



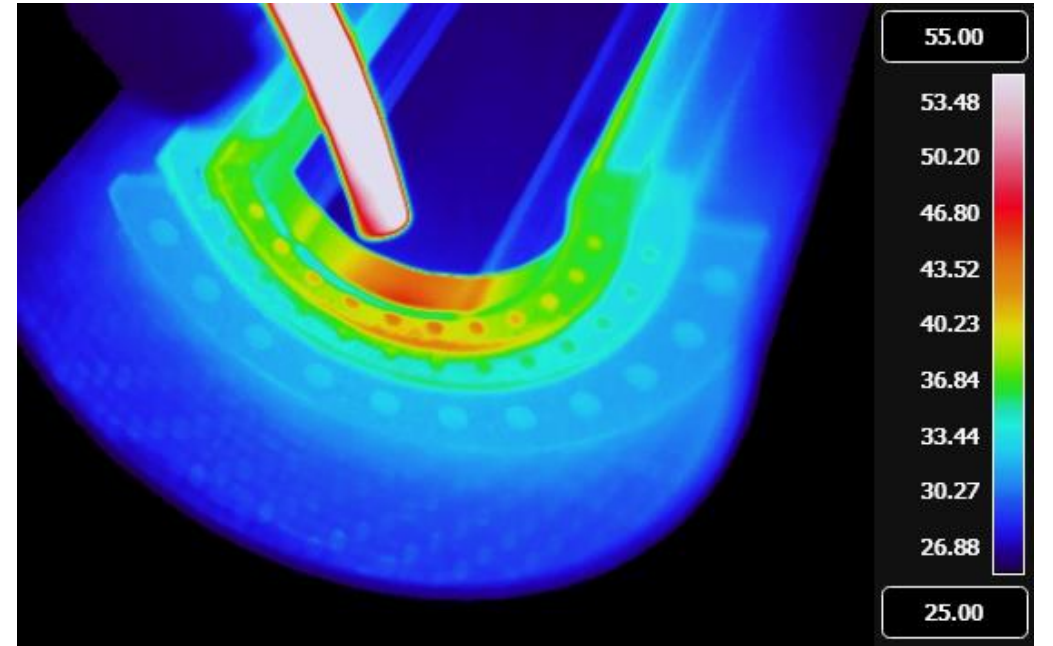
ALICE

ITS3

Tuesday 11th June 2024

WP5 progress report

WP5 collaboration





- Tests:
 - Thermoelastic test
 - Vibrational test
 - Particle realise test
- Status of the new Engineering Models

Investigate potential failure due to **differential thermoelastic expansion** among the half-layer components

Breadboard model
made of final-grade materials



Protective case
(avoid contamination in case of failure)



Thermal cycles

down to 10 °C
up to 50 °C
Humidity 30-40%

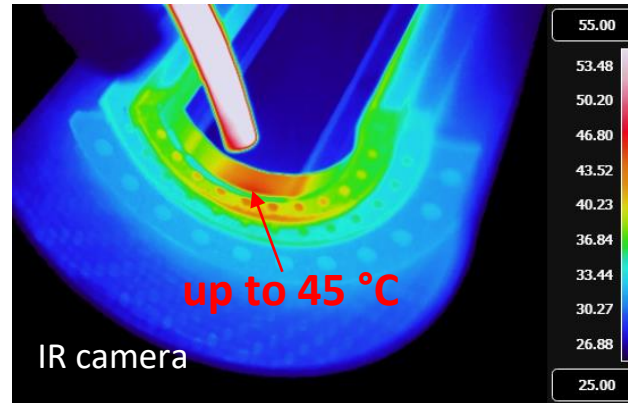
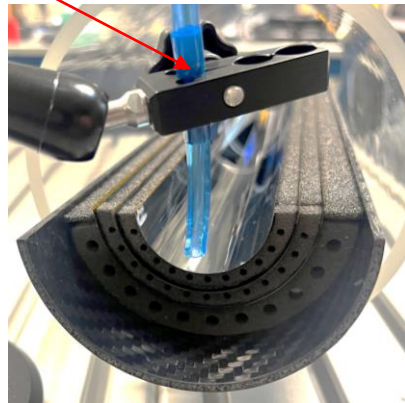
Climate chamber



Hot-spot testing

Heat gun

Localized heating to assess the effect of thermal gradient



Outcomes:

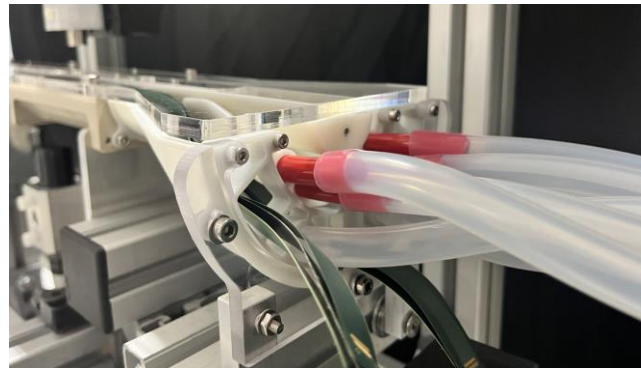
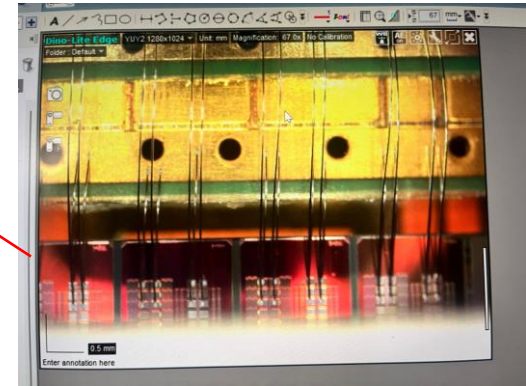
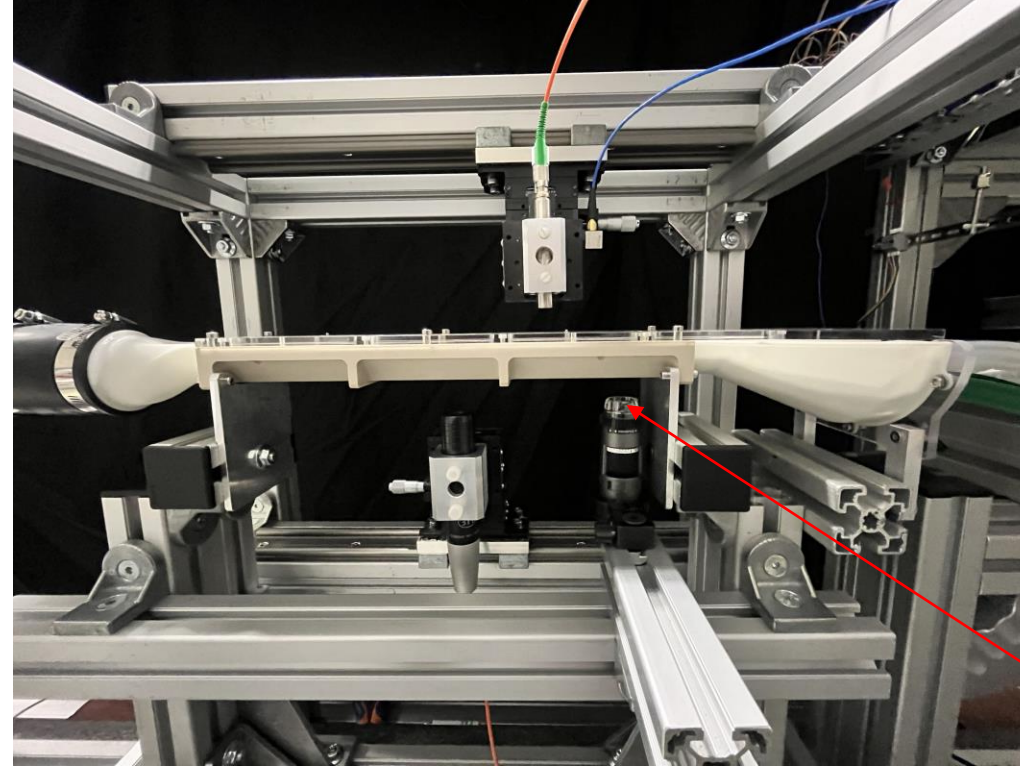
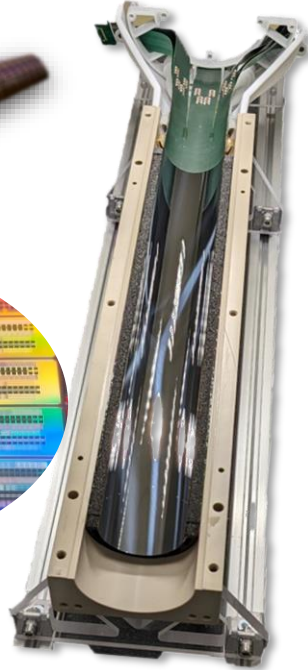
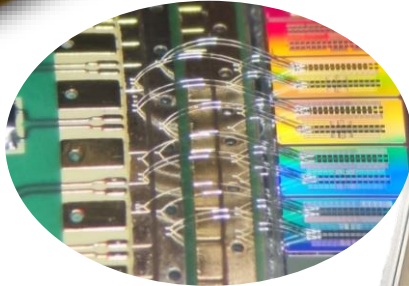
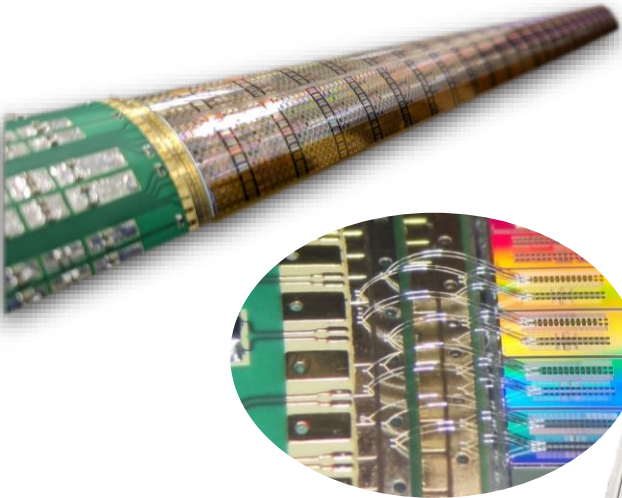
No thermoelastic failure within temperature range of 10-50 °C.

NEXT? Increase temperature range?

Investigate potential failure of wire bonding due to **vibration**, measure-natural frequencies and displacement of the Layer-0

BBM4

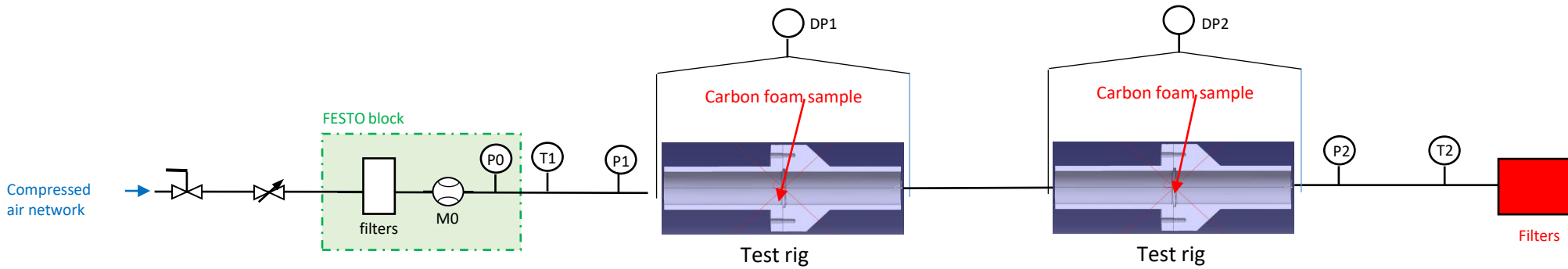
Wafer-size sensor integration,
FPC-sensor wire bonding,
Aeroelastic test



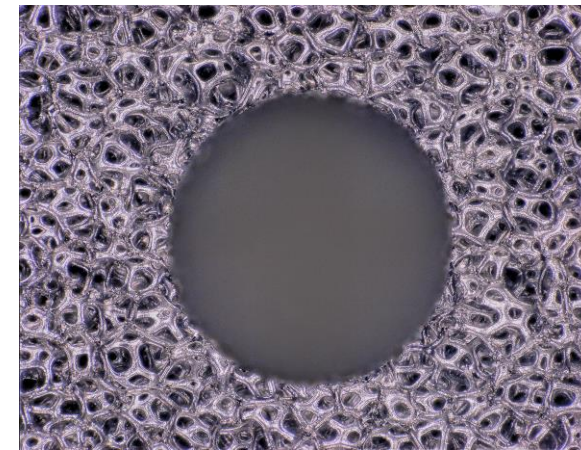
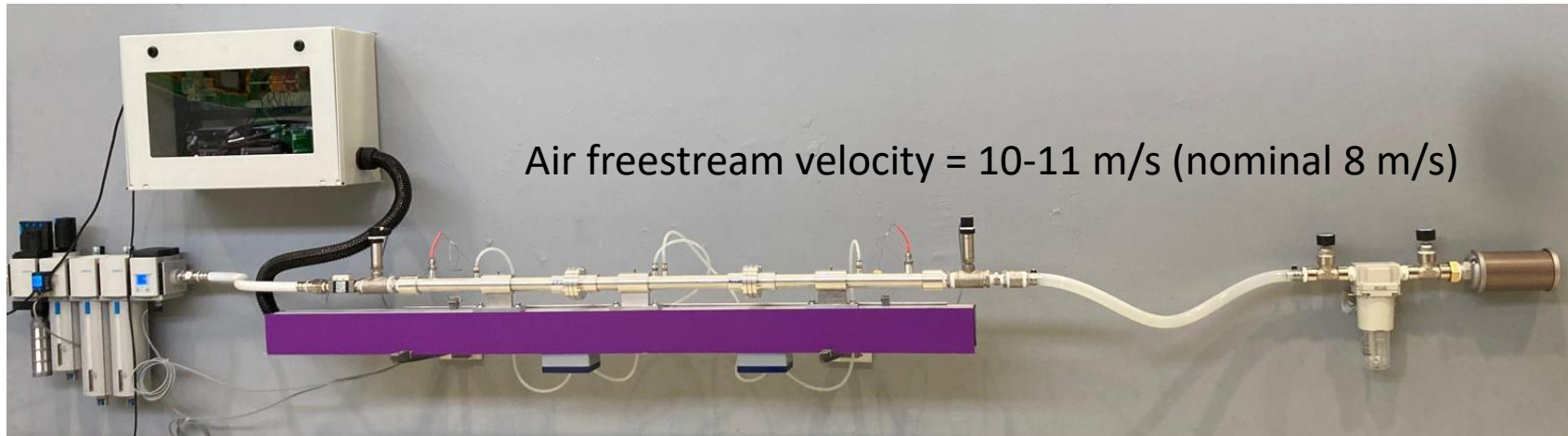
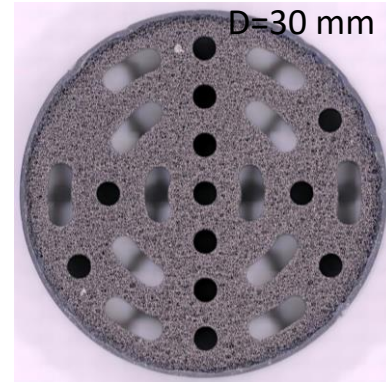
- BBM4 connected to the setup.
- Setup upgraded with microscope to visually inspect the wire bonding
- Test foreseen for Thursday 13/6

Investigate potential particle release and **potential degradation** of the holes/slots of the carbon foam

- Tests (2 weeks time) → inspection (visual, check of possible particle inside the vortex filter) → repeat test
- 2 samples : ERG and Allcomp



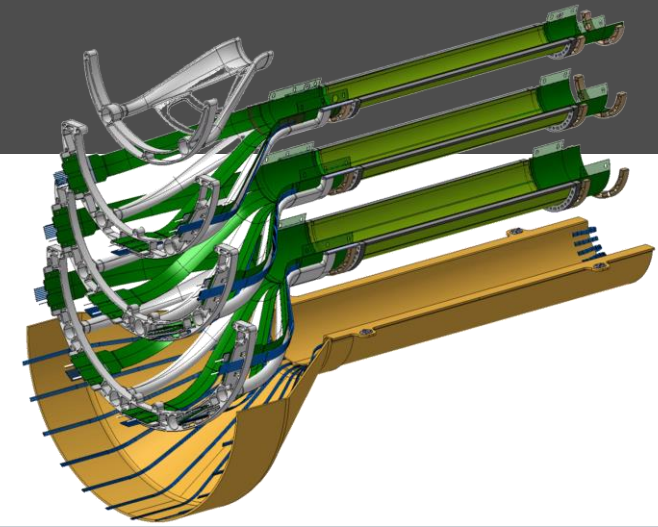
Visual inspection



- The release of particles due to the machining (approximately within the first hour of testing).
- No release of particles or potential degradation within a month of testing
- **The next visual inspections will be at monthly intervals.**

Before the QM assembly, a minimum of **3 additional Engineering Models (EMs)** will be constructed. These EMs aim to validate:

- The layout, including the electronics connections and the service interface
- The installation minimum clearances
- The final jigs and the assembly procedure

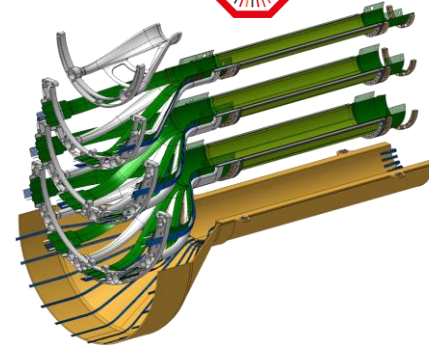


QM mechanics and jigs
EM finalised

ITS3 project schedule

PROJECT NAMES + TASK TITLES	START DATE	END DATE	# of mo.	2025												2026														
				25Q1			25Q2			25Q3			25Q4			26Q1			26Q2			26Q3								
				Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25	Aug 25	Sep 25	Oct 25	Nov 25	Dec 25	Jan 26	Feb 26	Mar 26	Apr 26	May 26	Jun 26	Jul 26	Aug 26	Sep 26						
Integration, Assembly & Installation	2023-12-15	2029-01-31	67	[Blue bar spanning from Jan 2025 to Sep 2026]																										
QM Assembly of ER2 half-barrels	2025-07-01	2025-10-30	4	[Blue bar from Jul 2025 to Oct 2025]																										
QM assembled	2025-08-31	2025-08-31	0	[Green bar from Aug 2025 to Aug 2025]																										
QM assembled	2025-10-01	2025-10-01	0	[Green bar from Oct 2025 to Oct 2025]																										
QM Verification cooling, powering, readout	2025-09-01	2026-01-31	5	[Blue bar from Sep 2025 to Jan 2026]																										
FM Assembly of 4 half barrels	2026-07-01	2026-11-30	5	[Blue bar from Jul 2026 to Nov 2026]																										

*The name are temporary. they might change depending on the prototype that can be produced first.



	EM3	EM4	EM5
Details:	<ul style="list-style-type: none"> - it integrates ER1 chips. - not nominal dimension, shorter length (~260mm) 	<ul style="list-style-type: none"> -It integrates Blank Si -Nominal dimensions (l=266mm) 	<ul style="list-style-type: none"> -Blank Si+Cr dep. - Nom. Dimension
Purpose:	<ul style="list-style-type: none"> -ER1 chip implementation - Wire bonding 3 layers - Qualif. jigs and the ass. proced. 	<ul style="list-style-type: none"> - “Installation” tests - Qualif. jigs and the ass. proced. 	<ul style="list-style-type: none"> - “Installation tests” - Wire bonding 3 layers
JIGS	Ready (@Rene)	Ready (@Rene)	Ready (@Rene)
Sensor	1 month tentative (@Magnus)	Ready	Ready for end of July (@Massimo)
PEEK half-rings	<1 month	<1 month	<1 month
Air distributors	<1month	<1 month	<1 month
Carbon foam parts	Prod. ongoing	Prod. ongoing	Prod. ongoing
FPC (dummy)	1 month tentative tbd (@Antoine\Magnus)	1 month tentative tbd	1 month tentative tbd
CYSS	End of July	After July	After July



*The name are temporary. they might change depending on the prototype that can be produced first.

EM3

Details:

- it integrates ER1 chips.
- not nominal dimension, shorter length (~260mm)

Purpose:

- ER1 chip implementation
- Wire bonding 3 layers
- Qualif. jigs and the ass. proced.

EM4

- It integrates Blank Si
- Nominal dimensions (l=266mm)

- “Installation” tests
- Qualif. jigs and the ass. proced.

EM5

- Blank Si+Cr dep.
- Nom. Dimension

- “Installation tests”
- Wire bonding 3 layers

