EP-DT
Detector Technologies

CERN, 9 December 2021

ALICE

EP-DT contribution to ALICE

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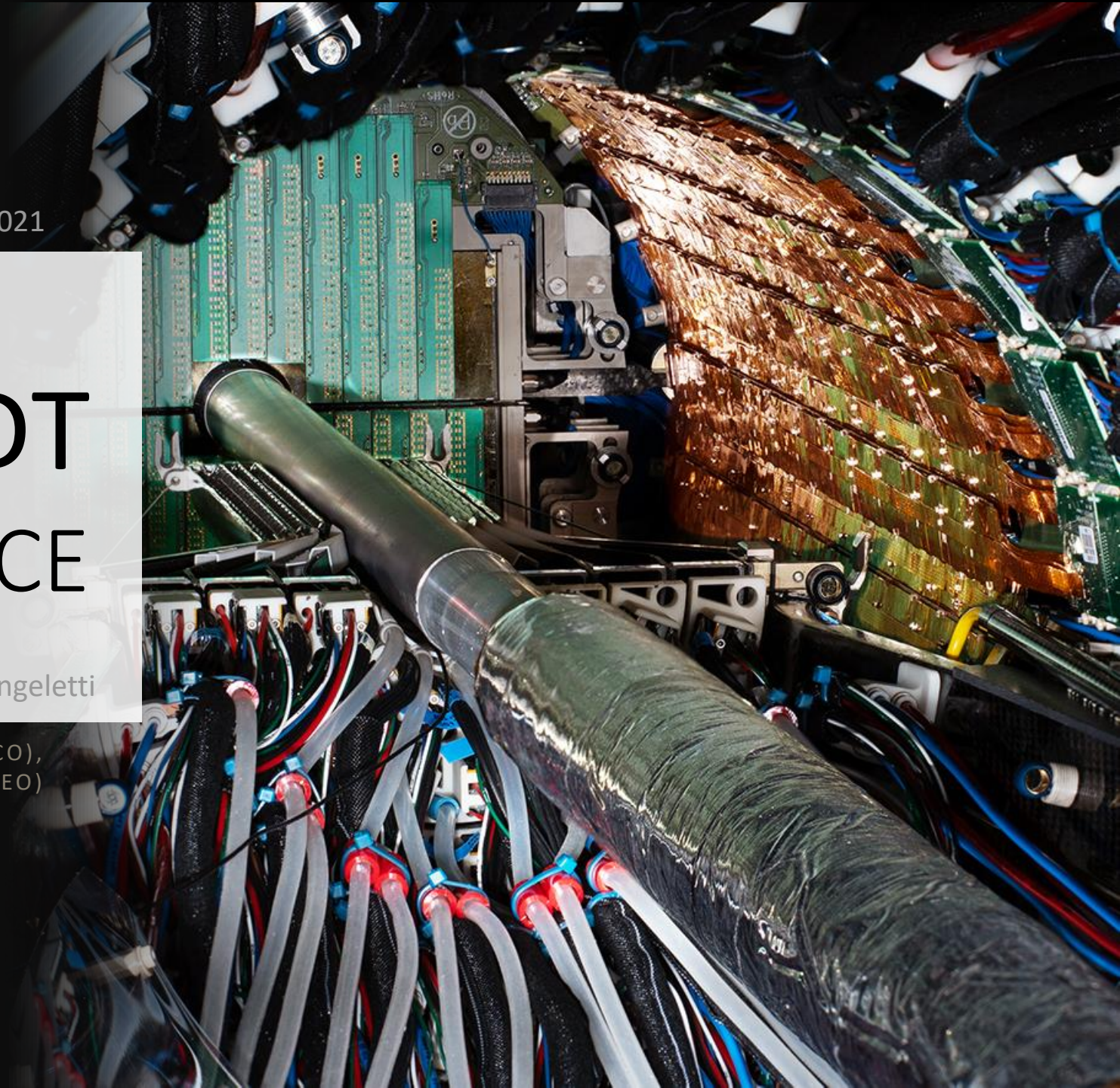
Paolo (DT-TP), Petra (DT-DD), Giovanna(DT-DI), Corrado (DT-EO)

DSF QART and Bonding lab, Composite lab, Micropattern lab, Workshop 162, Magnet M&O, GasSystem M&O, Irradation Facilities.

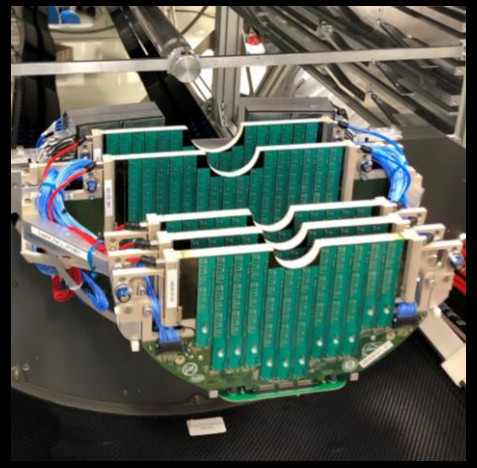


Outline

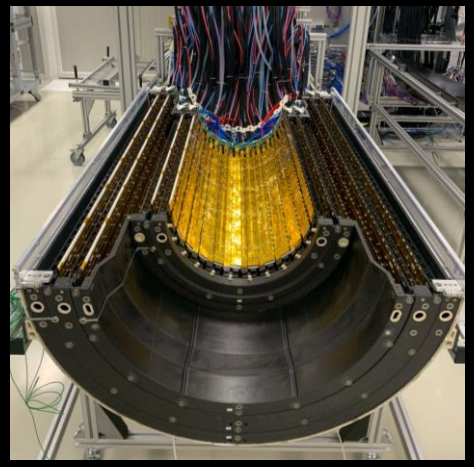
Long Shutdown 2

Detector installation

MFT



ITS Outer Barrel

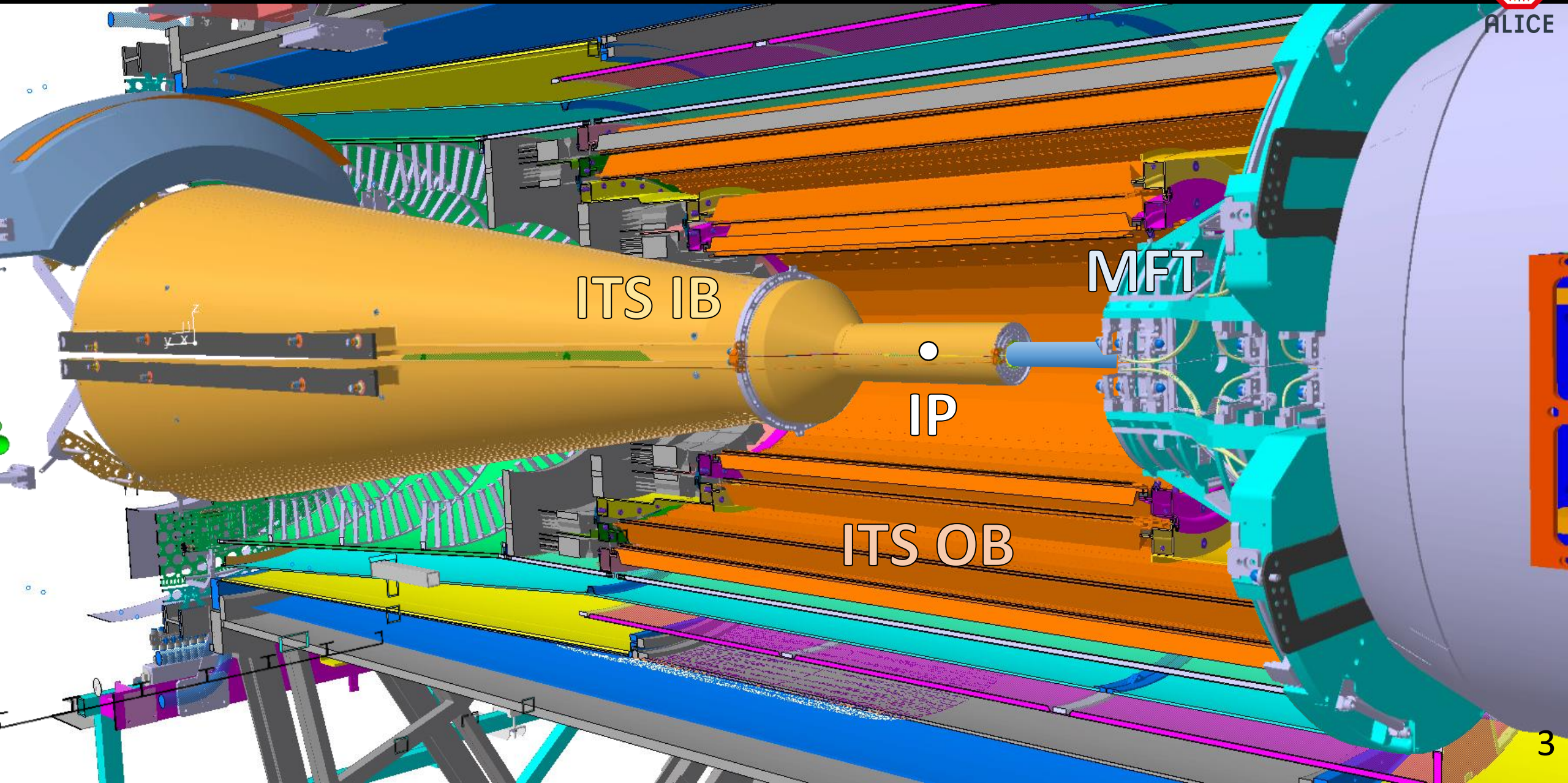


ITS Inner Barrel

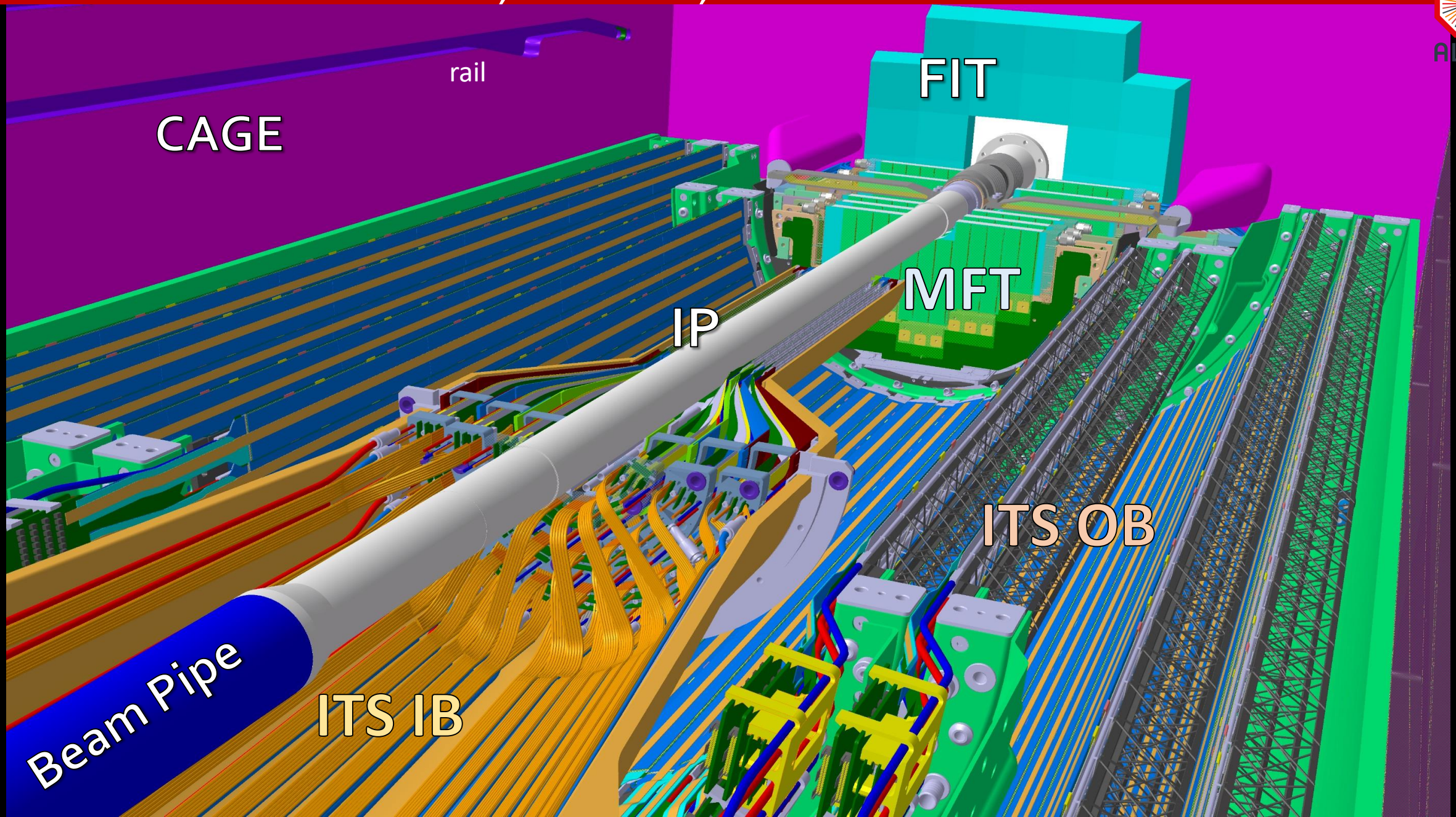
Long Shutdown 3

R&D Inner Tracking System

Inner detectors: MFT, ITS OB, ITS IB

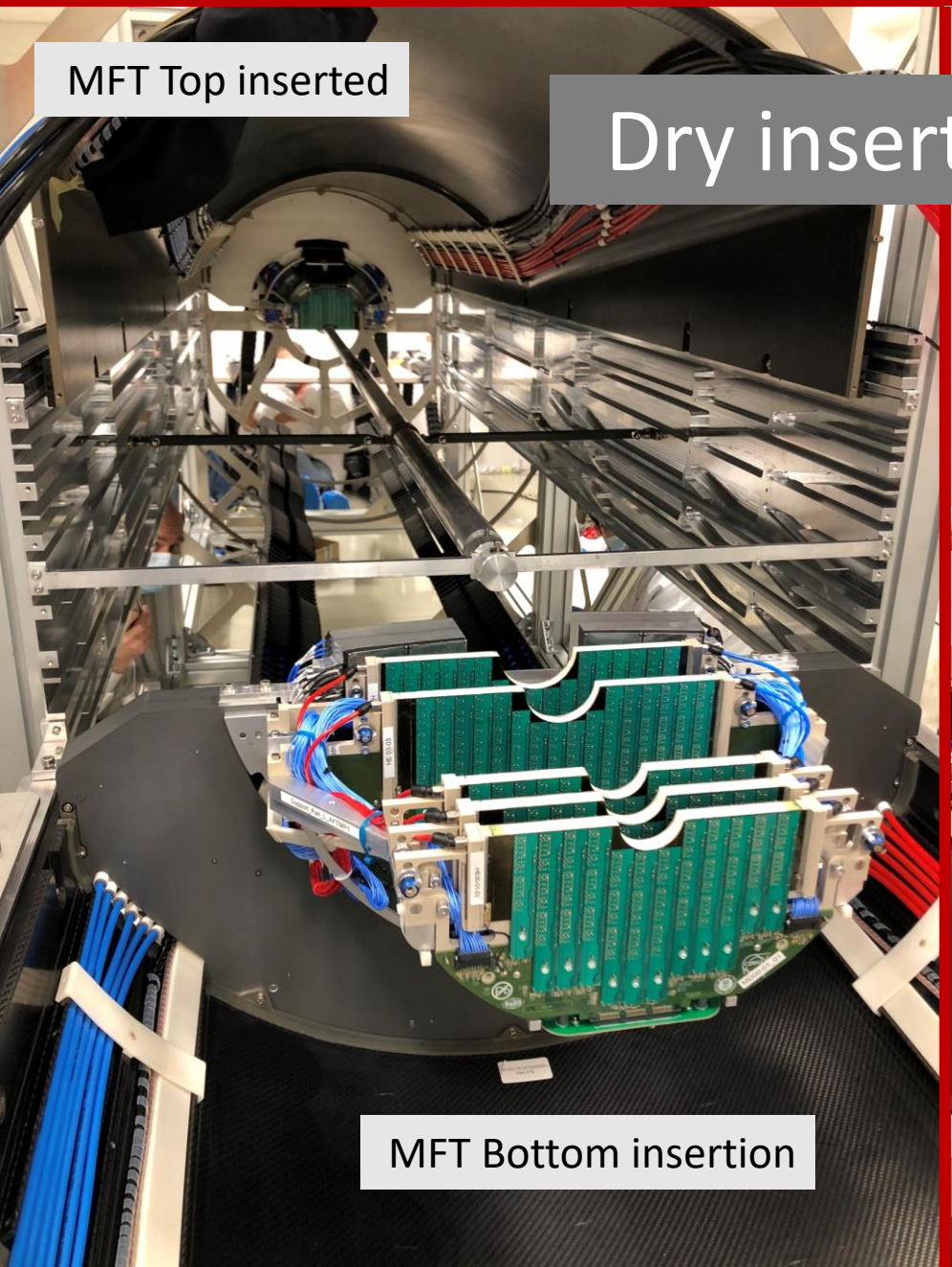


Inner detectors: MFT, ITS OB, ITS IB



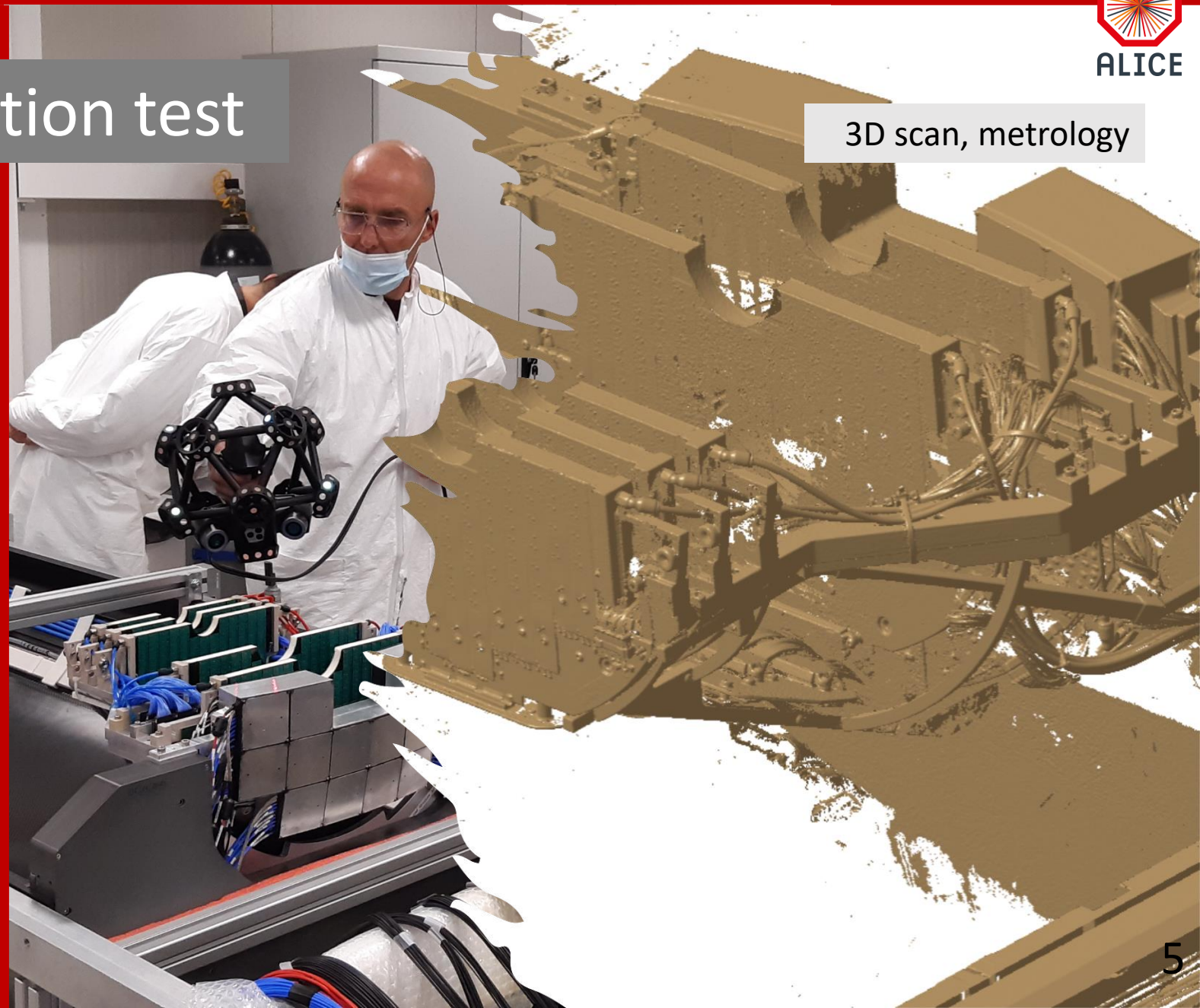
MFT

MFT Top inserted



MFT Bottom insertion

Dry insertion test

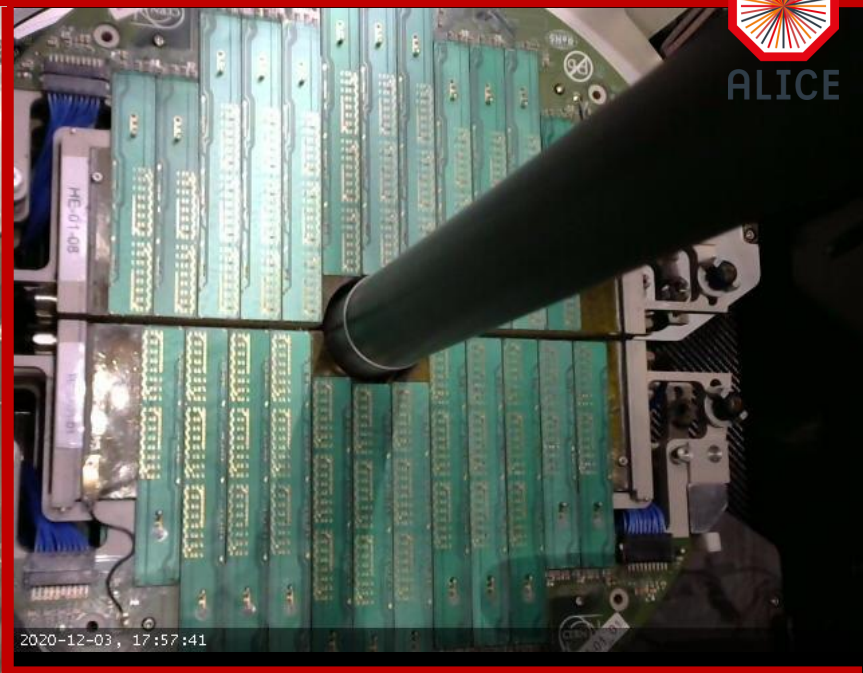


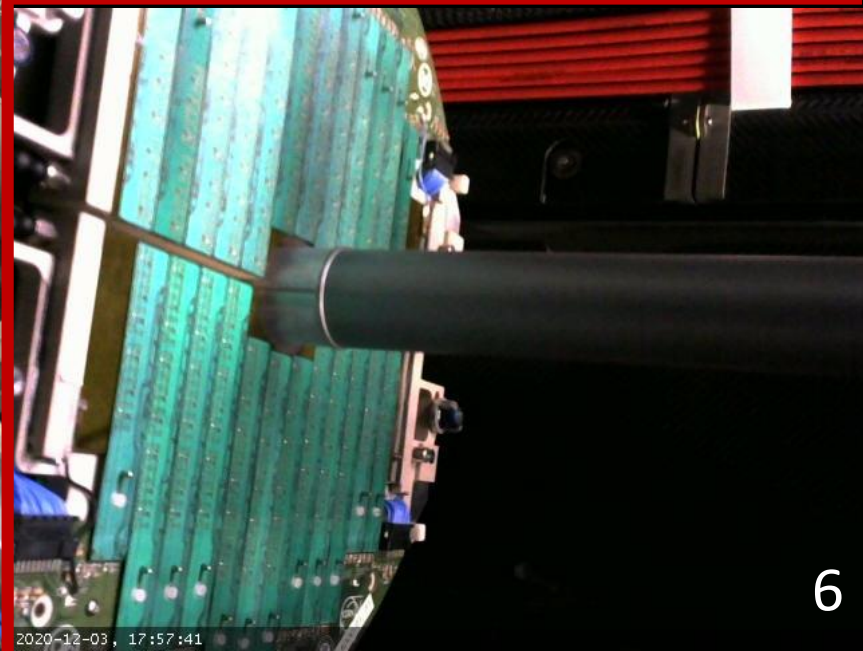
3D scan, metrology

Installation

MFT Top inserted

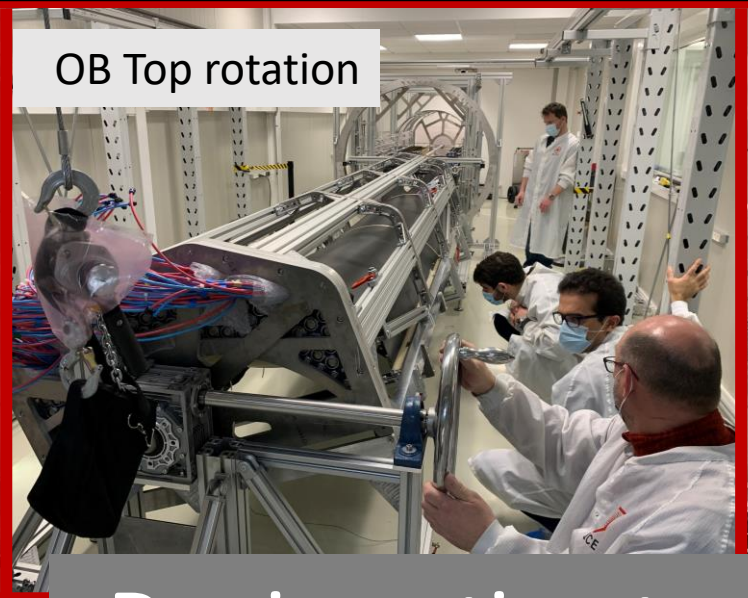
MFT Bottom insertion





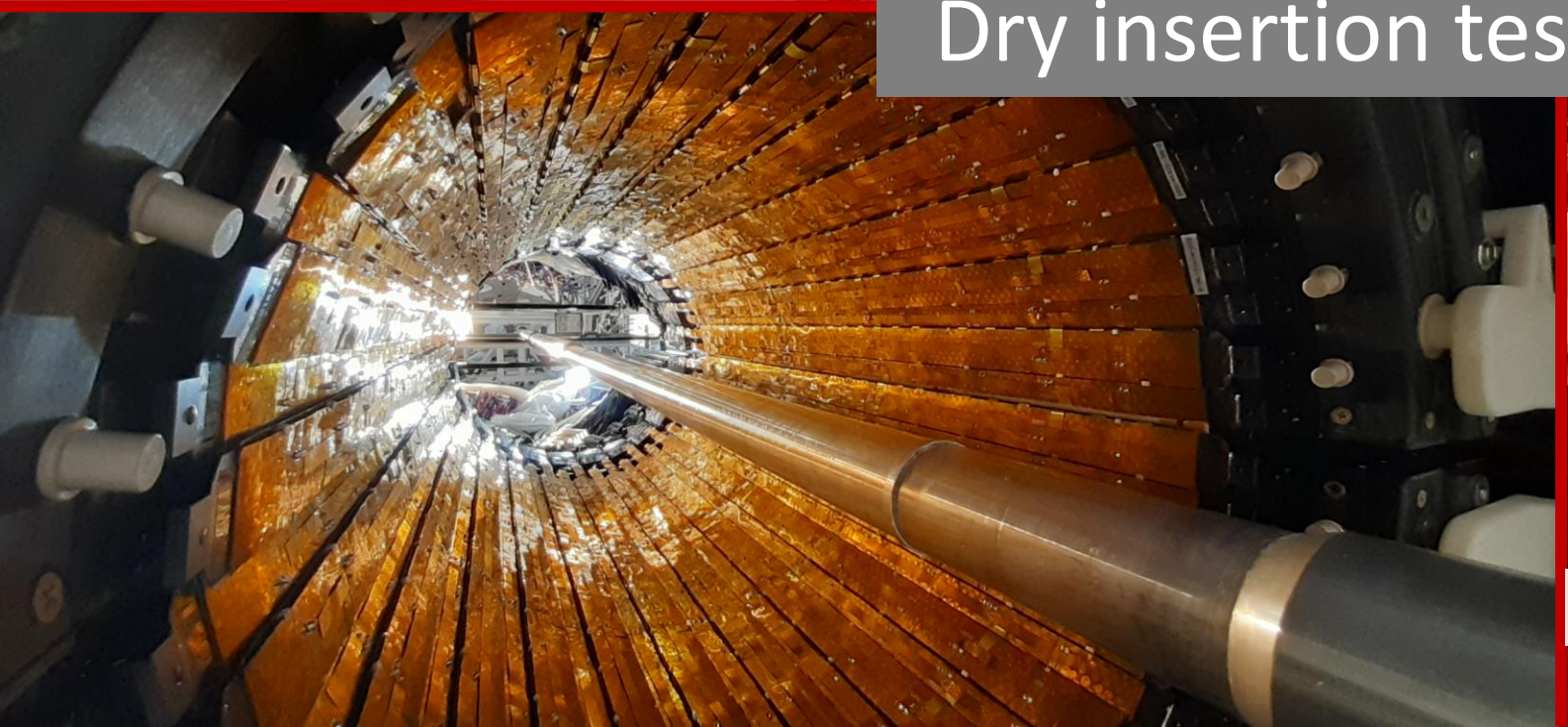
ITS2 Outer Barrel

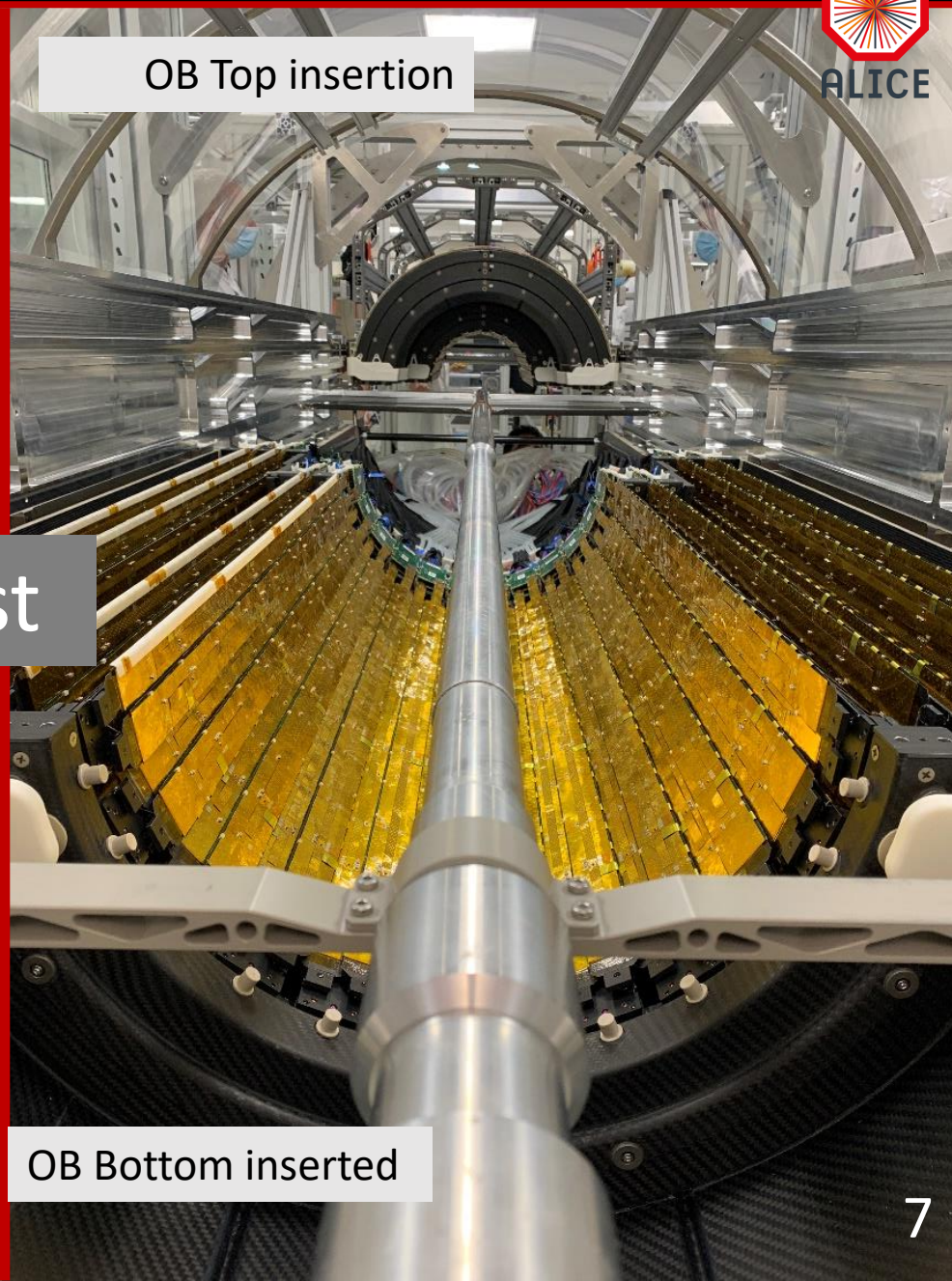
OB bottom insertion



OB Top rotation

Dry insertion test

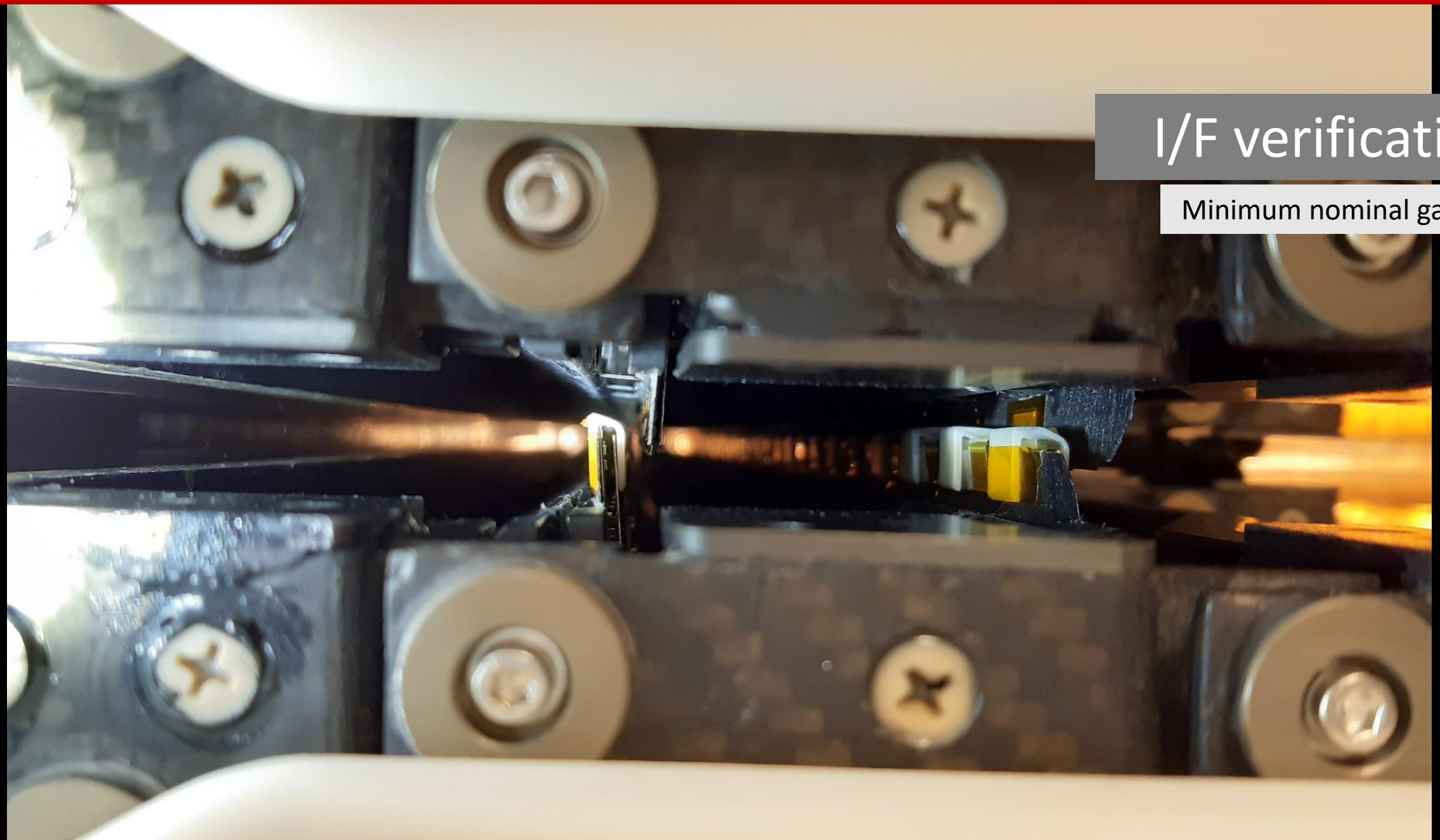




OB Top insertion

OB Bottom inserted

ITS2 Outer Barrel



I/F verification

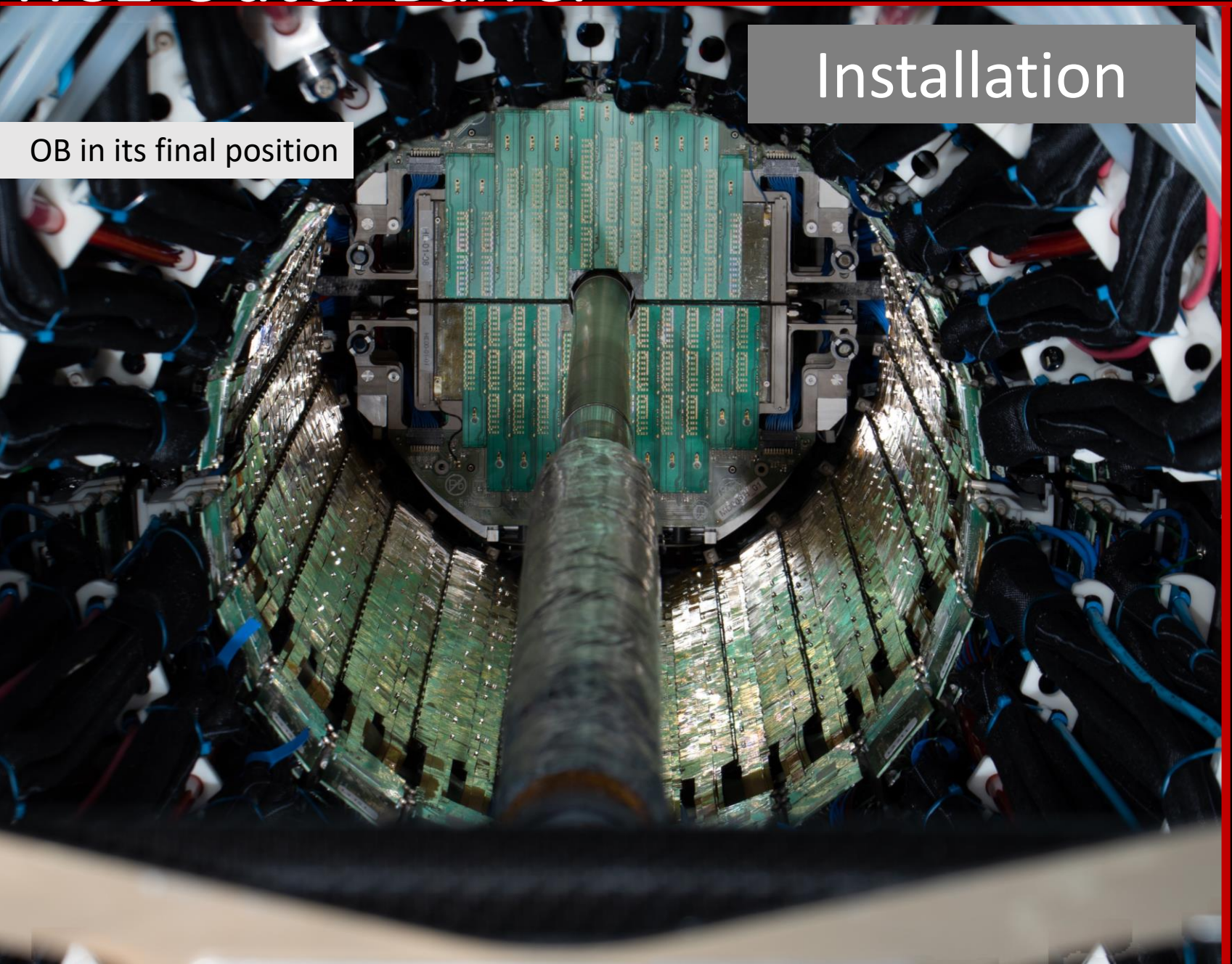
Minimum nominal gap 1.4mm

LESTAGE

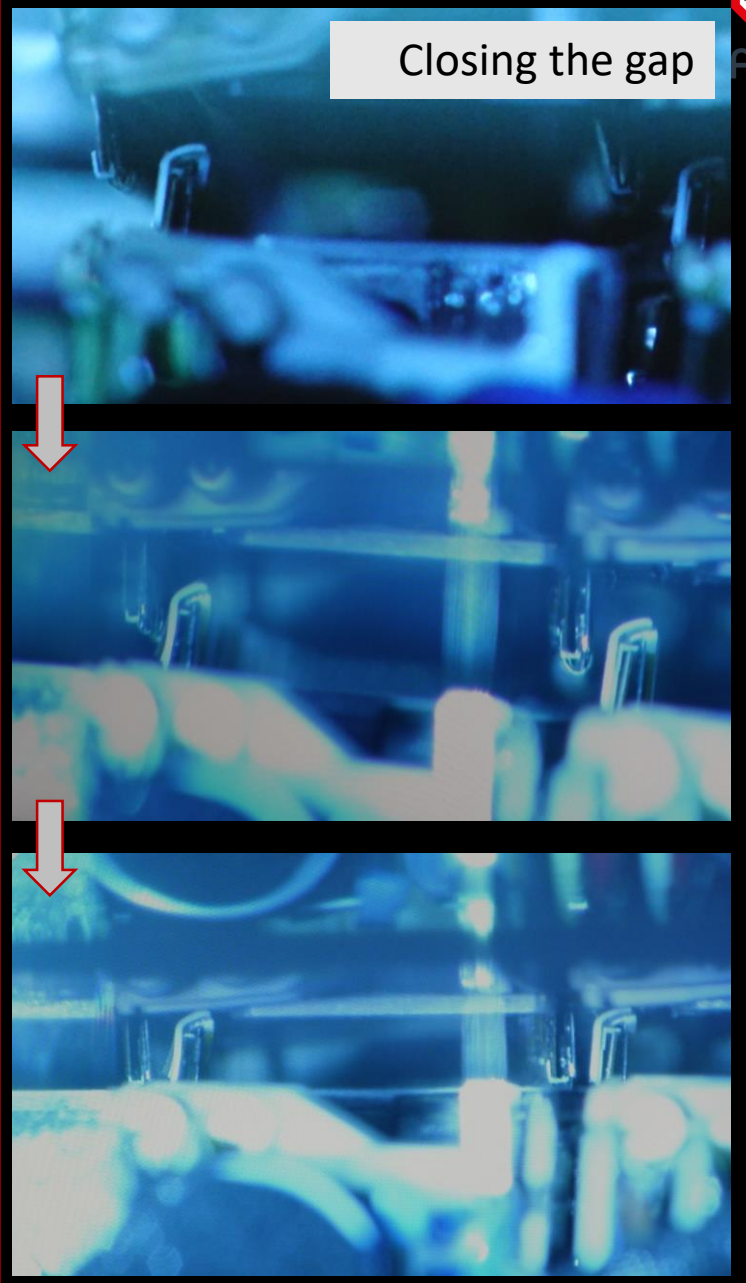
ITS2 Outer Barrel

Installation

OB in its final position

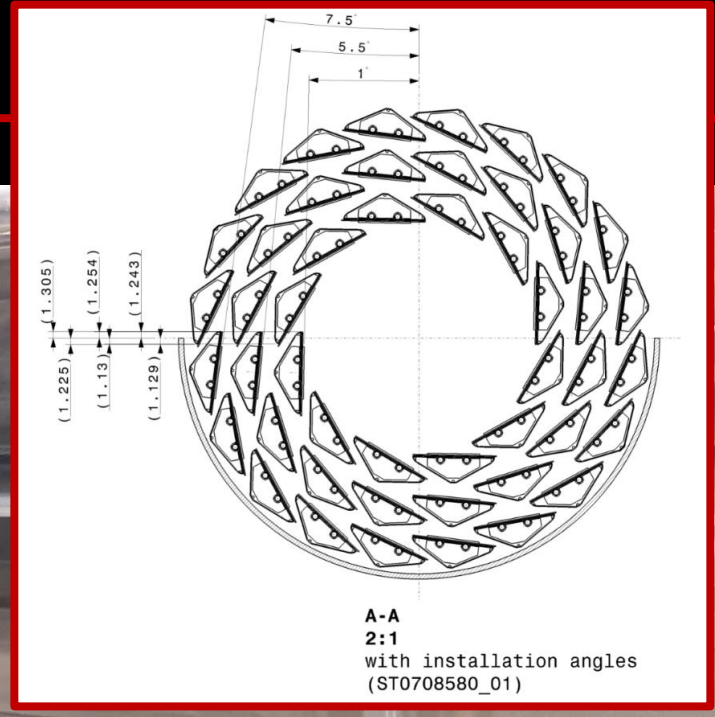


Closing the gap

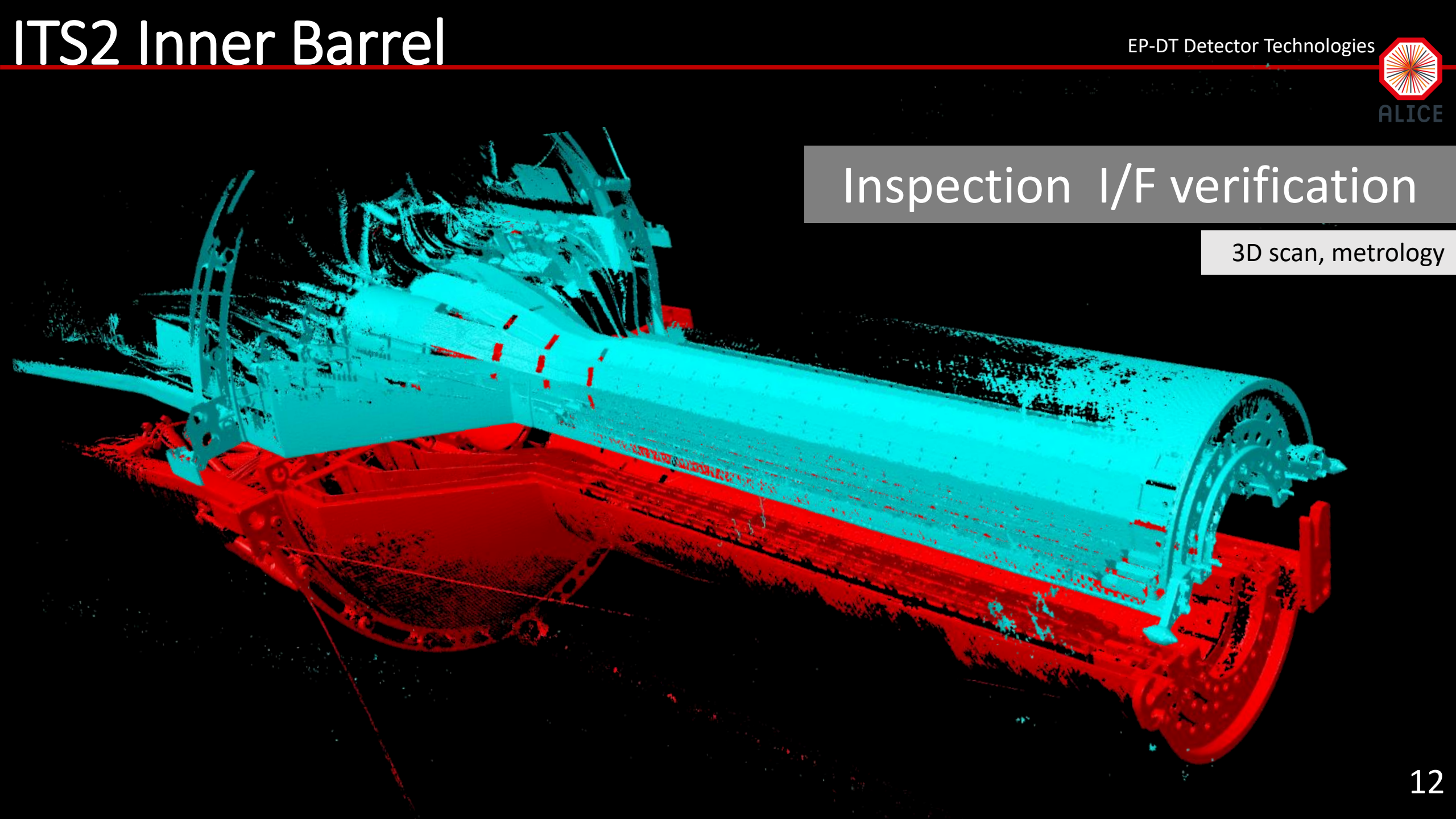


ITS2 Inner Barrel

Dry insertion test



ITS2 Inner Barrel

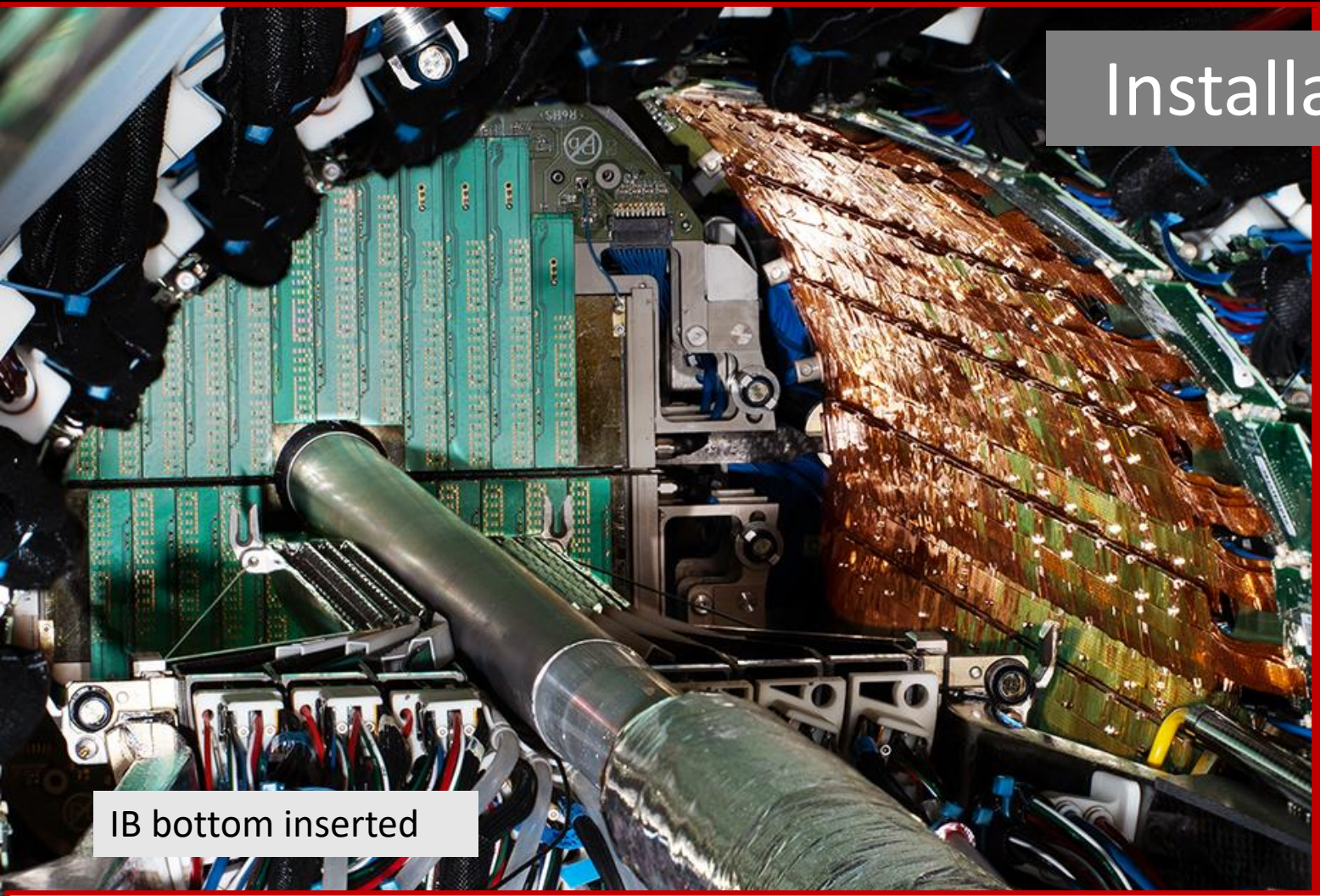


Inspection I/F verification

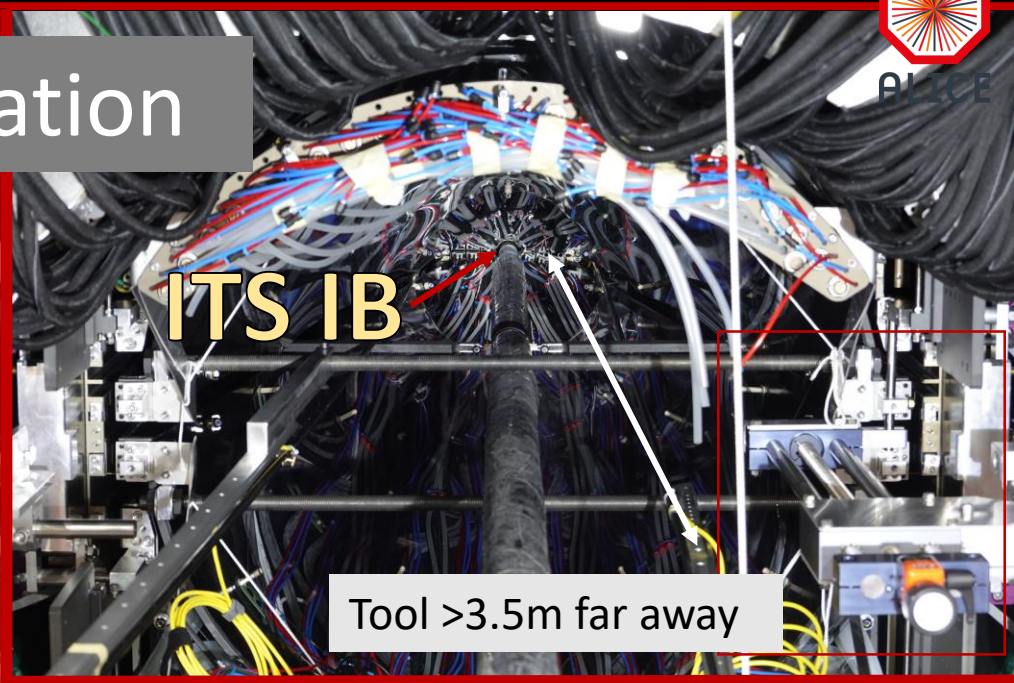
3D scan, metrology

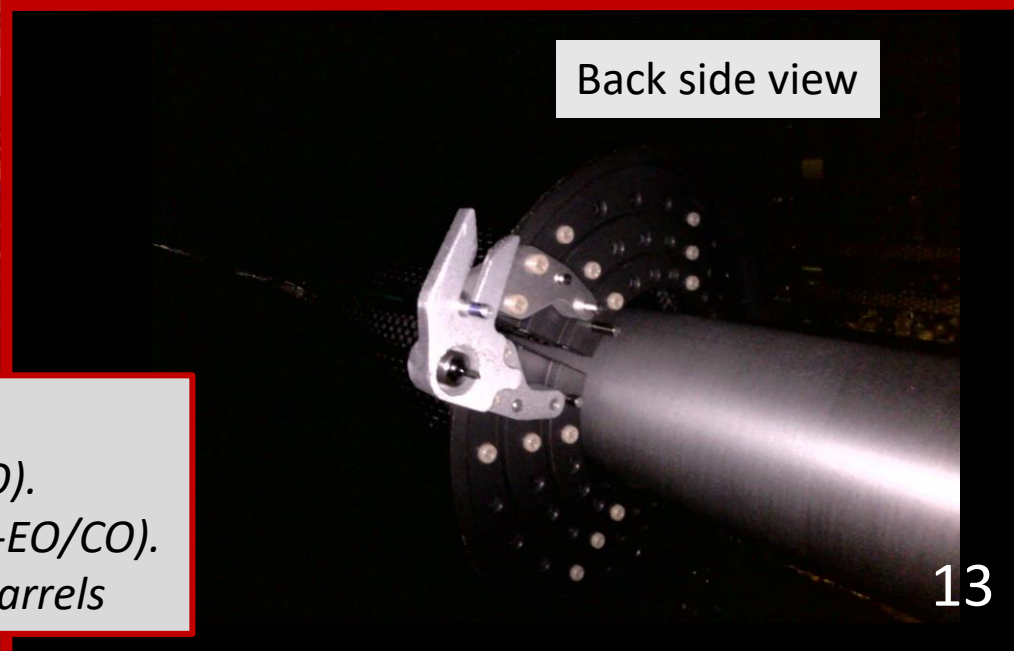
ITS2 Inner Barrel

Installation



IB bottom inserted



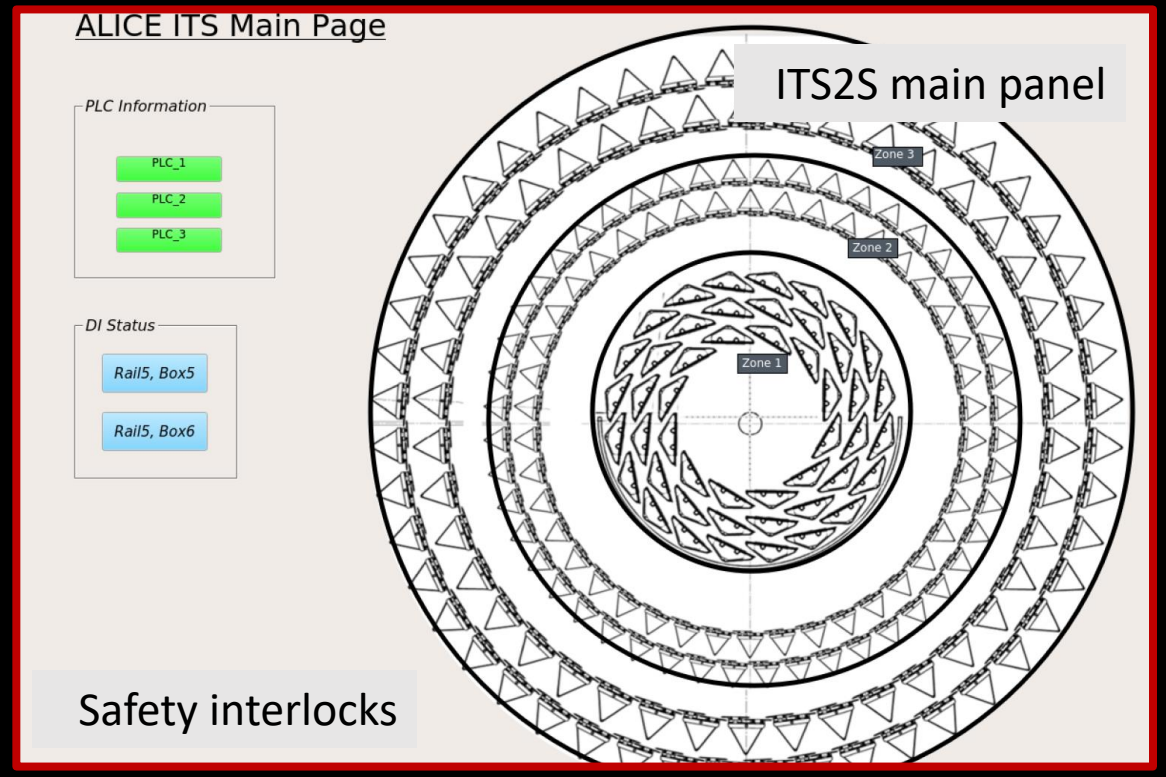


Back side view

EP-DT CONTRIBUTION TO ALICE: (ITS2 FOR RUN3)

Detector design and construction and pre-commissioning (EP-DT-DD/TP/EO/CO).
Development of the entire installation sequence around the beampipe. (EP-DT-EO/CO).
Installation in ALICE of the two ITS OB H-barrels followed by the two ITS IB H-barrels

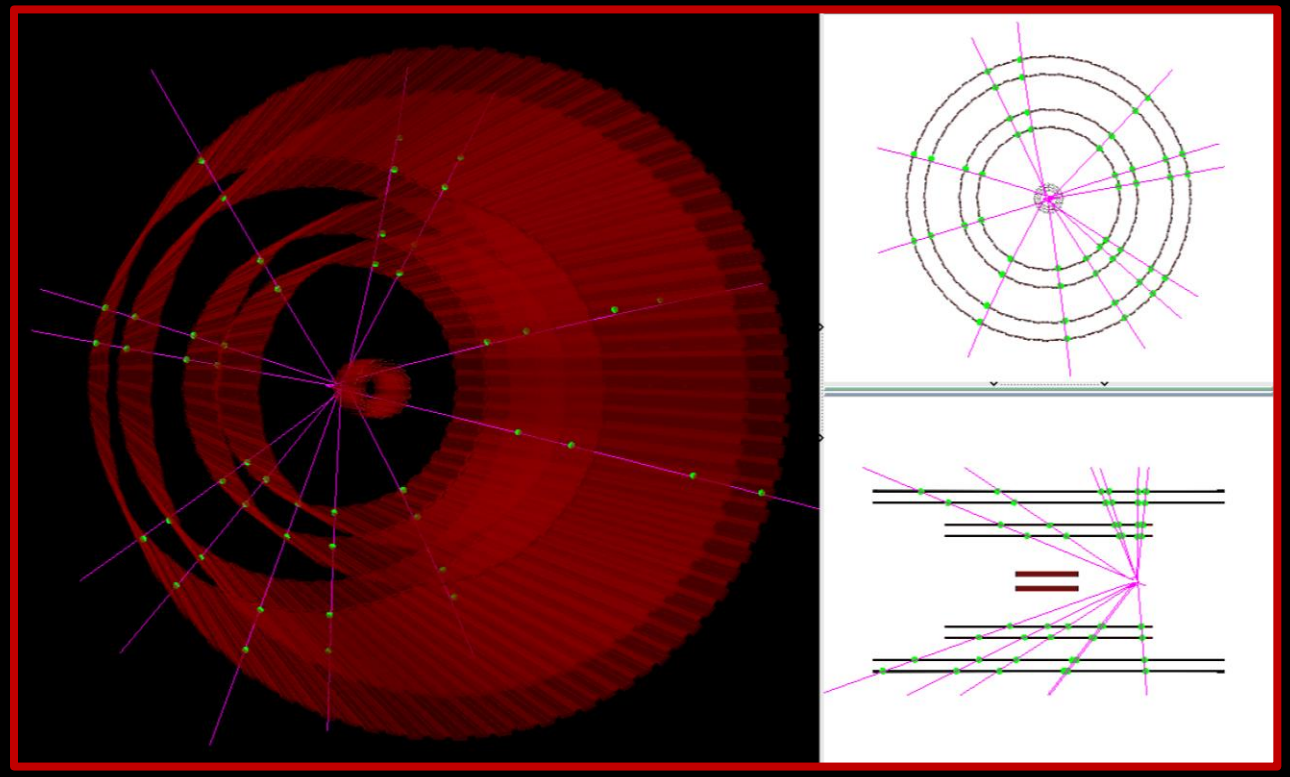
ITS2 safety system (ITS2S)



ITS2S main panel

Safety interlocks

1st Acquisition



First pp event reconstructed with ITS2

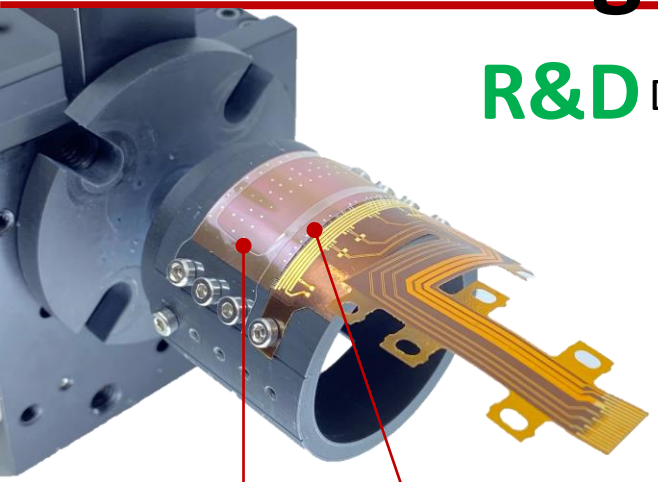
EP-DT CONTRIBUTION TO ALICE: (ITS2 FOR RUN3)

Safety system for the new ALICE ITS protected against over temperatures (EP-DT-DI)

Inner Tracking System 3 (ITS3) – LS3

R&D Directions towards unprecedented vertex minimum layers materials

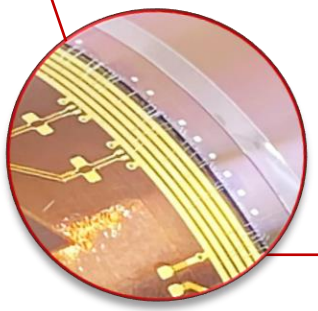
(unprecedented low material budget of 0.05%)



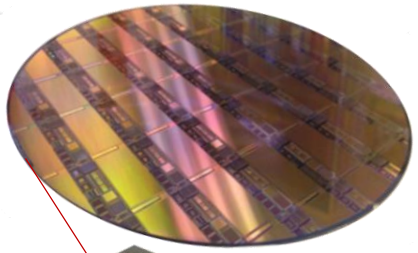
➔ minimum material support and gas cooling

L0 L1 L2

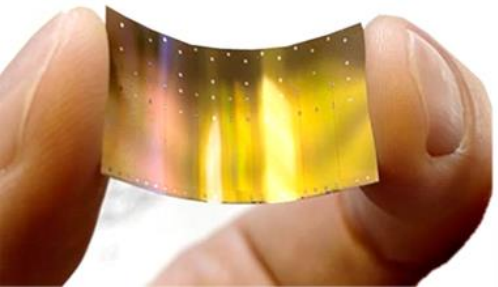
➔ Wire bonding
at the edge side



➔ Chip stitching



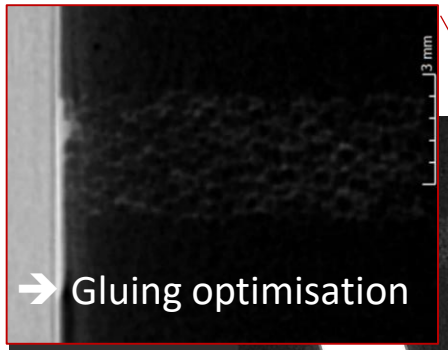
➔Curved Silicon sensors



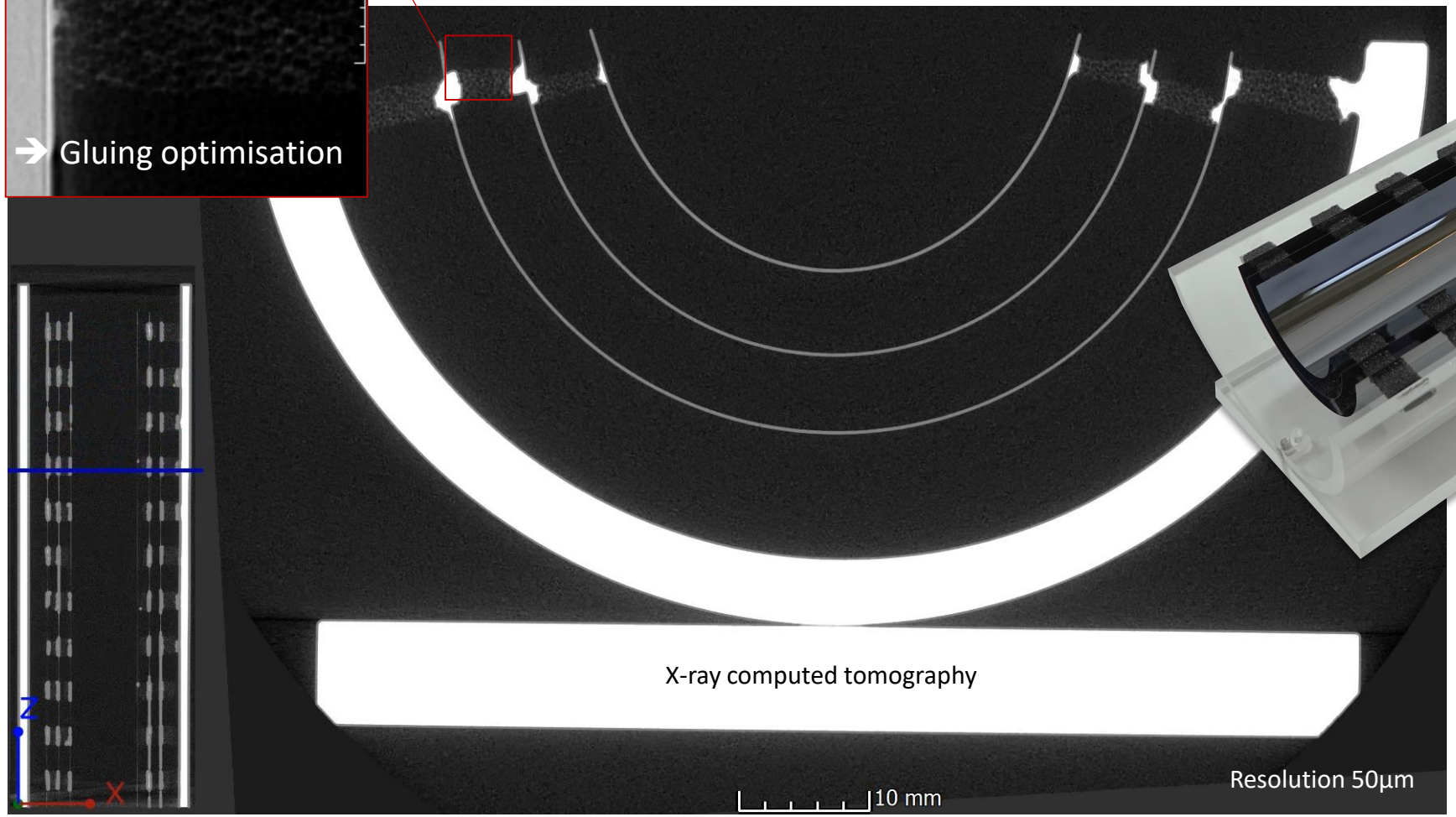
Inner Tracking System 3 (ITS3) – LS3

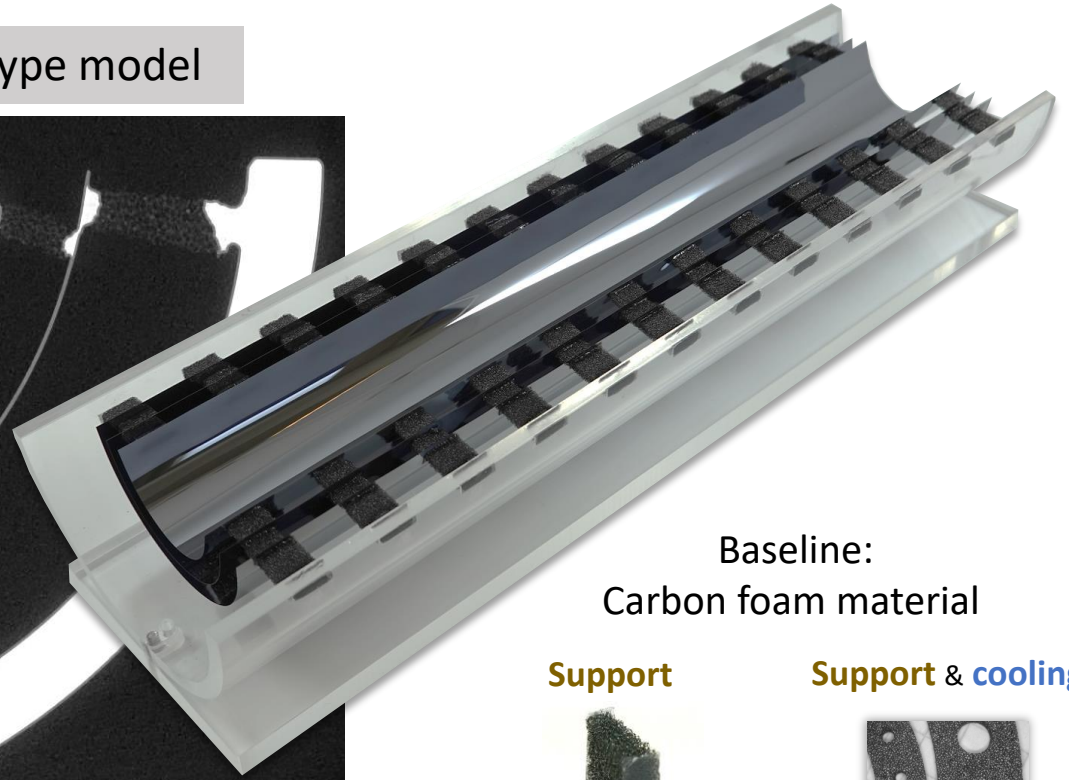
ALICE

Metrology assessment on the first prototype model



➔ Gluing optimisation





Baseline:
Carbon foam material

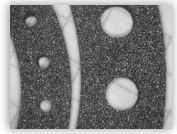
Support

ERG Carbon
@Duocel

ρ = 0.06 kg/dm³

K = 0.033 W/m·K

Support & **cooling**



Allcomp K9
Standard Density

ρ = 0.2-0.26 kg/dm3

K = >17 W/m·K

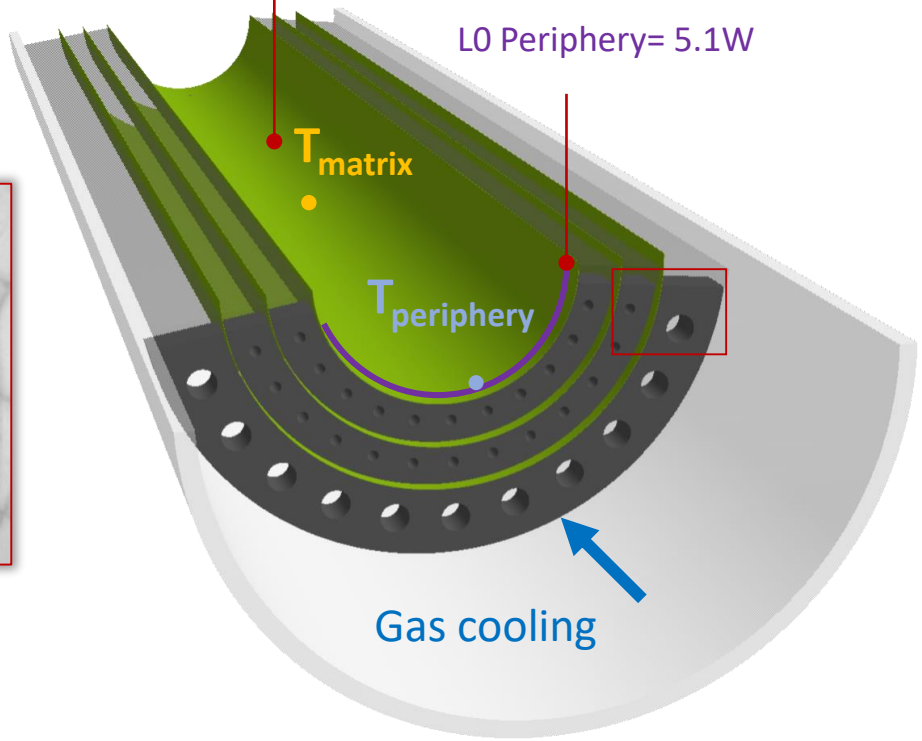
Inner Tracking System 3 (ITS3) – LS3

NEXT: wind tunnel thermal test of new dummy model with **carbon foam radiators**

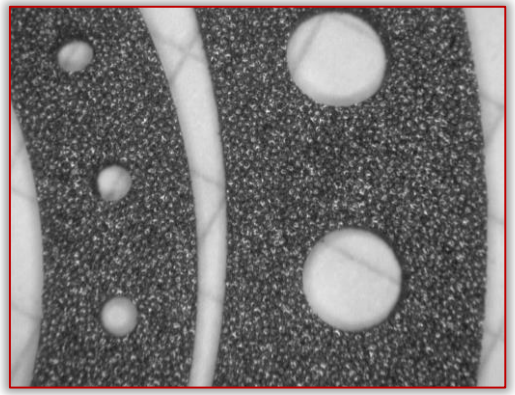
Heat dissipation is non-uniform

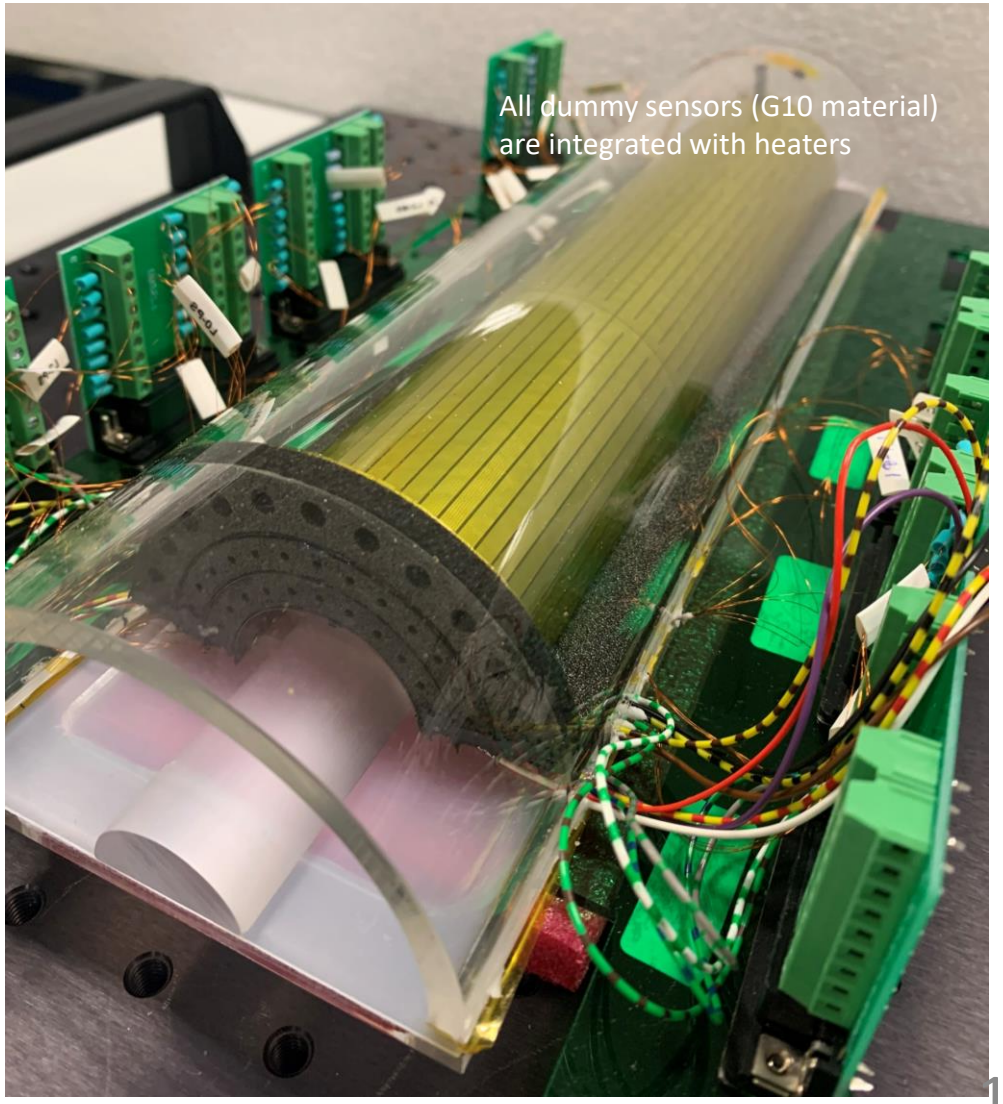
L0 Matrix= 1W

L0 Periphery= 5.1W



Allcomp K9 standard density





EP-DT CONTRIBUTION TO ALICE: (ITS3 FOR RUN4)

Development of the mechanics and cooling system of a novel vertex detector, the ITS3. (EP-DT-EO/CO, MPT, TFG lab)

Thank you for your attention