HIMB Progress Update – Long Shutdown 2028-2029

Beam Instrumentation

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Beam Instrumentation, Proton Beam (TP03)
PSI, October 28th, 2026

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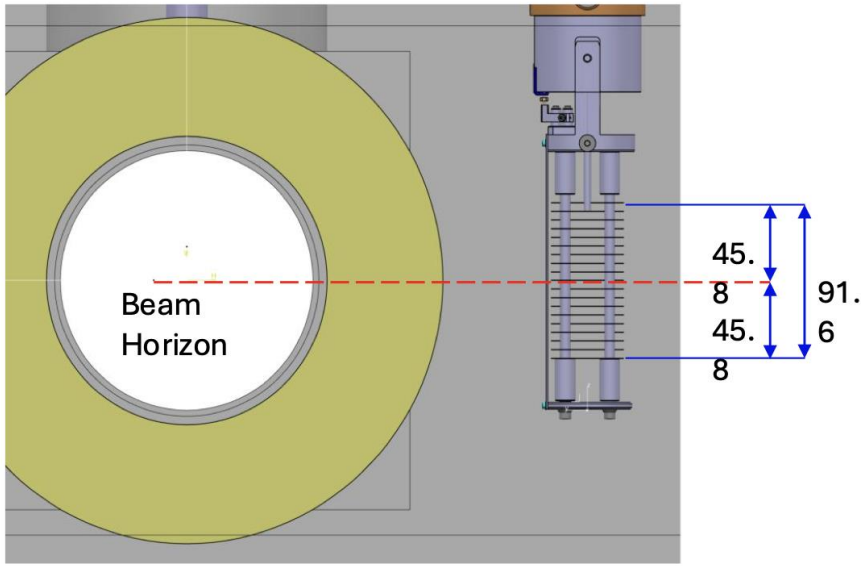
In-Shielding Ionisation Chamber: MHI11

1 Measurement of the beam loss.

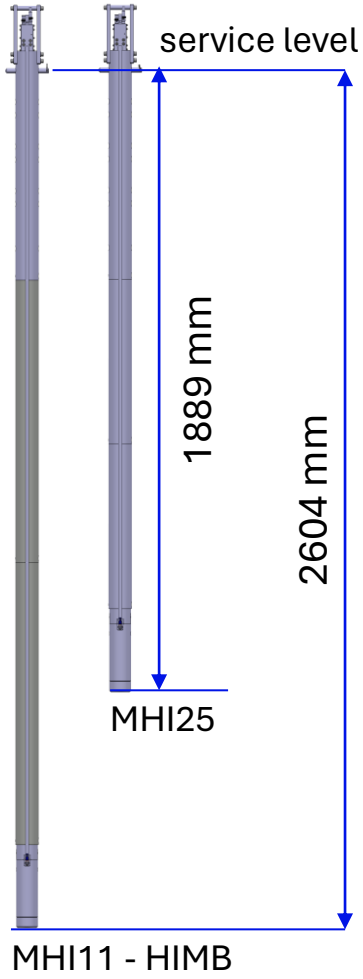
2 Similar to MHI25, larger.

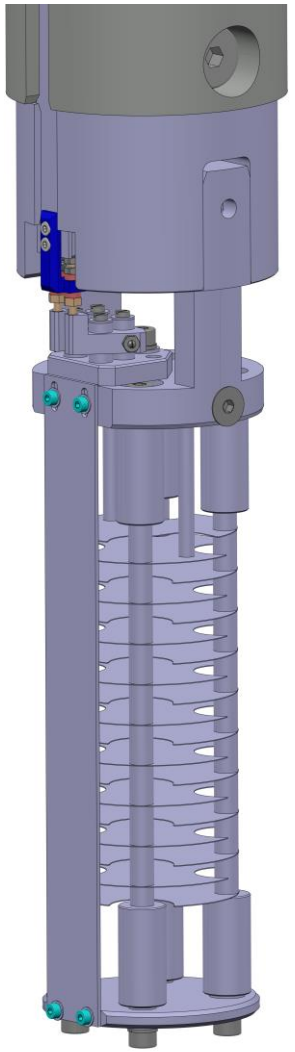
3 Electronics: SoM-CAM
+ mezzanine HV4.

4 Status: ready for testing





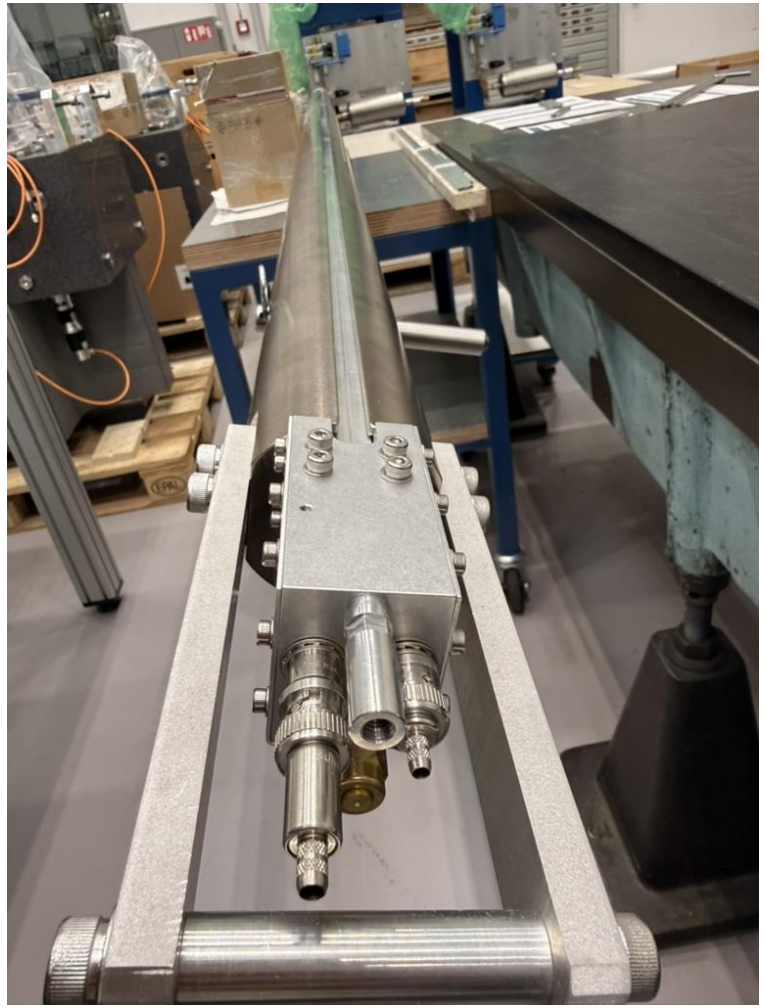




In-Shielding Ionisation Chamber: MHI11

1 Picture from PiA workshop on Monday.





PSI

In-Shielding Profile Monitors: MHP/S23/24 and MHP/S23B/24B

1 Measurement of beam profile (MHP) and beam position (MHS).

2 New, modular design, tested as MBPT (since 2022) and MHP/S45/46.

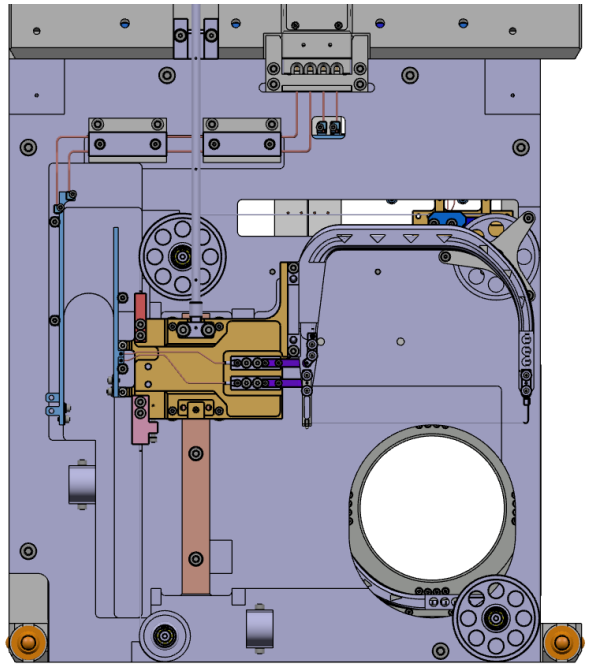
3 Electronics based on the SoM-CAM system, a new motor controller, and DBPM3-HIPA platform for MHS (Boris Keil: on time)
(MESON system as a fallback solution).

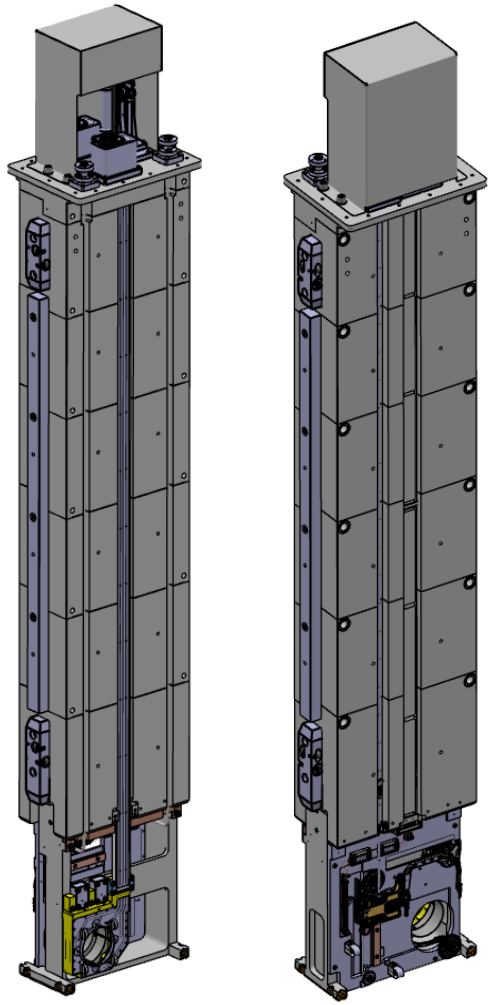
4 In production including spare parts.

5 Complex devices, 2 months for assembly and testing (each).

6 Final assembly in the Montagehalle
– monitors are long and heavy.

7 Movement calibration and testing
- in Experimentalhalle.





In-Shielding Profile Monitors: MHP/S23/24 and MHP/S23B/24B - Status

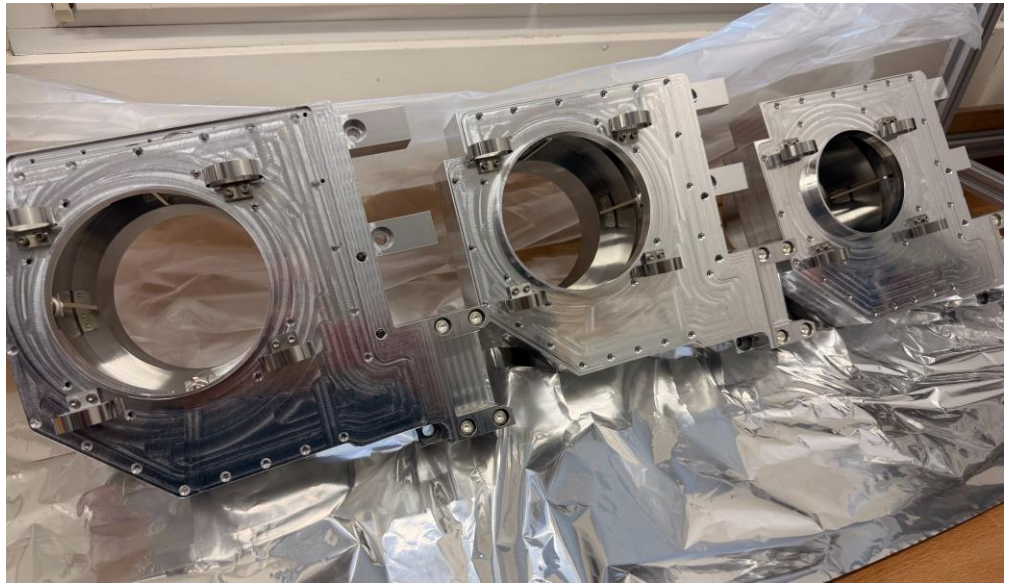
- All components in PSI

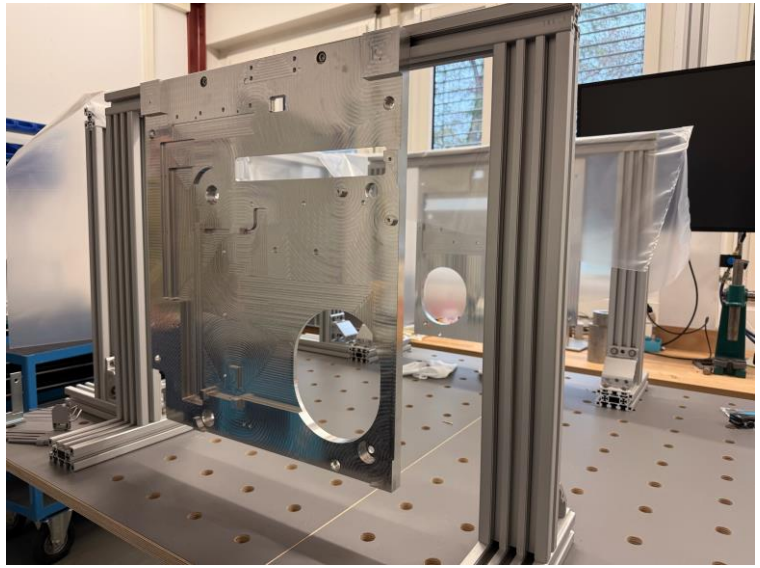
  (3 monitors including one spare).
- BPM assemblies are ready.
- Working on assembly of monitor heads.

  Ready by end of the year.
- BPM signal rail assembly will take until

  February (depending on shutdown works).
- Testing with SoM-CAM and new motion

  solution: summer next year.





4-segment aperture foil: MHBEI

1 Measure beam centering in front of KHHEI.

2 Mechanically a part of KHHEI.

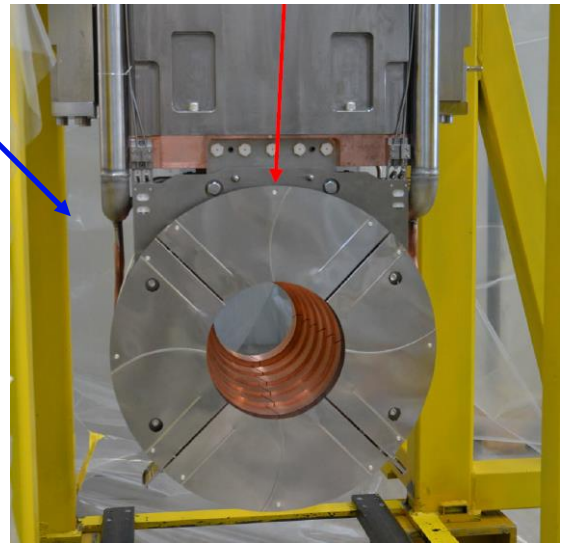
3 Electronics: SoM-CAM.

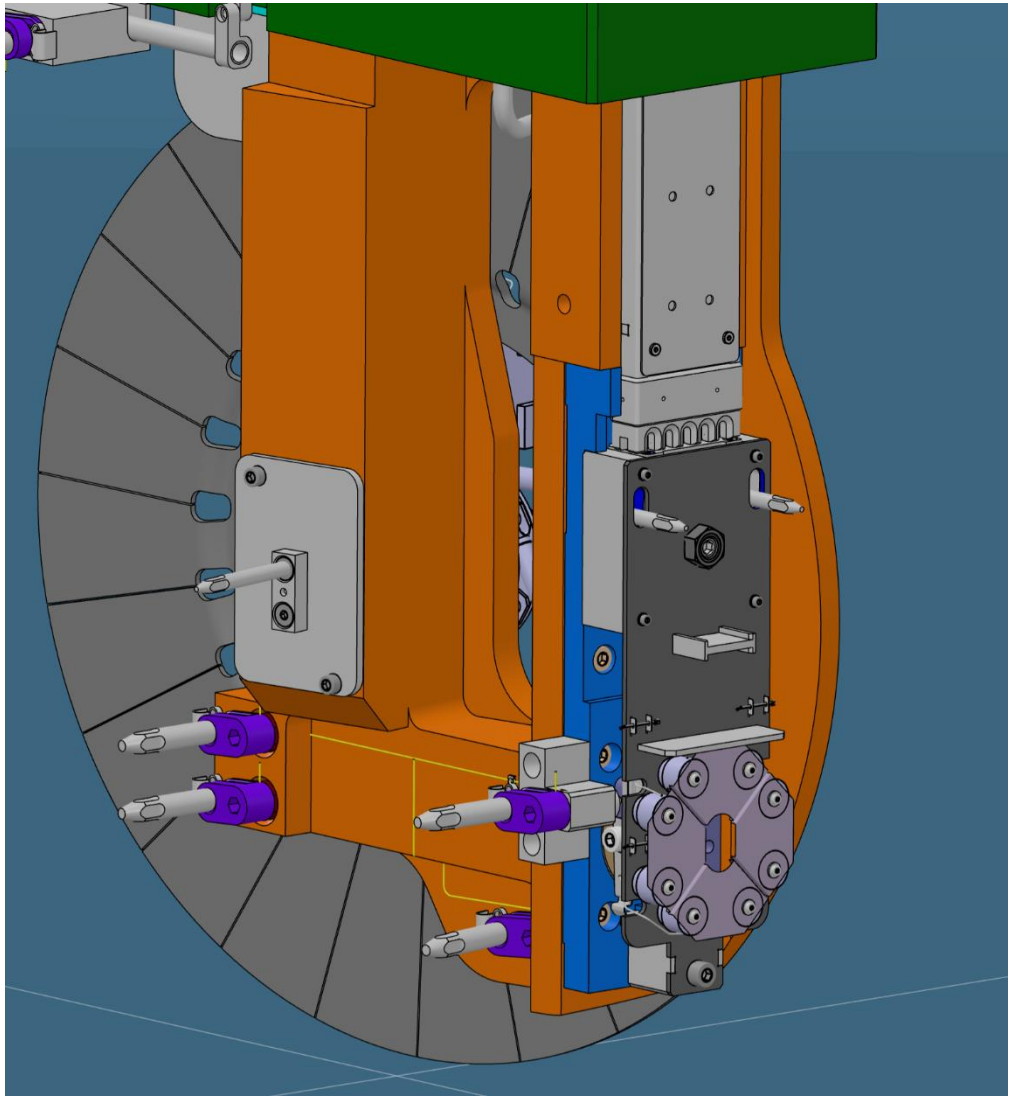
4 Foil thickness: 50 µm, Molybdenum.

5 Not yet in production.

6 Similar aperture foils exist in HIPA e.g. MHB7.

7 Status: target design in optimization, nothing ordered yet.





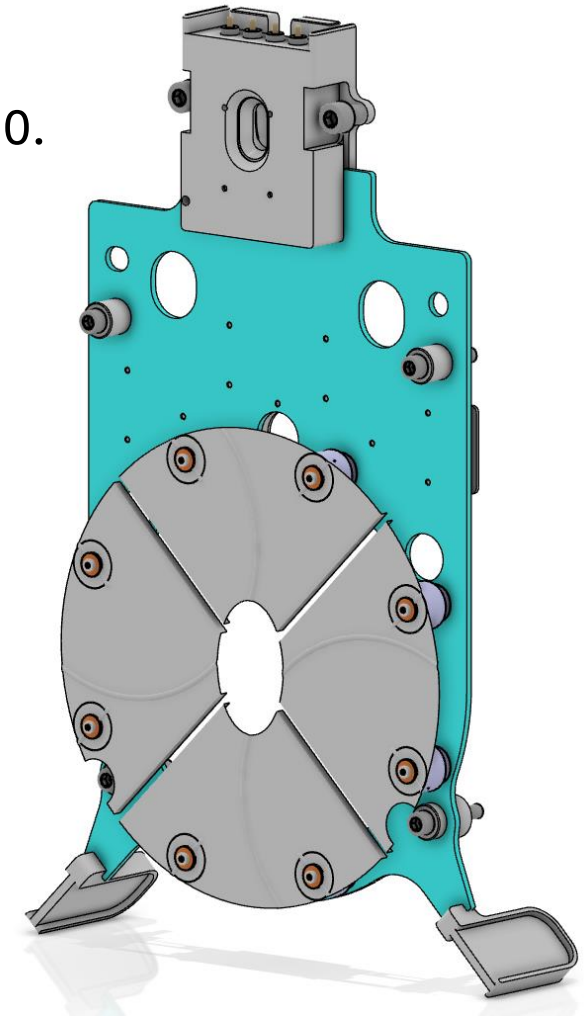
4-segment aperture foil: MHB0

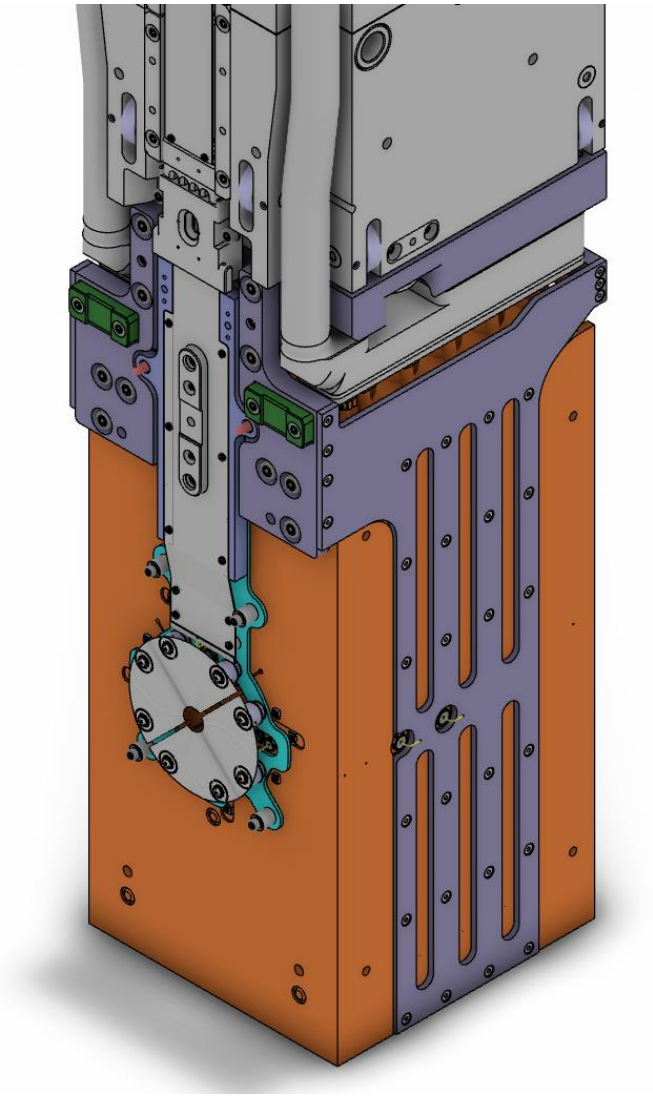
1 Measure beam tails/position in front of KHH0.

2 Electronics: SoM-CAM.

3 Foil: 50 µm Molybdenum.

4 Parts in production.





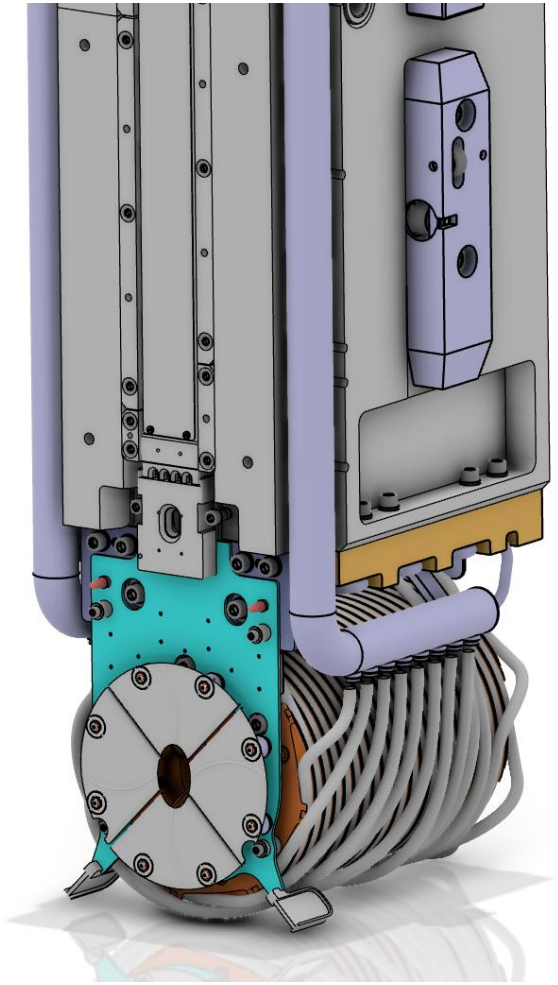
4-segment aperture foils: MHB1 and MHB2

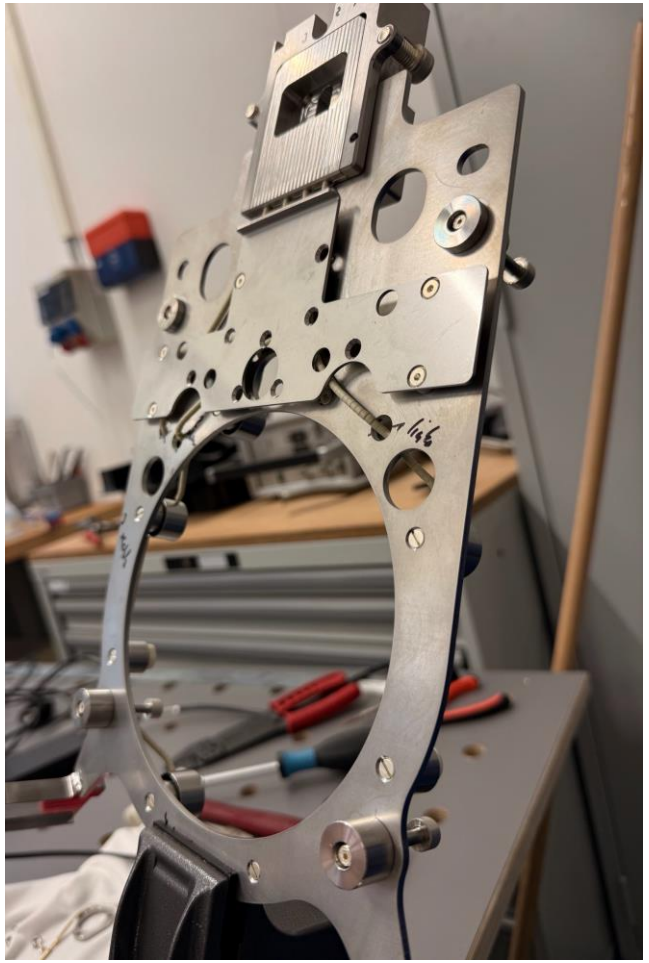
1 Measure beam tails/position in front of KHH1 and KKH2.

2 Electronics: SoM-CAM.

3 Foil: 100 µm Molybdenum.

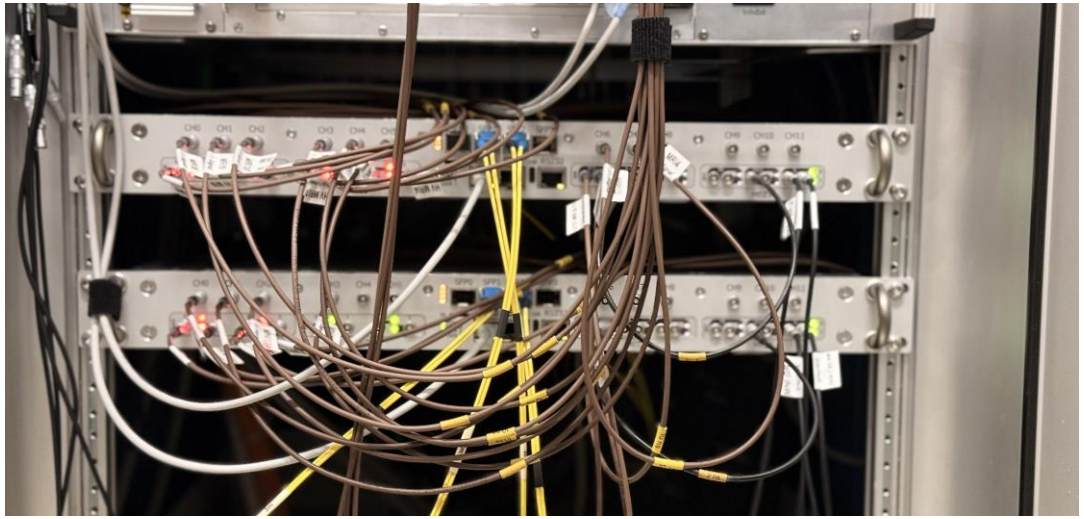
4 Status: assembly almost finished, need to test how electrical connections behave during the replacement procedure.





SoM-CAM project status

- SoM-CAM – in-house, standalone current acquisition module to replace 40-years old CAMA.
- ECMC motor drivers and controlers - needed for wire scanners, radial probes, slits and collimators.
- We have 5 SoM-CAM v.1 devices:
  - Two SoM-CAM ver. 1 in operation, 12 channels.
  - One SoM-CAM ver. 1 used for test-run of fast wire scanner in 870 keV beamline.
  - Others in the labs.
- 15 SoM-CAM ver. 2 produced, waiting for tests.
- Firmware for HIMB aperture foils and MHI11 - OK
- Firmware for HIMB wire scanners – needs development and testing.



Other works during Long Shutdown 2028

- Replace some of the wire scanners at 870 keV beamline with newly-developed, much faster devices we call Oscillating Arm Wire Monitors (OAWM).
- Regular maintenance works.

Summary

1. HIMB beam instrumentation has some delays but in general is on-track for shutdown 2028.

2. In-shield Wire Scanners require significant time for assembly and tests.
   .
3. Readout and control electronics, based on SoM-CAM, mezzanine cards and motion controllers:
   - Started deployment in HIPA.
   - Ready for MHI11 and aperture foils.
   - Need more development and testing for wire scanners.

4. Long shutdown HIPA Reneval work: replacement of selected legacy wire scanners on 870 keV beamline with high-speed Oscillating Arm Wire Monitors.

Acknowledgements

Special thanks to: Stephan Hirt, Martin Roher and Simon Lindner,

Additional slides

Oscillating Arm Wire Monitor (OAWM)
MDP1/2, MDP3/4 and HIPA 870 keV

1 Prototype tests successful in the lab, it can easily drive at 4 m/s.

2 Installation in CW for beam tests during Shutdown 2026. Initial results OK!

3 Design and testing: Martin Rohrer,
Rudolf Doeling, Simon Lindner

