



n_TOF Technical Report at the 75th INTC Meeting

Oliver Aberle, n_TOF Facility Technical Coordinator, SY-STI-TCD

08/11/2022

Main works during YETS 23/24

■ ***TT2A***

- General Maintenance
- Endoscopic magnet checks
- Installation of new SEM grid detector head (larger aperture, more channels)

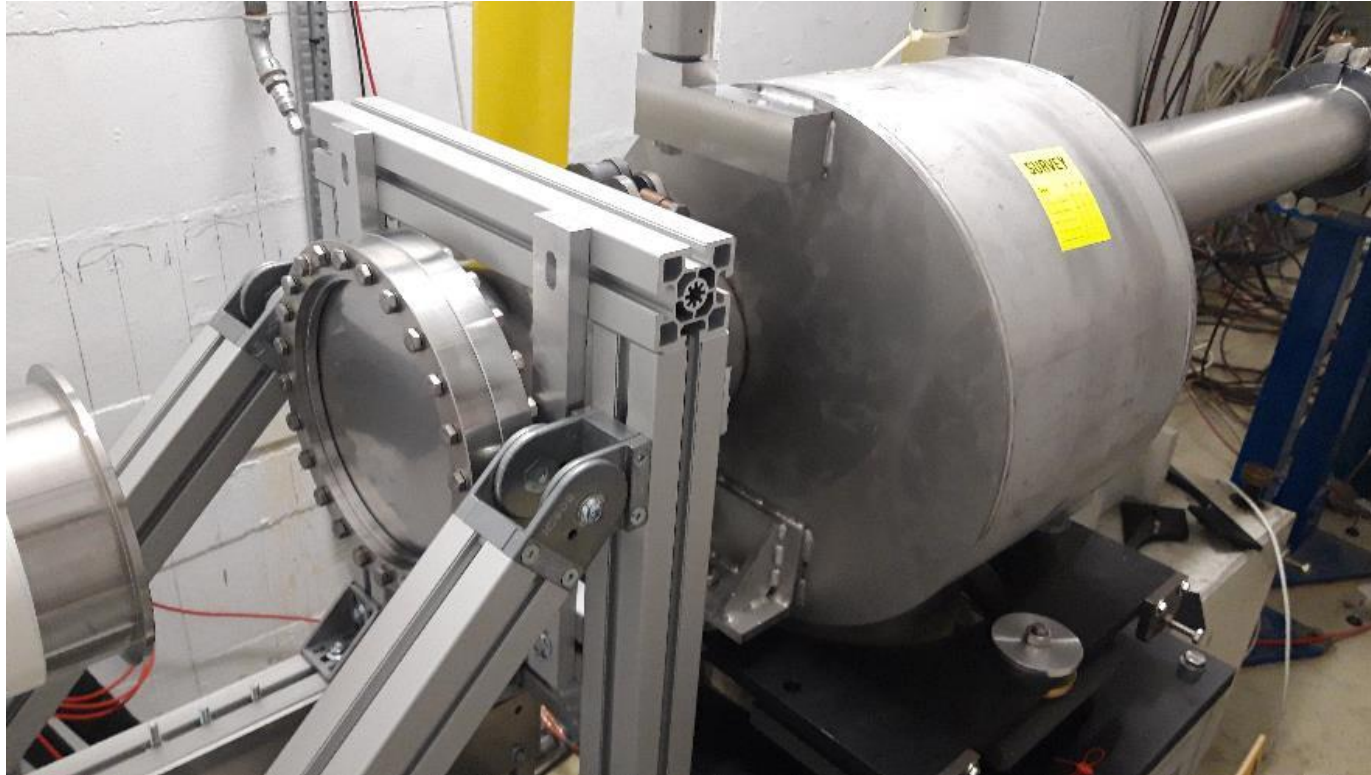
■ ***Target***

- Cooling station safety improvement (extend under pressure confinement to the entire station + additional retention vessels for the moderator skids, as requested by the tripartite)
- Target #2 autopsy and waste packaging in the ISR8
- Near activities with open target shielding (R2M)

■ ***Critical Path:***

- EN-CV works period :
14th of November-21st February (n_TOF water circuit stopped)

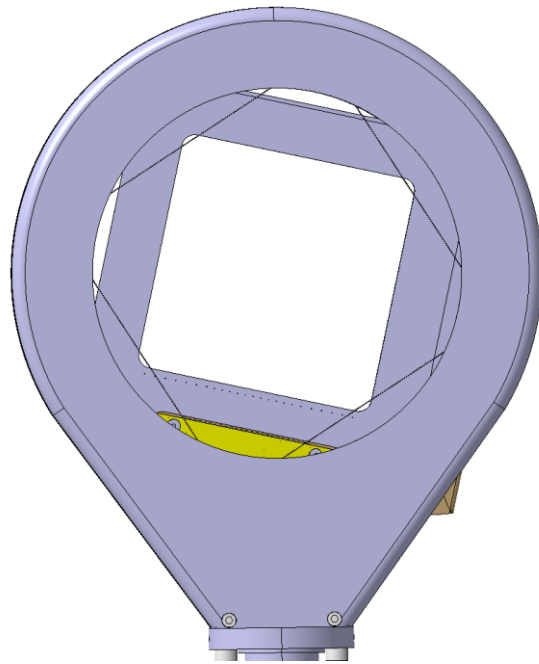
SEM grid in the FTN line



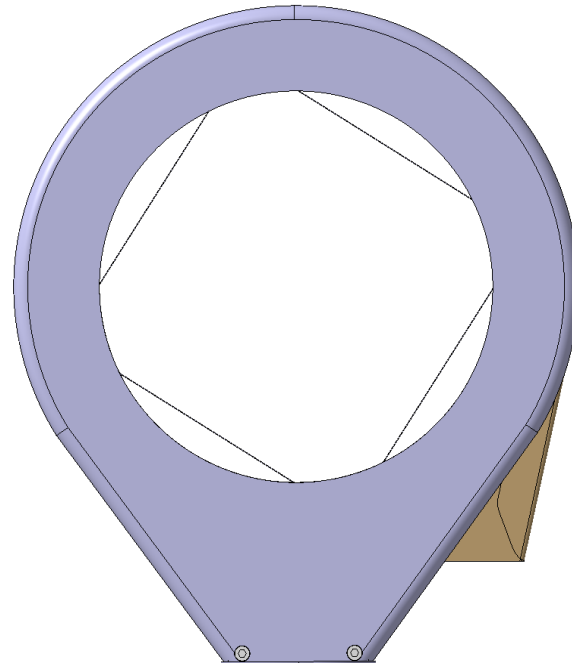
Increased diameter DN160 to DN 200 to reduce losses, additional wires and independent read out in the two planes

Upgrade of the Wire Grid System in FTN.BSGF484 to the Enlarged Aperture Version

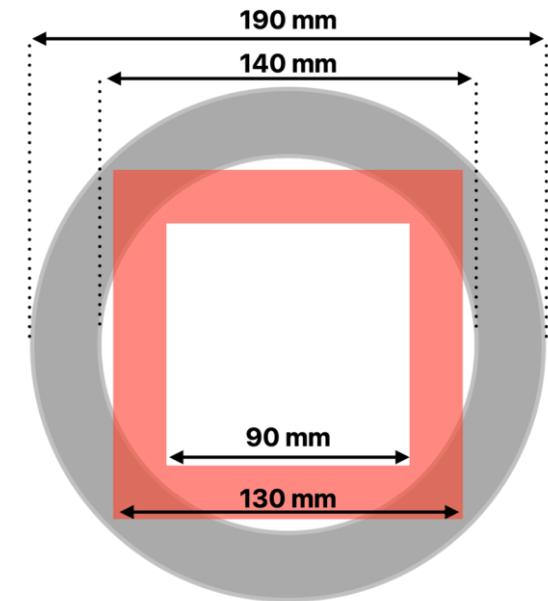
[EDMS 2958701](#)



Left: old design (SPSBSAPB0030)

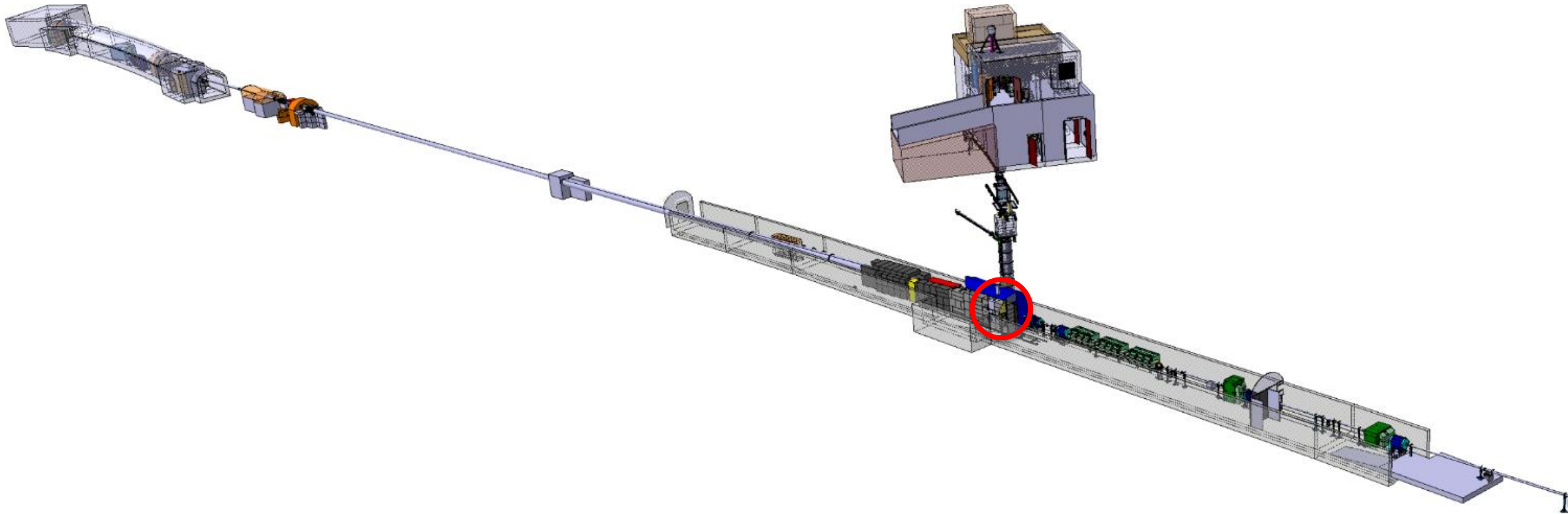


Centre: new design SPSBSAPB0064



Right schematic overlap of the old (red) and new (grey) aperture, illustrating the increased clearance for the beam passage.

n_TOF target

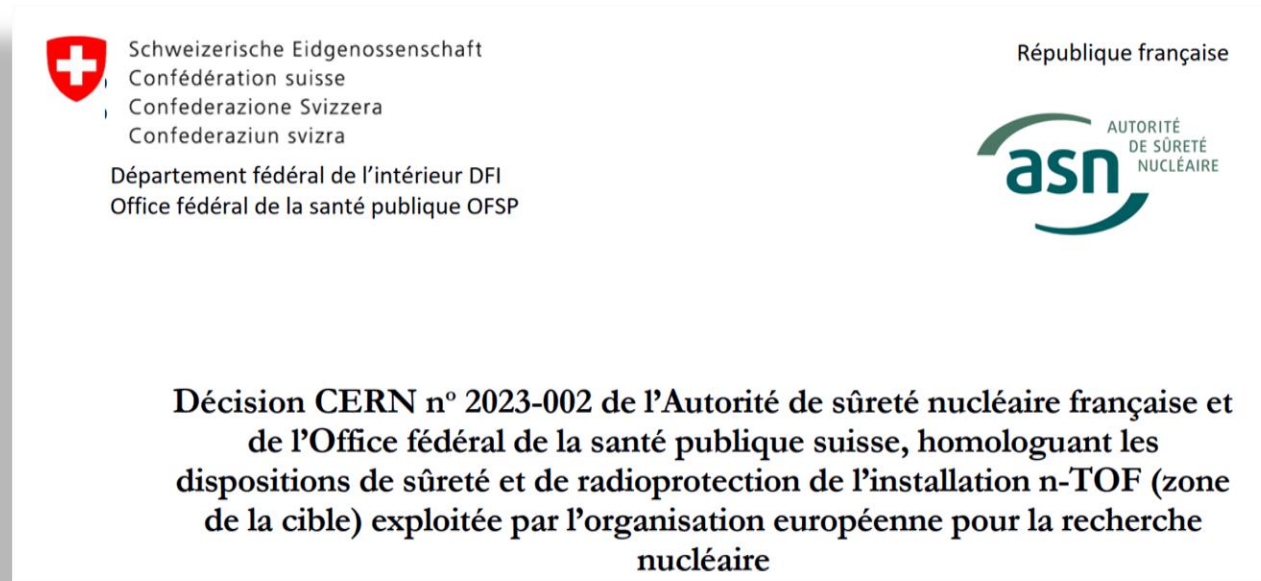


n_TOF spallation target #3

- First beam on target received on 19th July 2021
- Work on optics and proton line modifications, defined setting during 2022.
- MD during September to push intensity limits
- Homologation of n_TOF with increased intensity $220e10$ p/s (from $166e10$ p/s, allowed by improved Target #3)
- Excellent performances and availability for the target operation

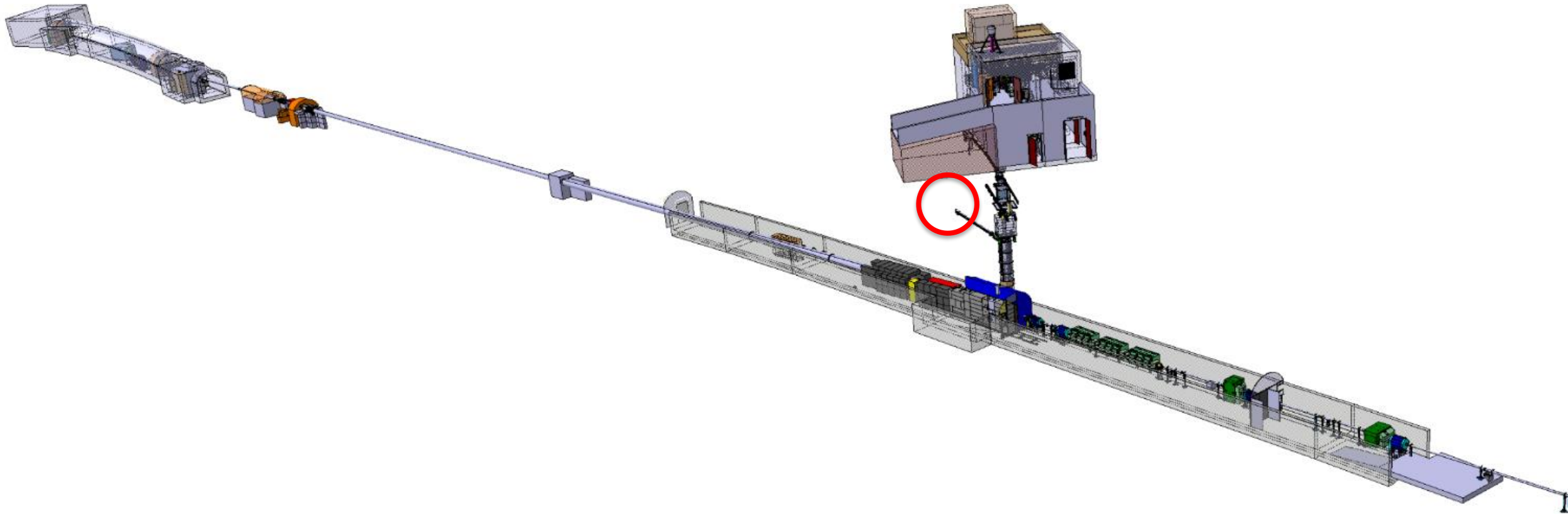
Homologation of n_TOF facility

- Facility “homologation” with Tripartite Authority (ASN/OFSP) completed on 13/09/2023 ([TOF-L-SF-0005](#)) --> big success!



- Implementation of global confinement of the cooling/moderator station

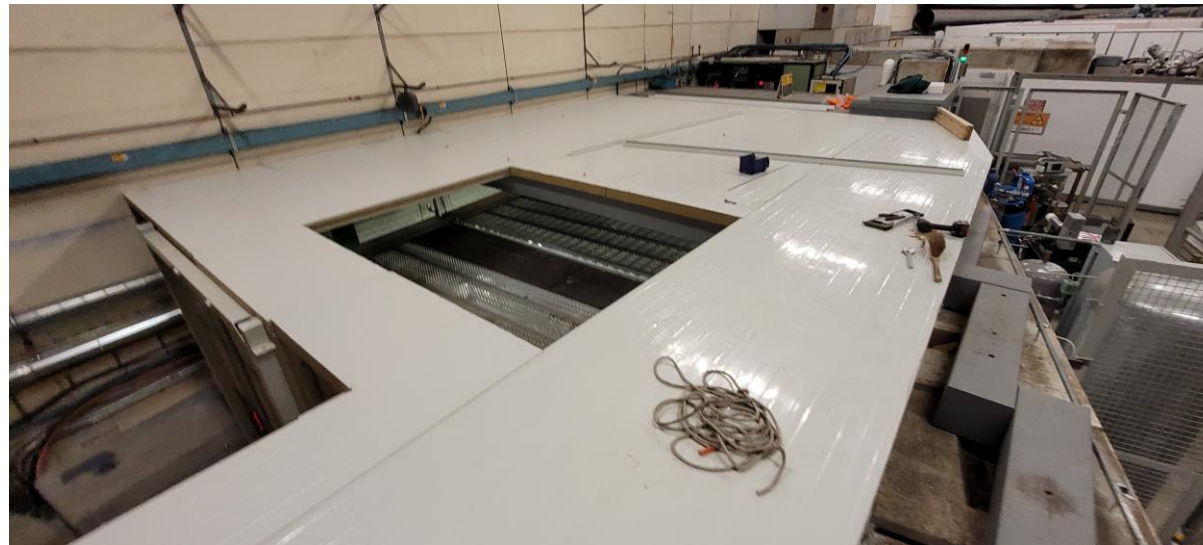
n_TOF target cooling station



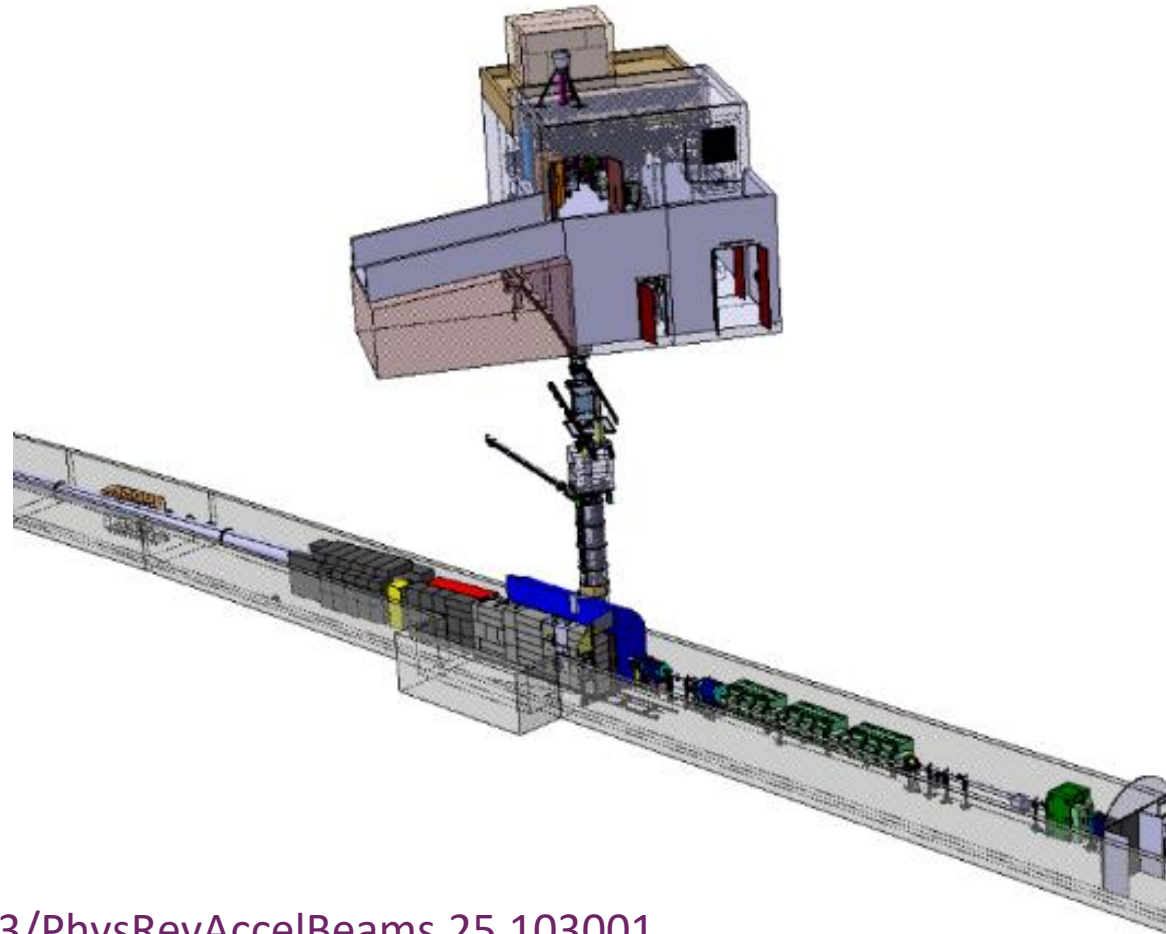
n_TOF target cooling station



Comments from the
visit of the French and
Suisse authorities
(global confinement)



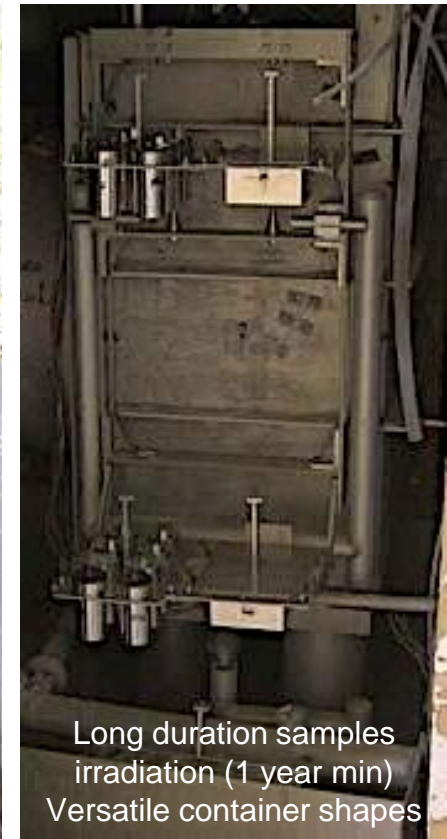
n_TOF target shielding - NEAR



Recently published paper

<https://journals.aps.org/prab/abstract/10.1103/PhysRevAccelBeams.25.103001>

i-NEAR at n_TOF (R2M)

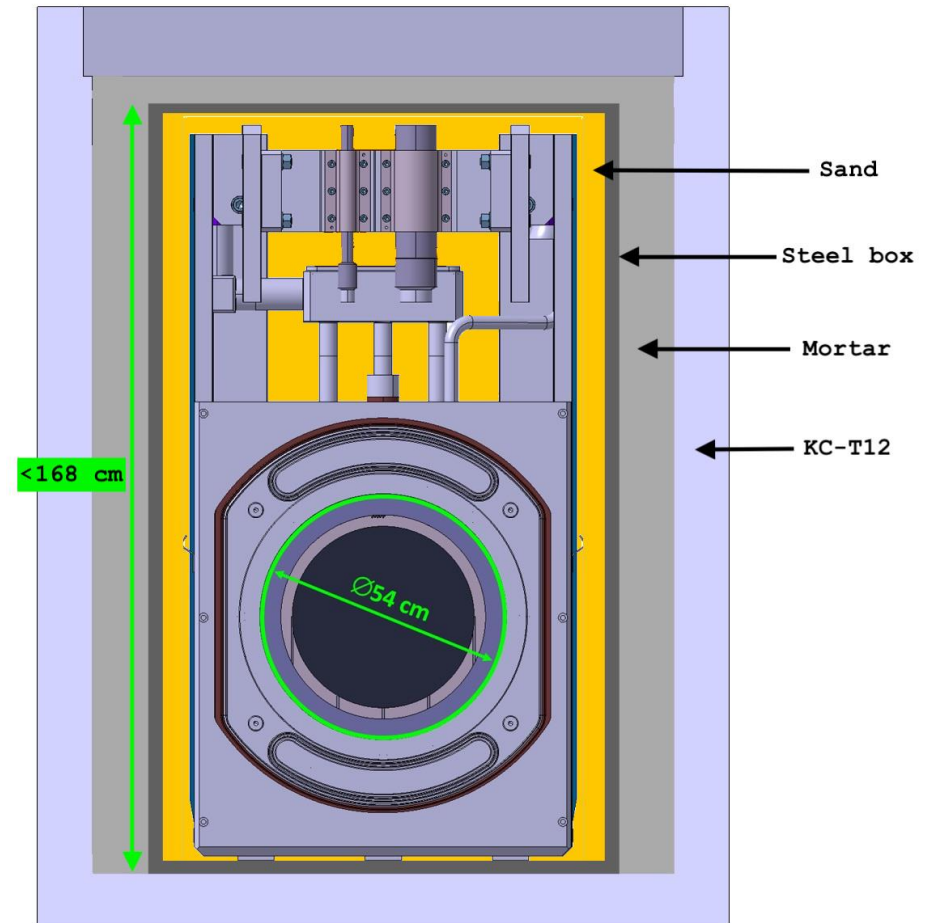


n_TOF spallation Target #2

Autopsy and Waste Packaging Review (T2AWPR) on 03/10/2023

<https://indico.cern.ch/event/1293320/>

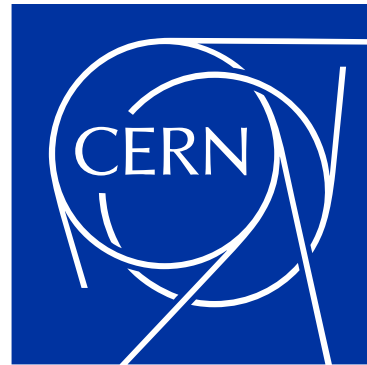
- In Switzerland, bulky radioactive waste items are **generally cemented with mortar** inside concrete containers. The so-called KC-T12 container is to be used for n_TOF Target #2 (e.g. same as n_TOF Target #1).
- n_TOF #2 is made of a cylindrical monolithic **lead** block enclosed in a vessel (water cooling and moderator) made of **aluminium** ← **chemical incompatibility with mortar**
- **Target dimensions:**
 - Footprint 830 x 628 mm
 - Height 1990 mm ← **not compatible with KC-T12**
- A **specific conditioning solution** has been developed for n_TOF Target #2.
- Review result (report in work):
No showstopper identified. Proposed timeline supported, green light to proceed after the final dry run in ISR8 (early 2024)



Courtesy P. G. Pisano, L. Bruno
On the behalf of HSE-RP-RWM

Conclusions

- Target performance without limitations, FTN beam line modifications completed before beam
- Excellent performances and availability of the facility during 2023!
- Implementation of the ASN-OFSP safety recommendations implemented
- n_TOF facility homologated and safety files up to date, visit of the authorities to EAR1 is planned for early March



Thank you!

home.cern