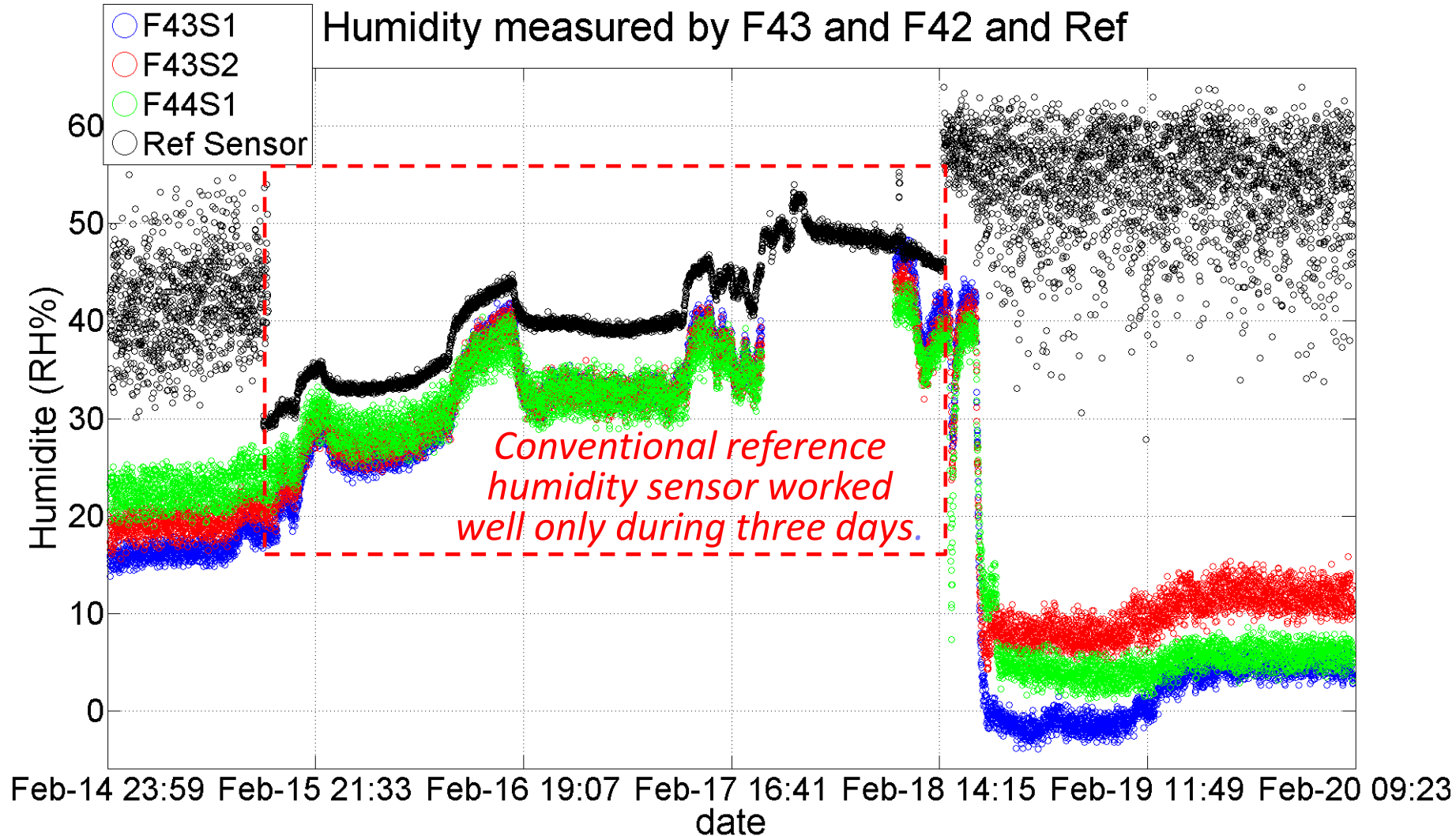
After polyimide damage

F43-S2 humidity calibration at different temperatures corr2



Measurements at ITA

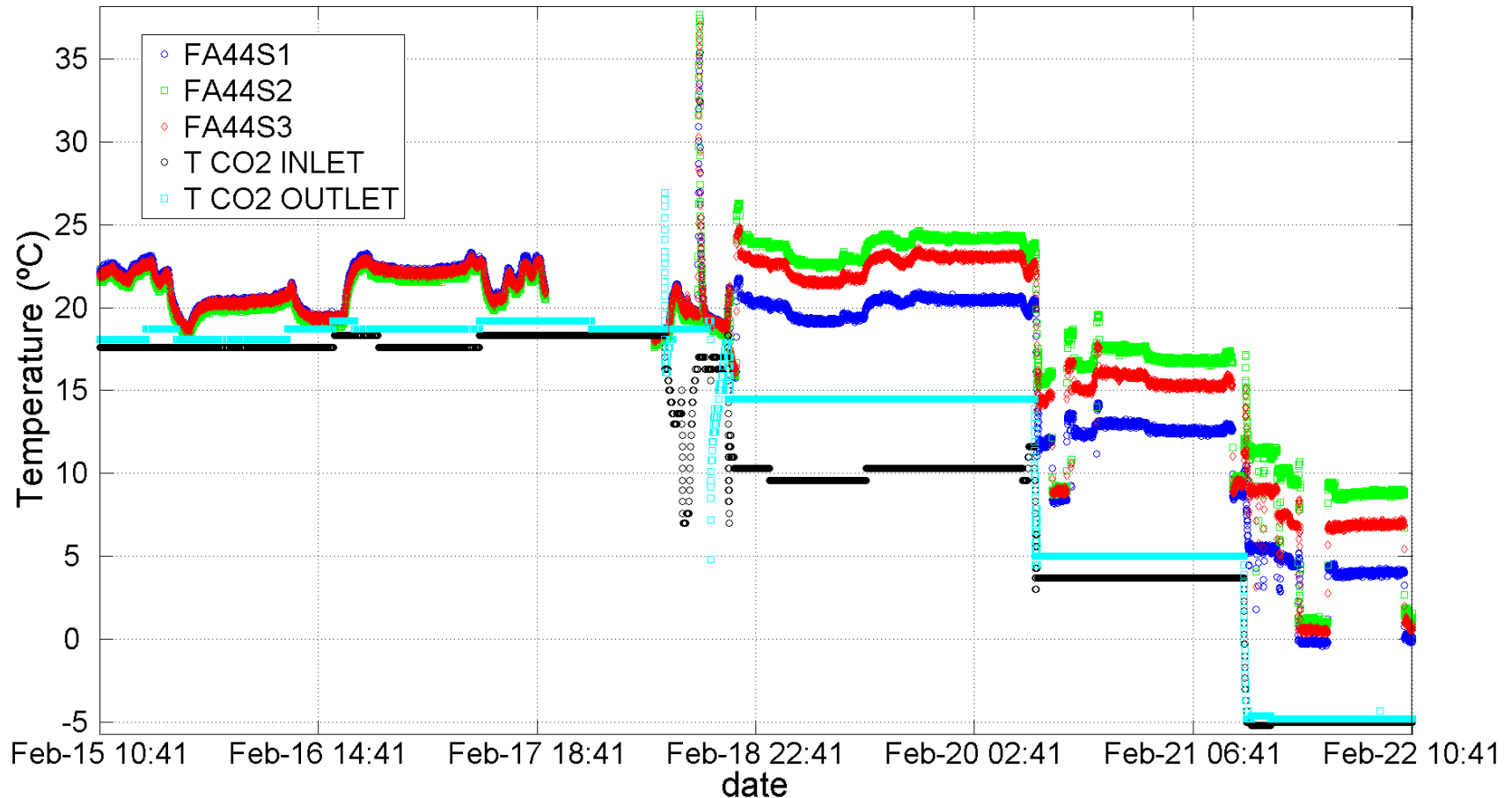
TB results: problems with humidity sensor



TB results: Temperature measurement

FA44 fiber mounted in real fang.

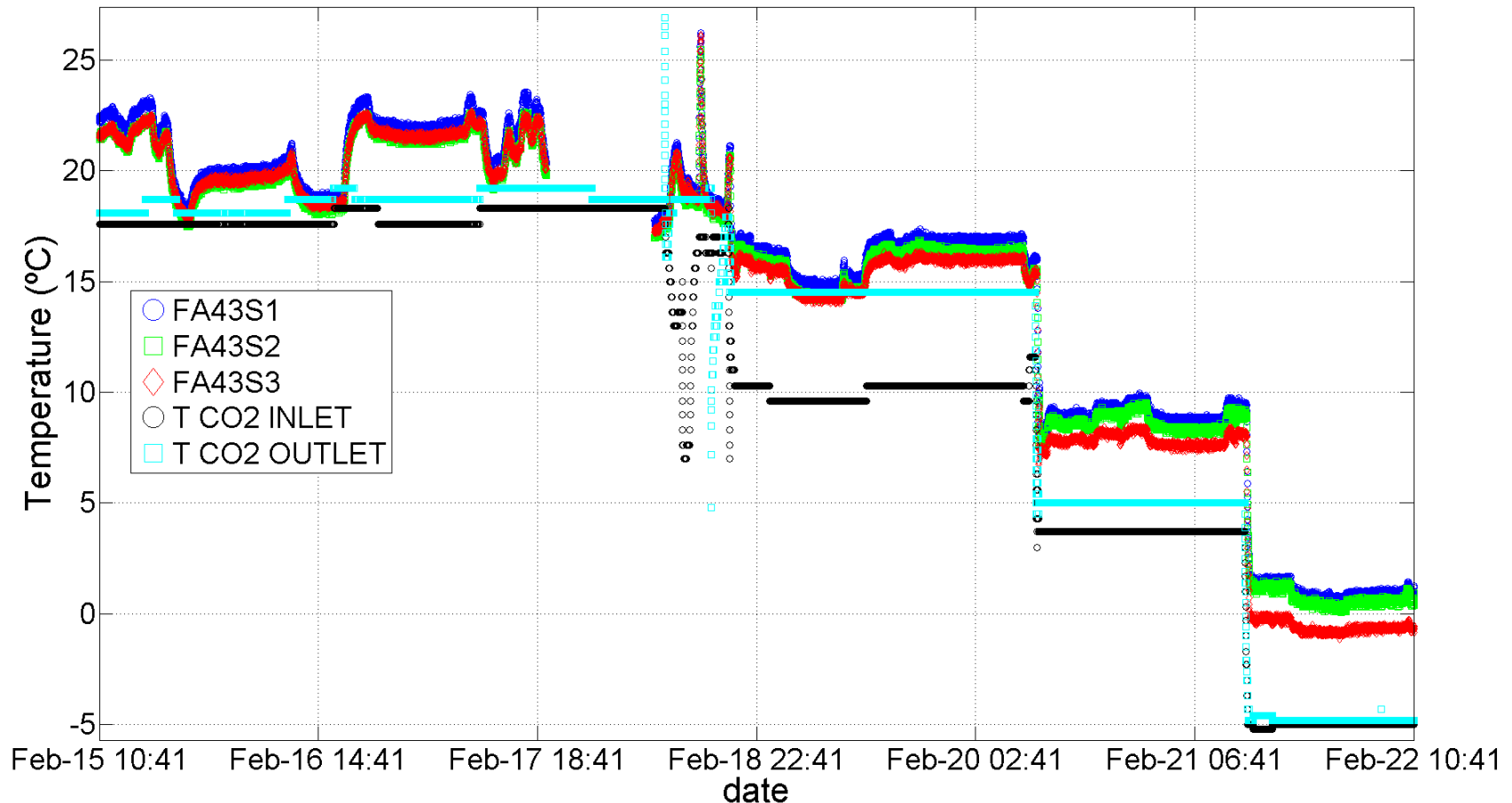
FA44 temperature comparison with CO2 cooling



TB results: Temperature measurement

FA43 fiber mounted in fake fang.

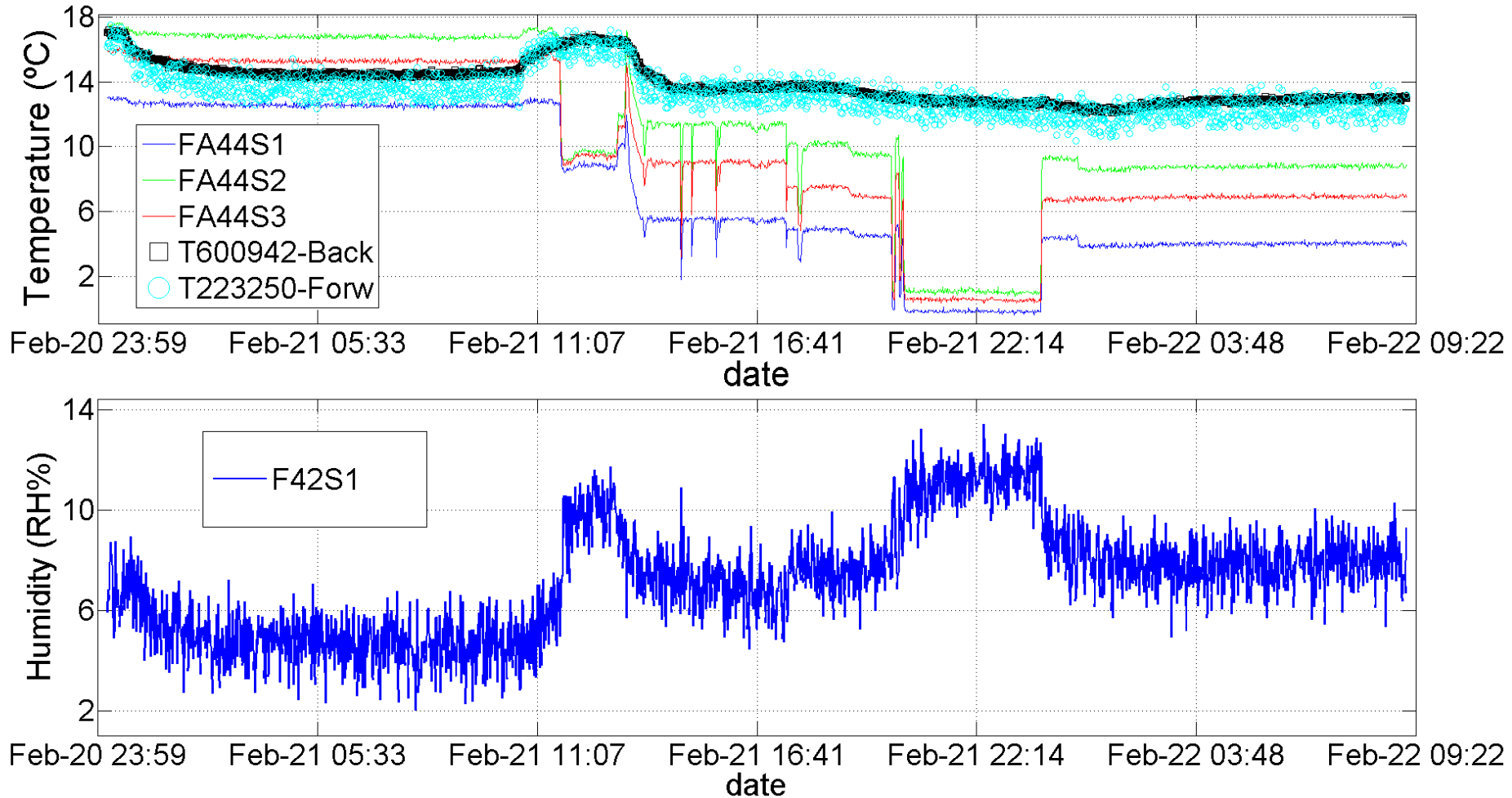
FA43 temperature comparison with CO2 cooling



TB results: Humidity measurement



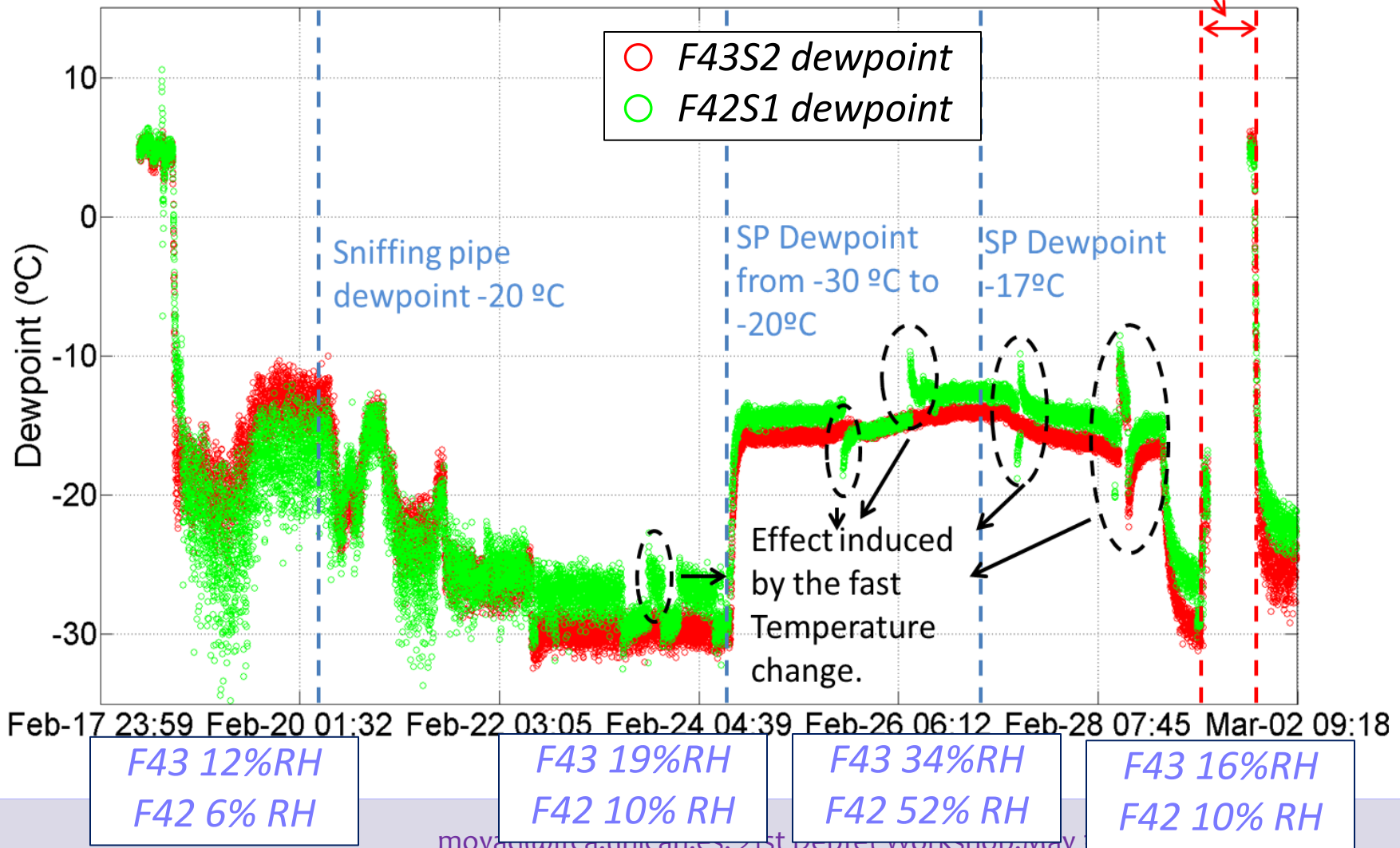
FA44 Temp and F42 Humidity measurement



TB results: dew point measurement



Dewpoint measured by F43 and F42



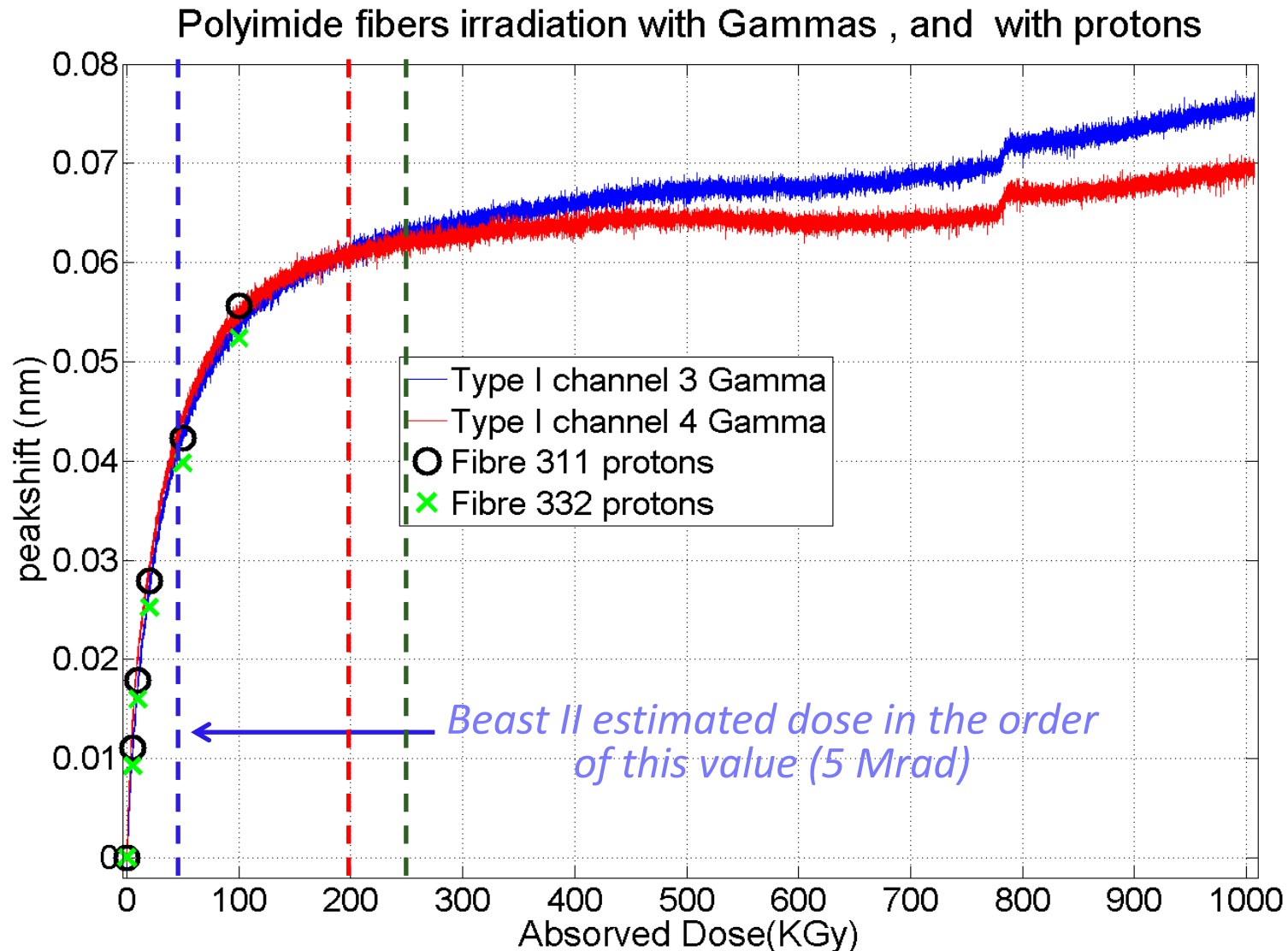
Beast II FBG monitoring system preparation



IFCA

- New polyimide fibers bought and received at IFCA.
 - TB fibers coating is damaged (Reliability is not 100 % ,the behavior could change with time)
- We would like to irradiate the fibers up to 200 K Gy. in order to avoid radiation effects on temperature-humidity measurement during phase II.
- The patch cords to interconnect from docs are at Trieste
- Working in the readout and the DAQ.
- New fibers guide design and manufactured in order to insert the fibers in FANG backplane 1x1 mm Groove

Irradiation up to 200 KGy



Conclusions



- During last test beam we managed to monitor temperature, humidity and dew point in an accurate way.
 - Extreme caution when cutting the fiber in order not to damage the coating.
- We have started preparing for phase II.
 - New polyimide coated fibers received.
 - Will be irradiated up to 200 KGy in order to avoid radiation effect during Beast II measurement.
 - Fibers will be calibrated with temperature and humidity before and after irradiation.
 - New fibers guide manufactured for FANGs

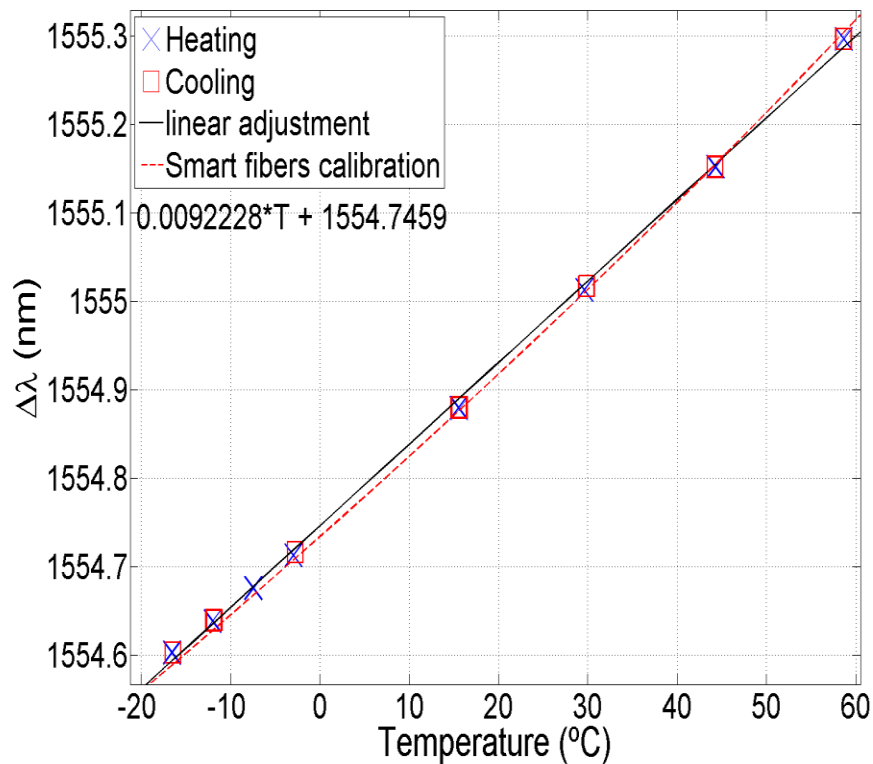
BACK UP SLIDES

Fibers thermal calibrations: Acrylate fibers

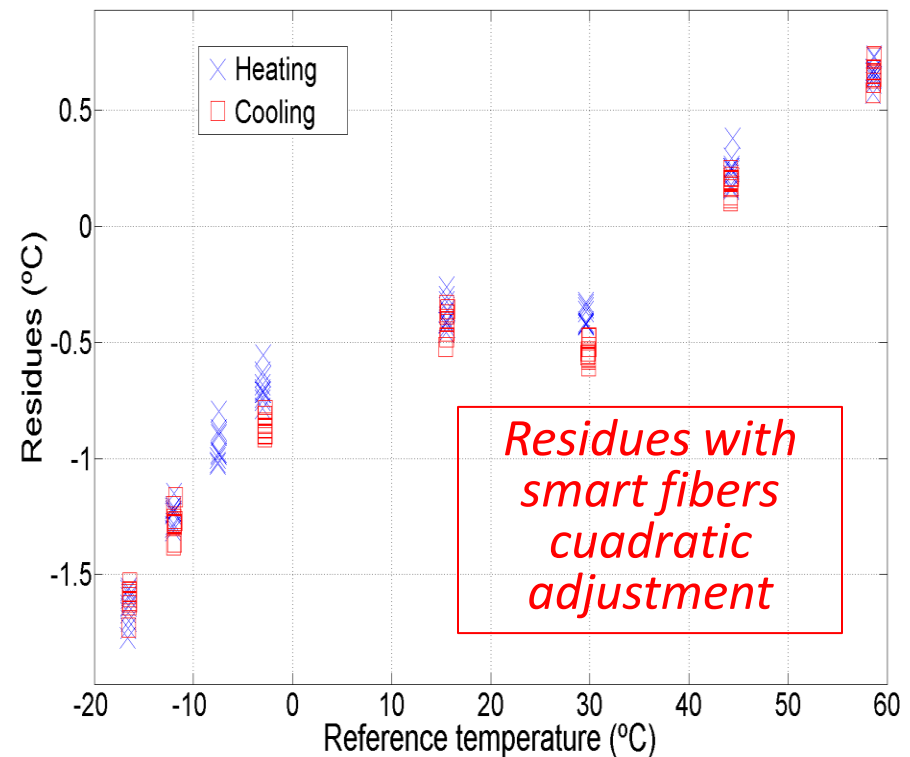


- Calibrated by the supplier in -30/60 °C range
- Results compared with our calibrations at IFCA. Difference below uncertainty.

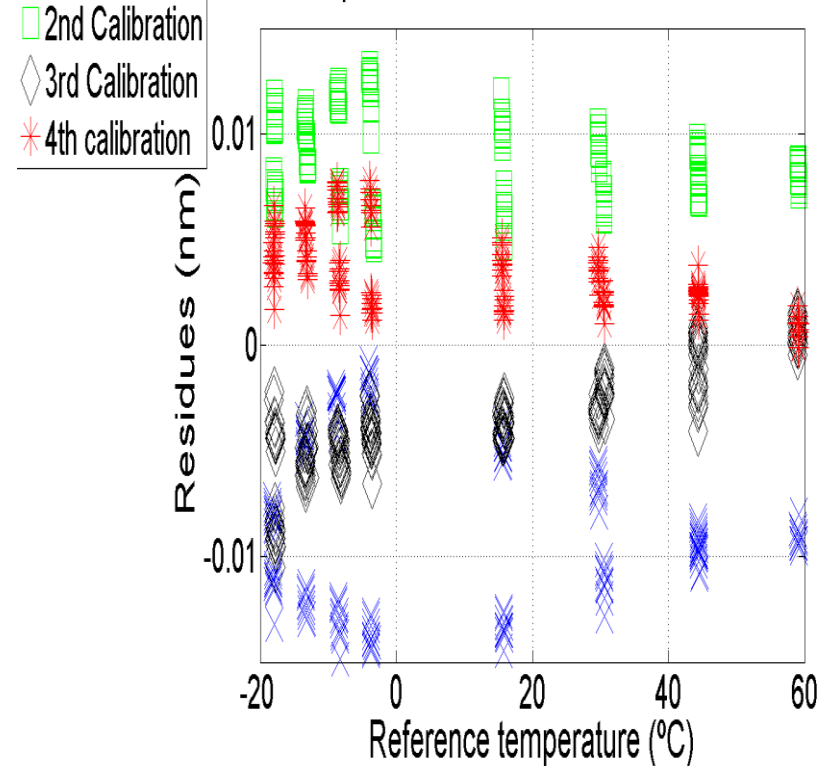
Temperature calibration A43S3



FA43S3 temperature calibration residues with smart-fibers curve

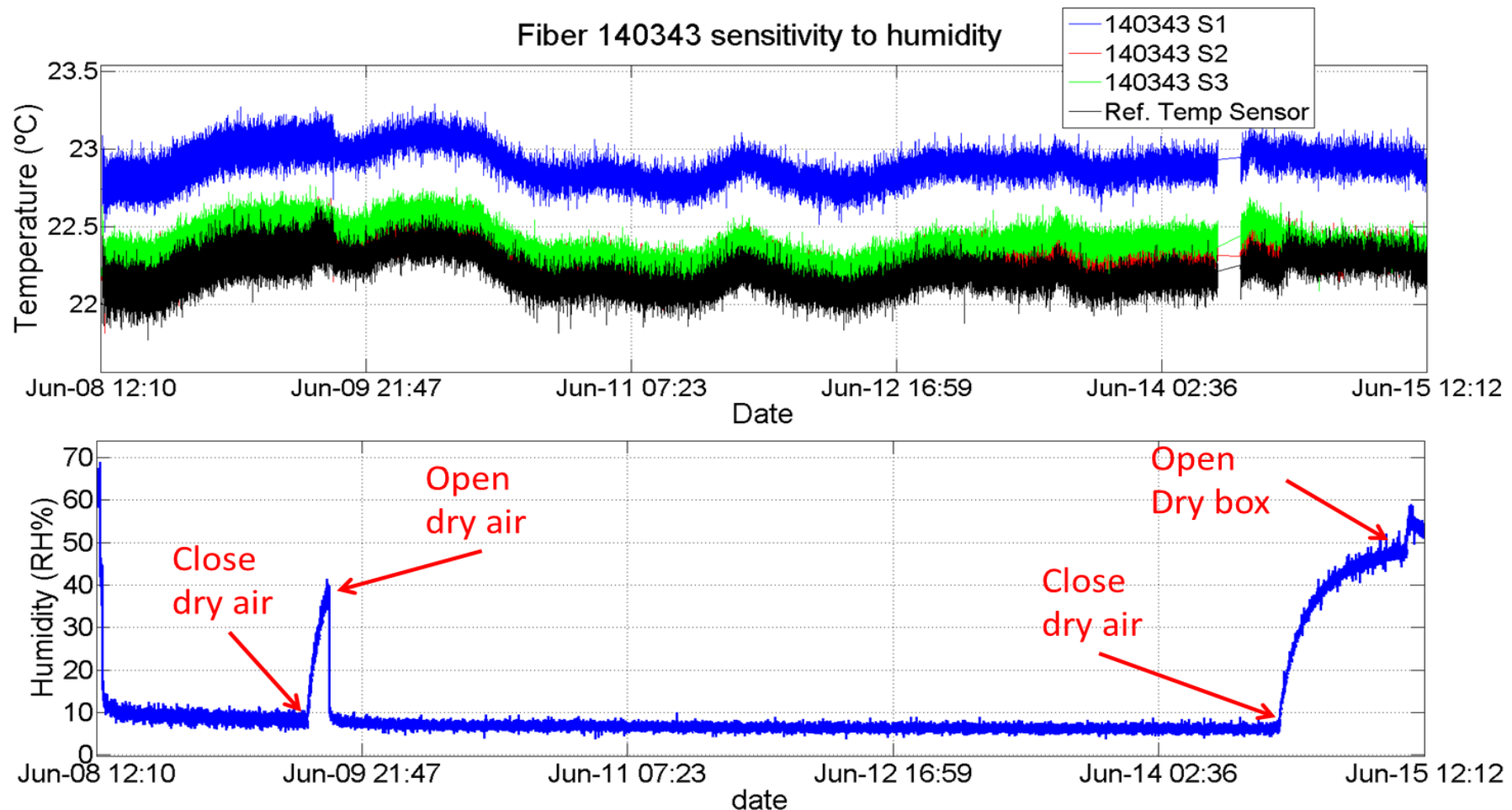


- ## Temperature calibration F42S1 under dry environment (1%



Acrylate fibers sensitivity to humidity

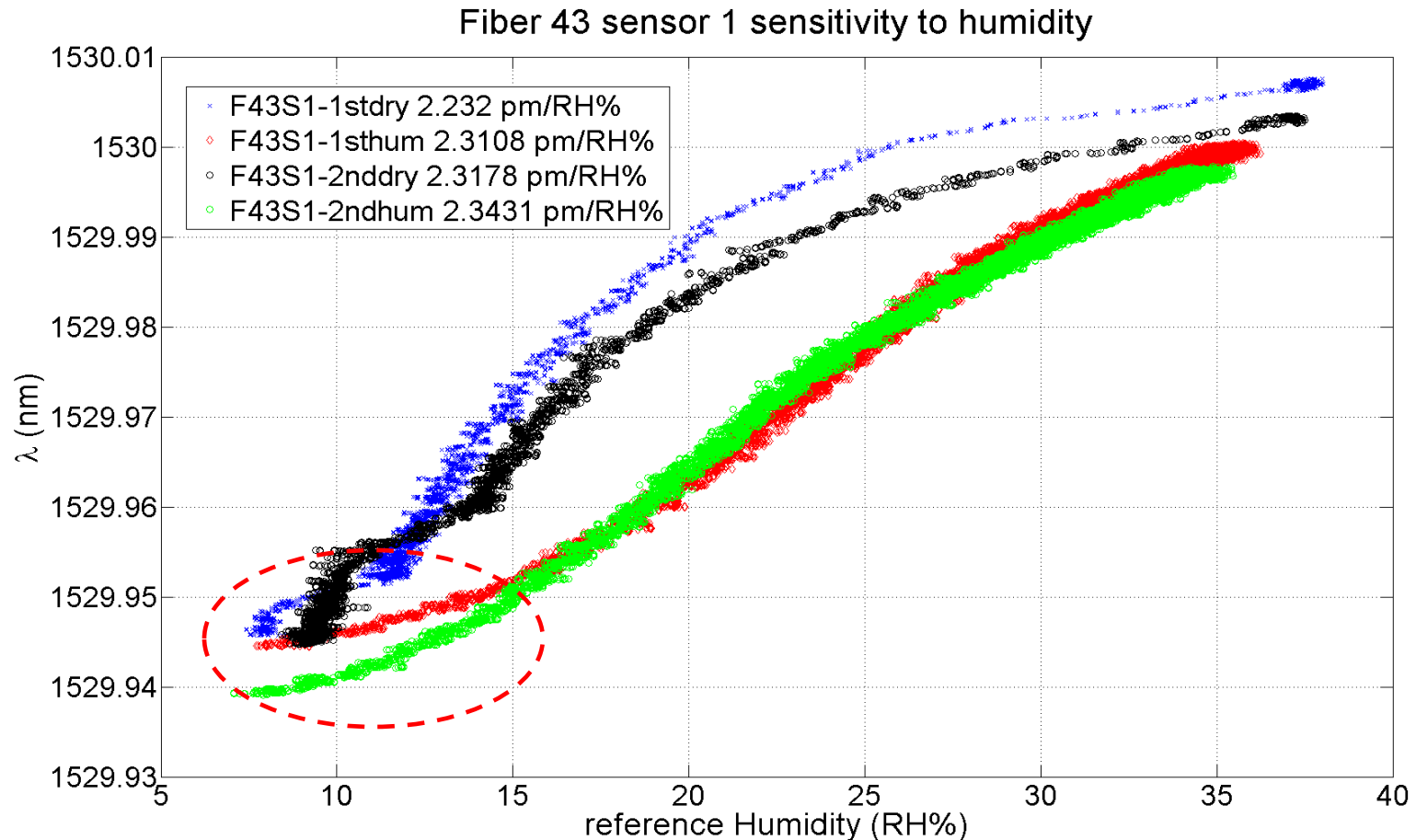
- Acrylate fibers under dry environment during six days without any effect in the signal.



Polyimide fibers sensitivity to humidity



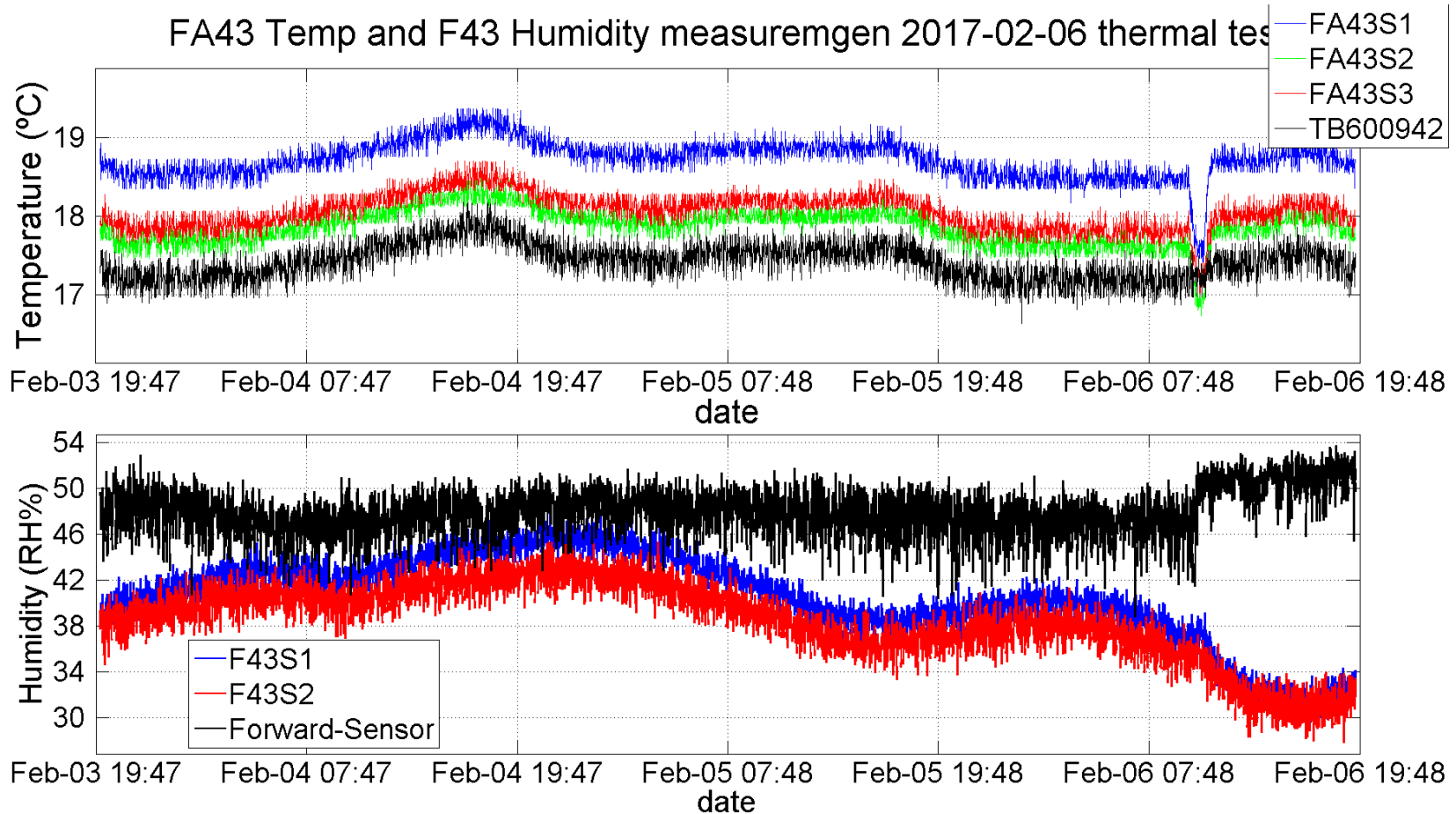
- F43 and F54 calibrated against humidity Before TB april 2016.



TB results



– Temperatur comparation reference



Beast Phase II fiber guide.

