Status of ISOLDE at the start-up - Ready for Run 3

S.Rothe for SY-STI-RBS

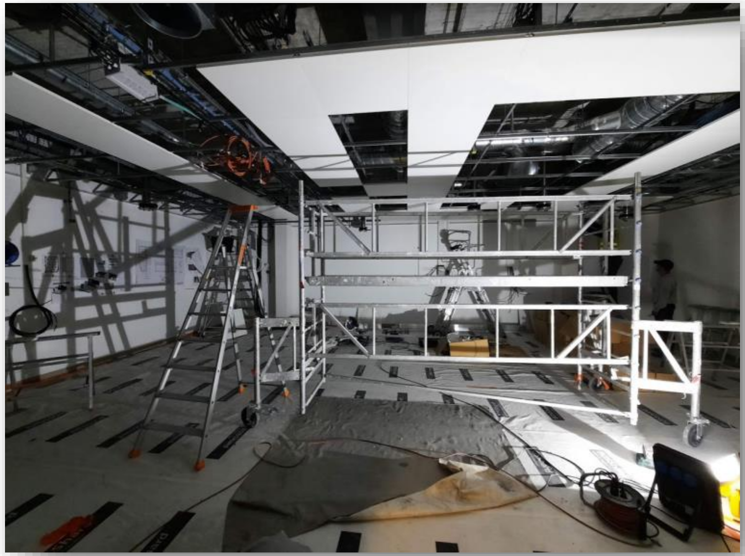
With contributions from: J.Cruikshank, L.Lambert, K.Chrysalidis, R.Heinke, Y.Vila, F.Josa, R.Lica J.Vollaire

Outline

- Nanolab (2)
- FE, YOL2 (4)
- Gas systems (2)
- The Tapestation (2)

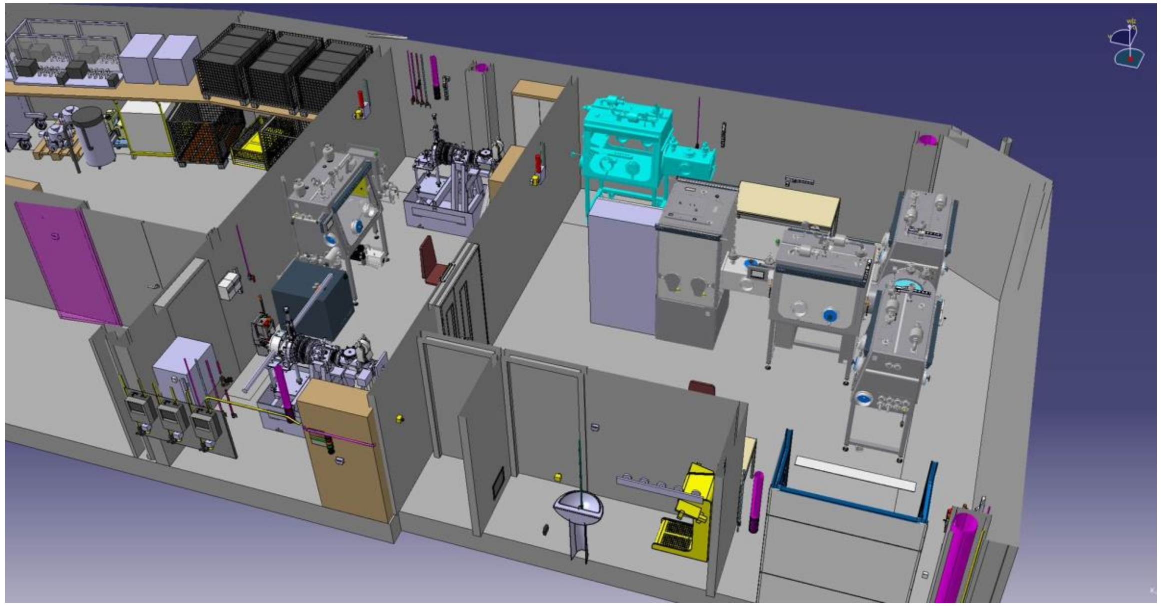
Nano Lab update

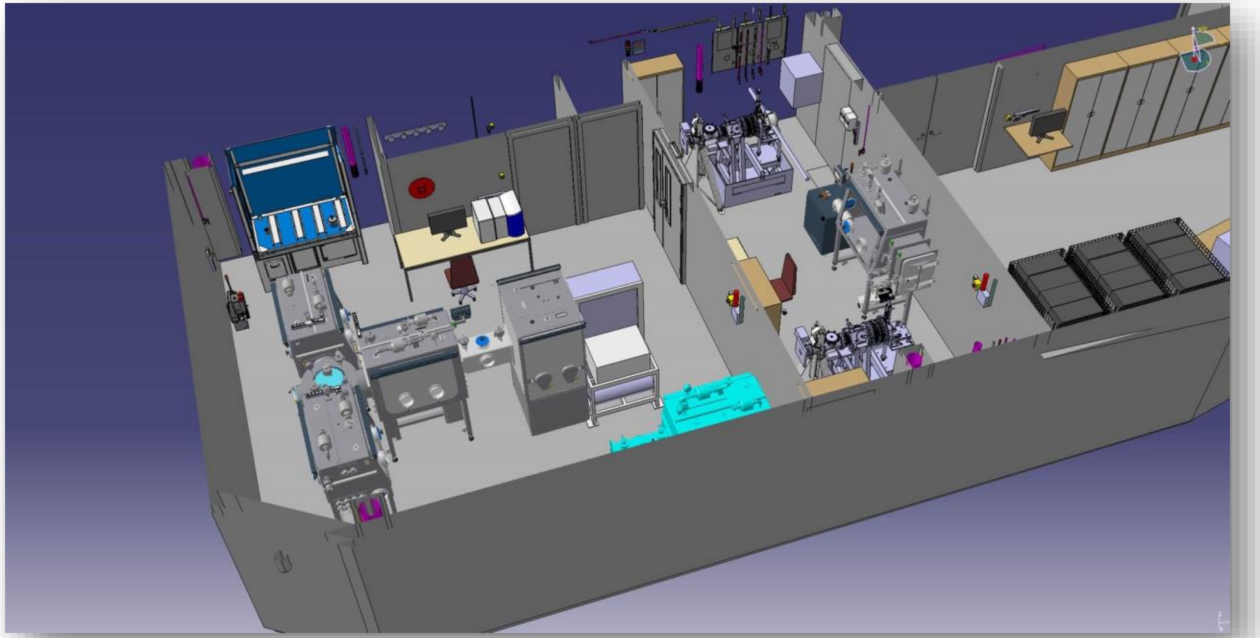
- Civil engineering started beginning of March 2020
- Completion expected in 1 week, end of June 2021



Nano Lab: next steps

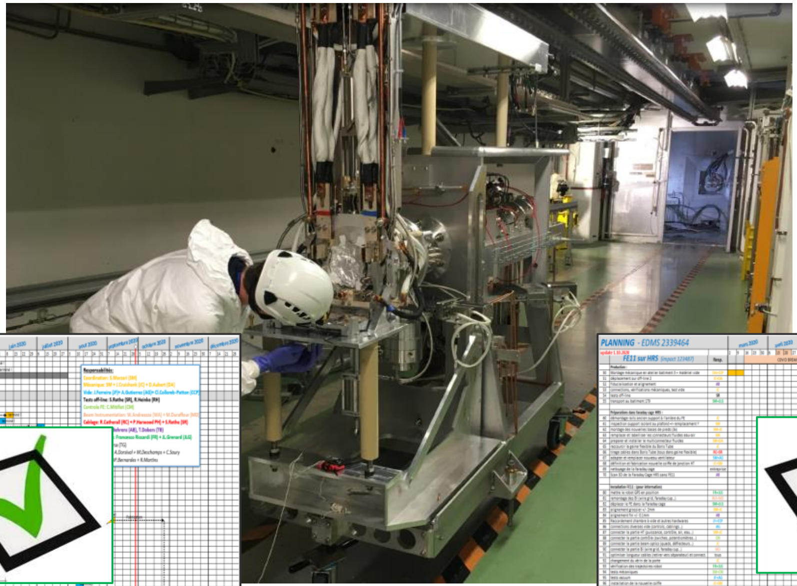
- **Smoke and ventilation tests** next week which will finalize the civil engineering phase
- **Commissioning of fumehood** beginning of July 2021
- Five custom **gloveboxes currently in manufacturing** stage – installation and commissioning fall 2021
- Finalizing the {initial} **procedure of nano-La(OH)$_3$ production** -> the stepping-stone to UC$_x$ production
- In the process of **retrieving authorization to start the development of non-radioactive nano-materials**

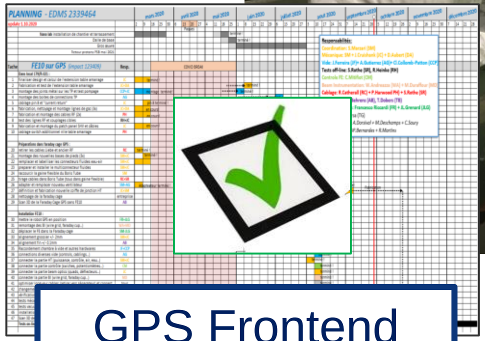




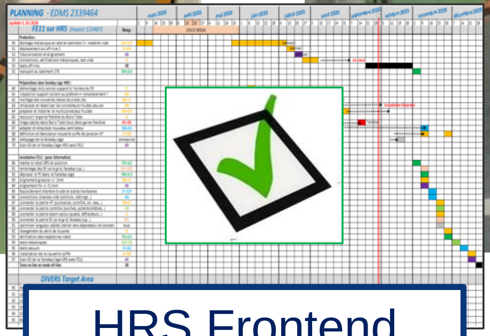
Two new ISOLDE Target Stations GPS & HRS

- **GPS Target Station (FE10) Commissioning completed September 2020**
- **HRS Target Station (FE11) Commissioning completed May 2021**





GPS Frontend



HRS Frontend

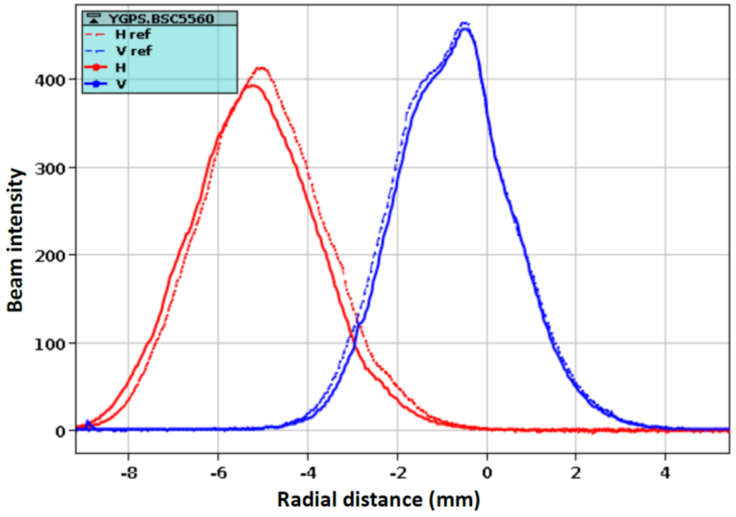
New frontend electrode & RF supply: LIST in Run 3

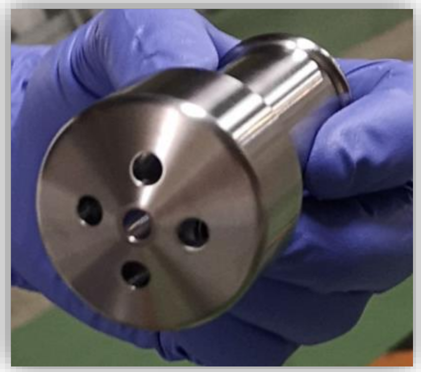
***Slotted extraction electrode** installed at GPS*

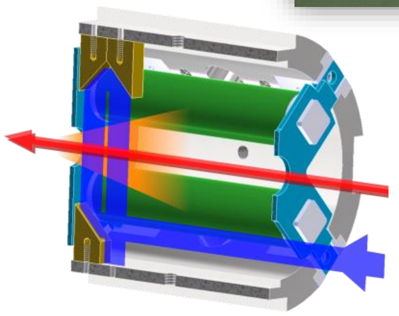
- Requirement for high resolution laser spectroscopy using **PI-LIST ion source**
- Transparency for standard operation confirmed: No change in ion beam parameters found

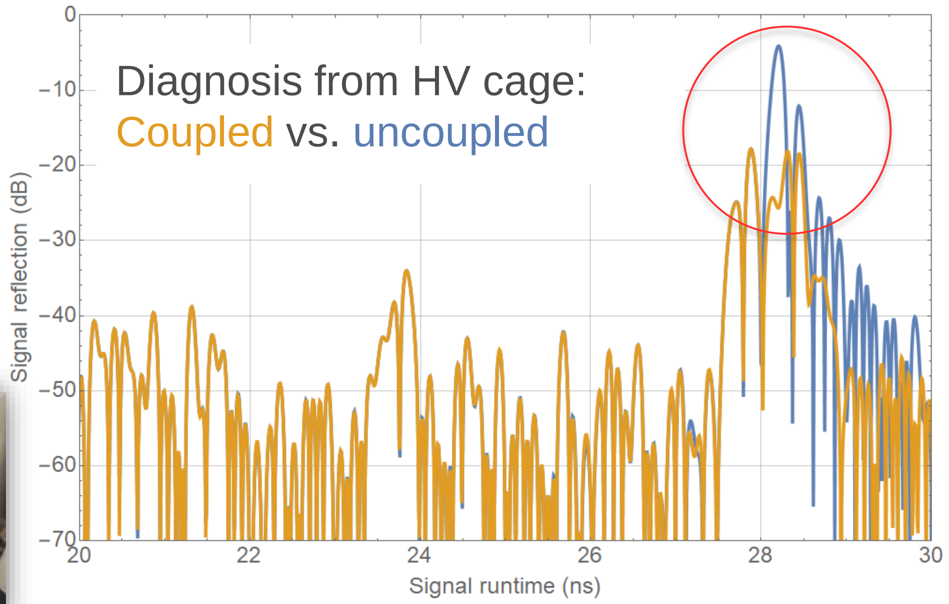
Radiation hard RF guide and automatic coupling

- Next generation of custom-made RF supply line
  - **Reduction of reflections** by factor 5
- **VNA blueprint data stored** for remote diagnosis



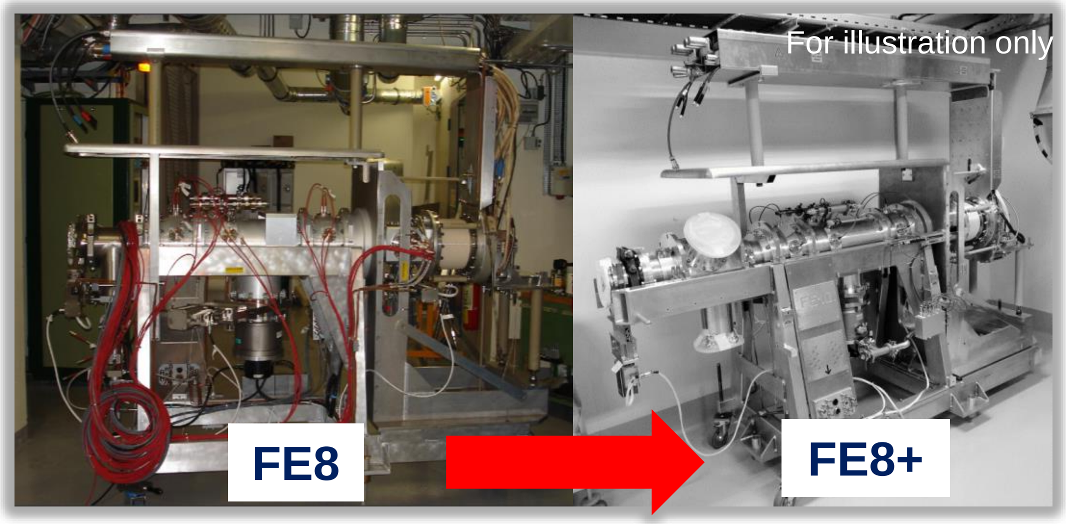




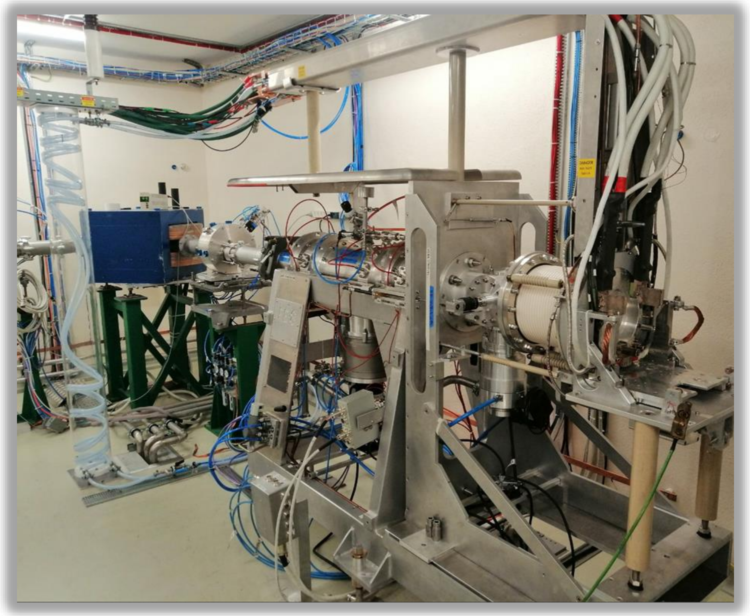


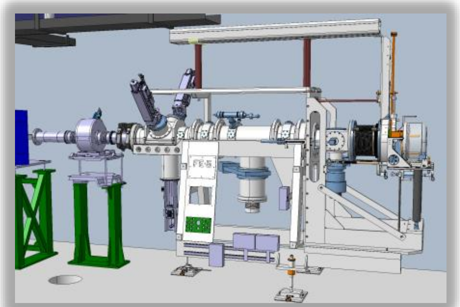
FRONTEND 8+ @ OFFLINE 2

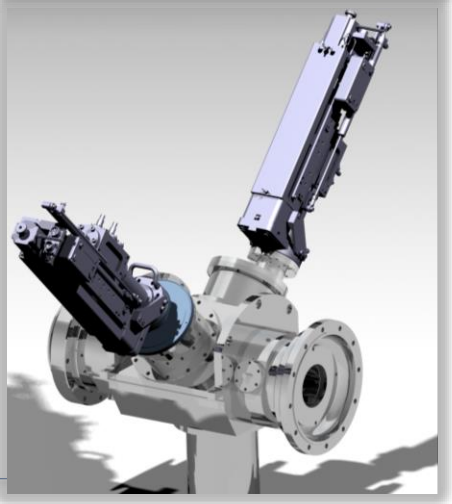
- FE8+ features
  - Potential spare target station for the HRS or GPS
  - Fully compatible with current and future target designs (RF, GAS, PIN8)
  - Beam optics identical to FE10,11. Allows comparison from offline to online results.
  - Visual and operational training, including maintenance and future on-line interventions at FE10 or FE11



- OFFLINE 2 facility upgrade
  - Integration of the new generation of emittance meters (Alison Scanners) provide via MOU with TRIUMF
  - New services and controls to replicate Online operation.
  - FGC magnet control
  - New BI boxes





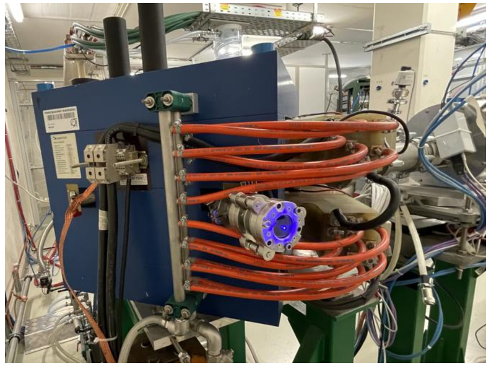


Milestone for the offline Facilities

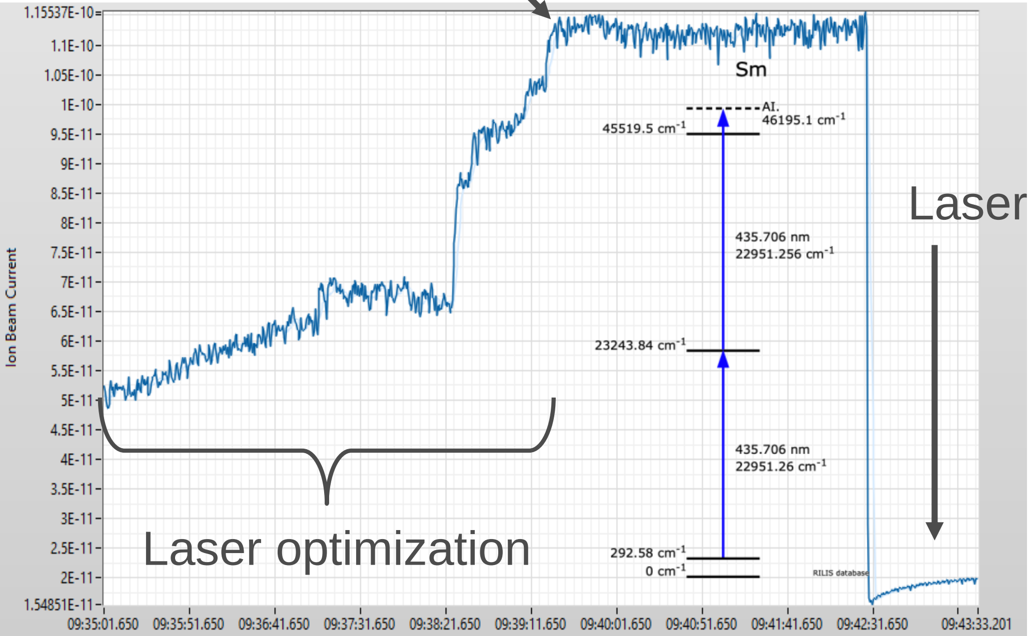
first laser ionized beam at OL2!

16	16:25	0	first laser ionized beam at OL2! we see the Sm isotope pattern quite clearly now on the scanner. We don't have any mass resolution on the FC, so can't really include a nice mass scan here to show this. scanner picture is attached though. laser on/off on the FC is 14pA/3pA /KC RH BAM

Last Friday
11.06.2021



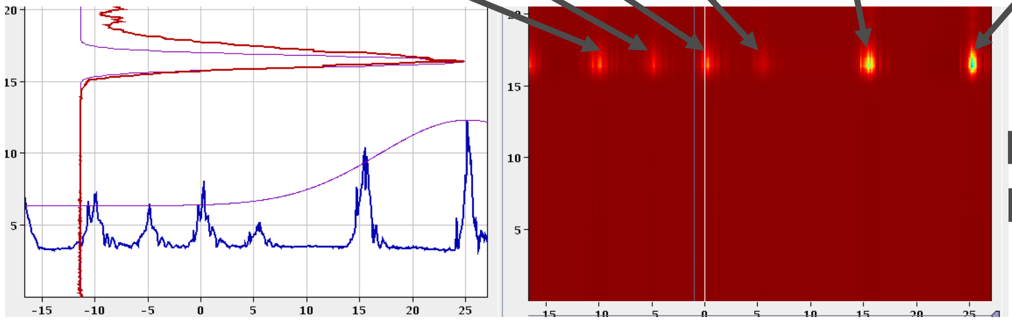
Laser ON (optimized)



Laser optimization

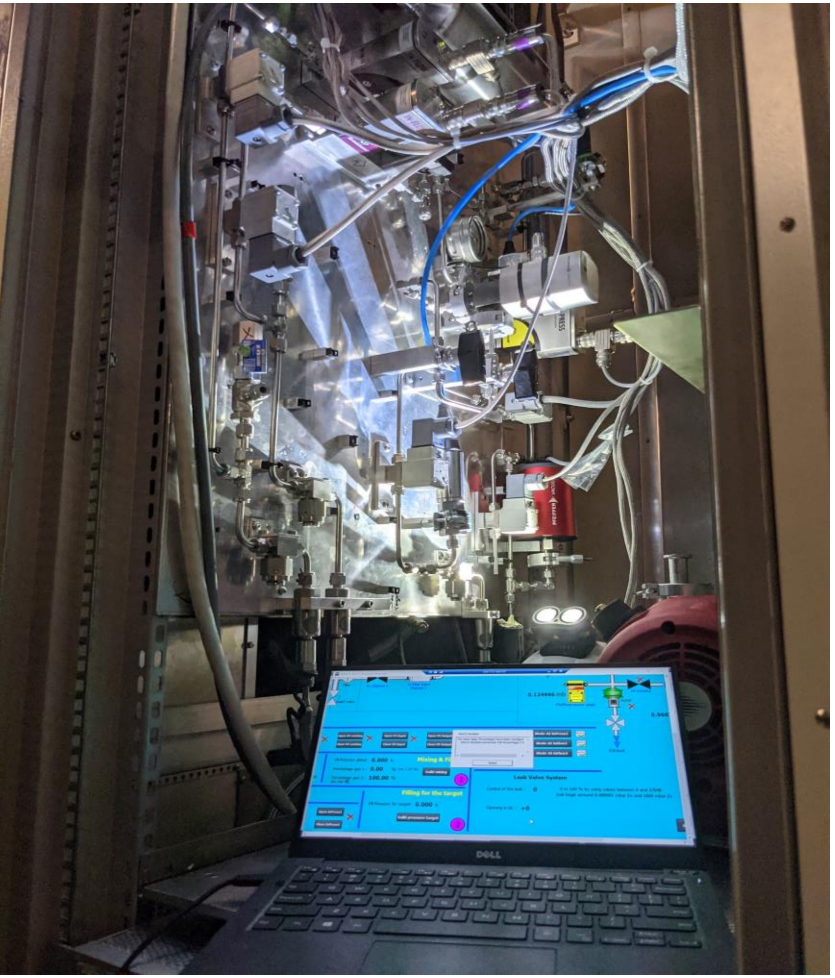
Laser OFF

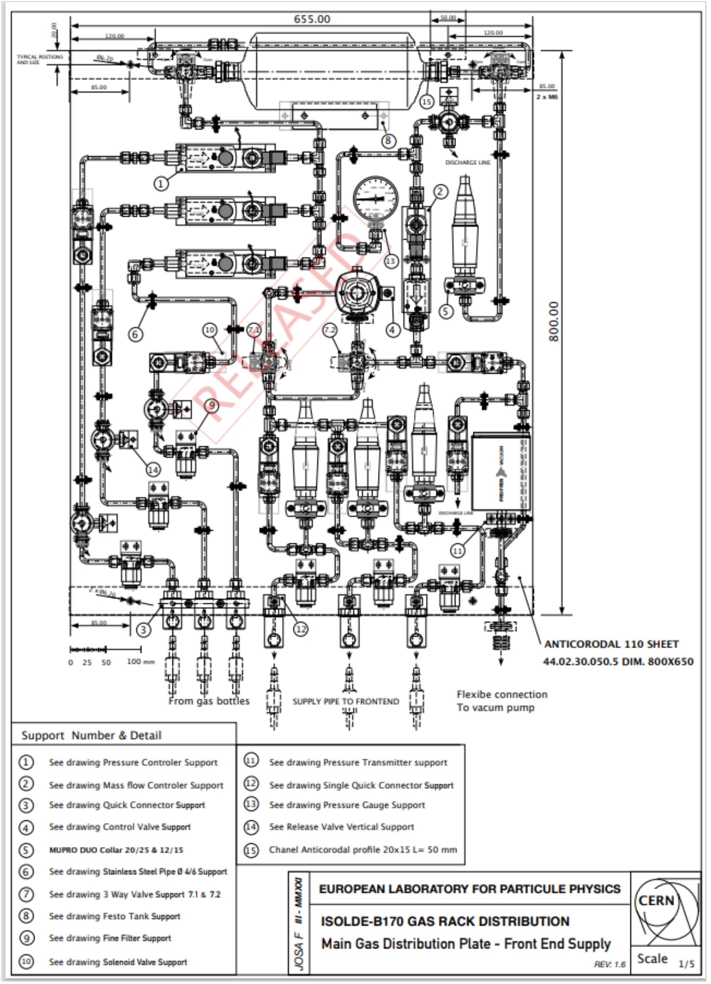
Sm 147	Sm 148	Sm 149	Sm 150	Sm 151	Sm 152	Sm 153	Sm 154
15.00	11.25	13.82	7.37	94.7 a	26.74	46.284 h	22.74
$1.07 \cdot 10^{11}$ a	$7 \cdot 10^{15}$ a			β^- 0.1... γ (22...), e^-		β^- 0.7, 0.8... γ 103, 70..., e^-	
α 2.248 σ 56, $\sigma_{n,\alpha}$ 6E-4	α 1.932 σ 2.4	σ 40100 $\sigma_{n,\alpha}$ 0.031	σ 102	σ 15200	σ 206	σ 420	σ 7.5



Laser ON (optimized),
Isotopes separated

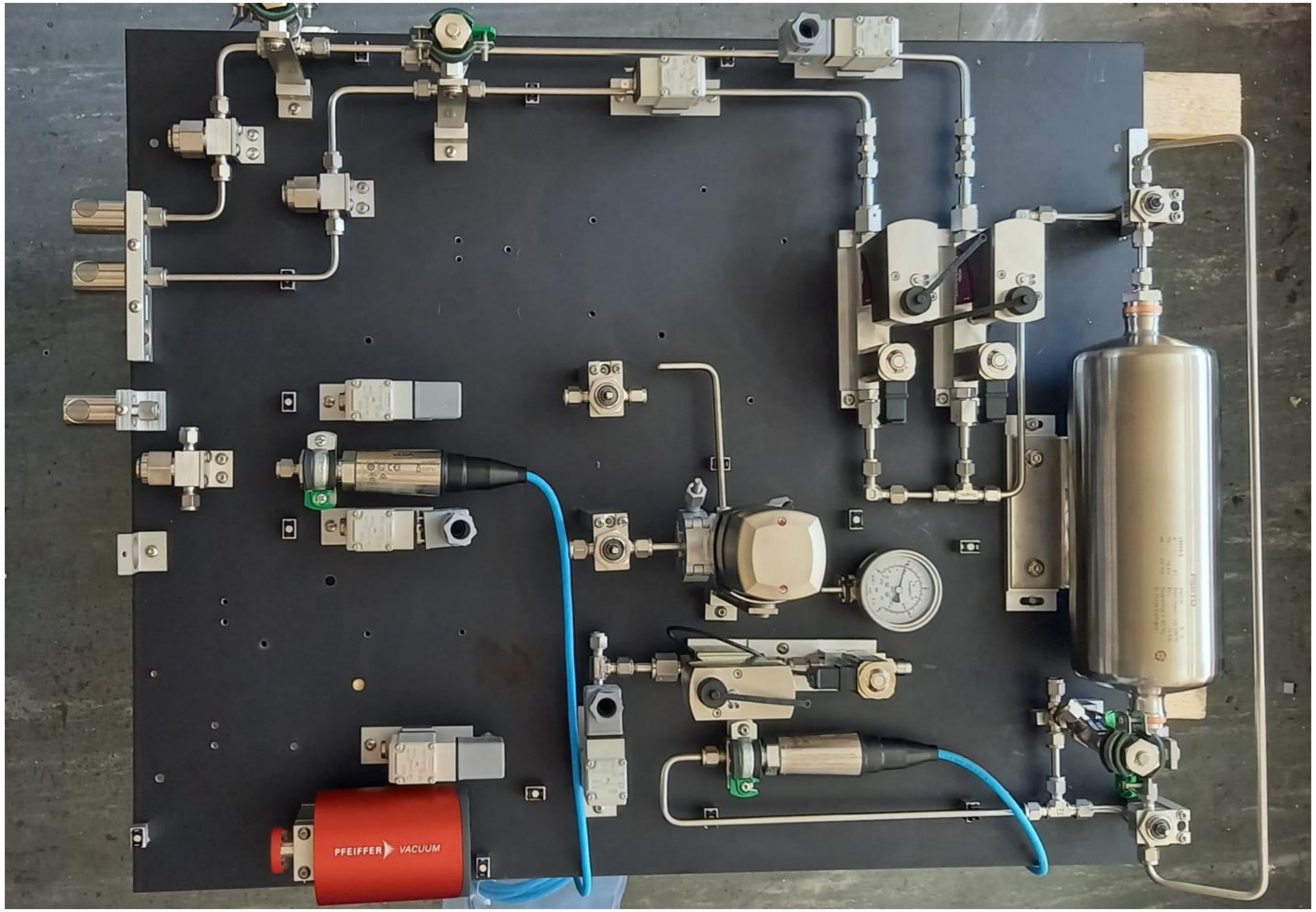
HRS, GPS gas systems





- Hardware installed and tested, expert CTRL ready.
- Documentation ongoing

OFFLINE2 gas system

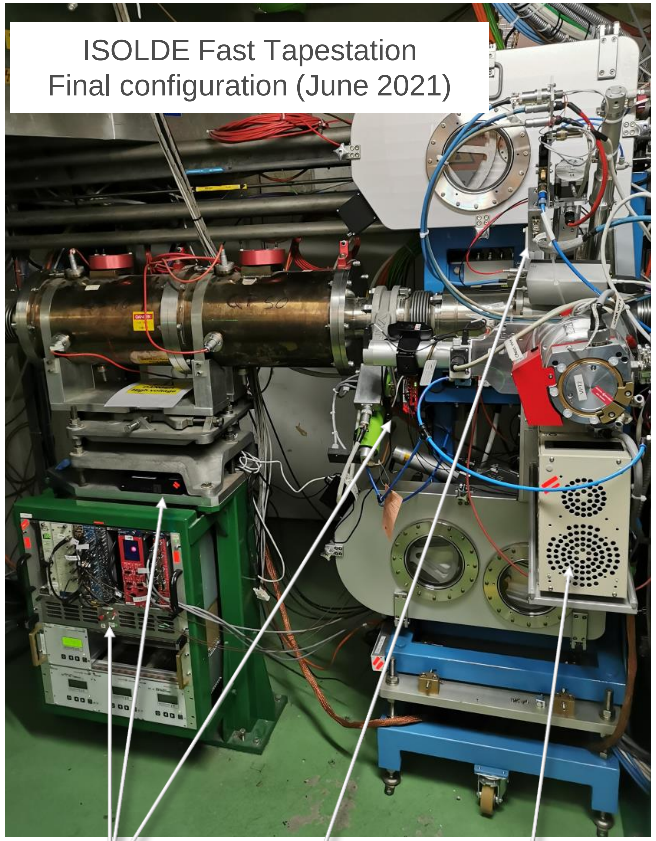


15.June 2021

- Hardware construction ongoing
- System will serve as **development platform** for GPS,HRS **hard and software features**
  - In-place gas mixing
  - Auto filling / flushing

Special Thanks to **R. Lica** !

The Tapestation

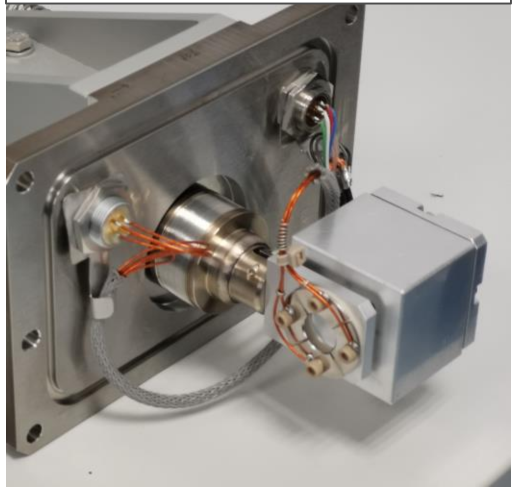


Electronics
(HV and preamp power, logic, DAQ)

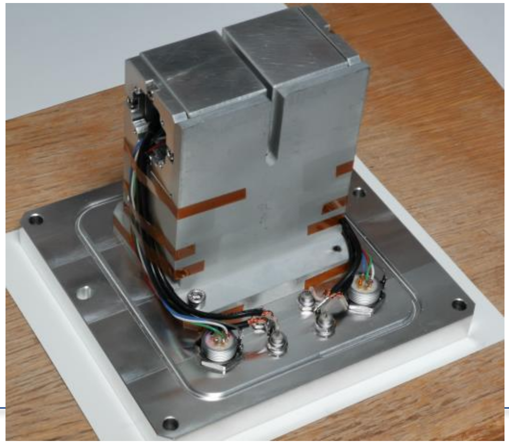
F.CUP

P2 position: HPGe γ-ray detector

P0 position: 2π β detector and collimator

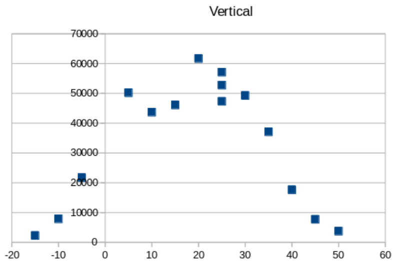


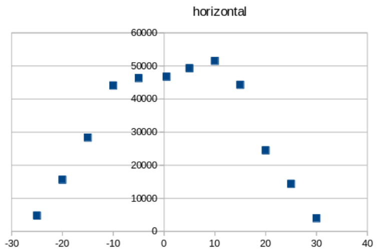
P1 position: 4π β detector

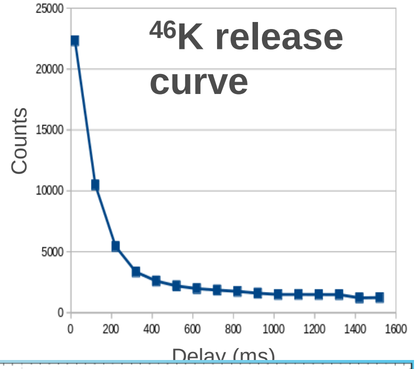


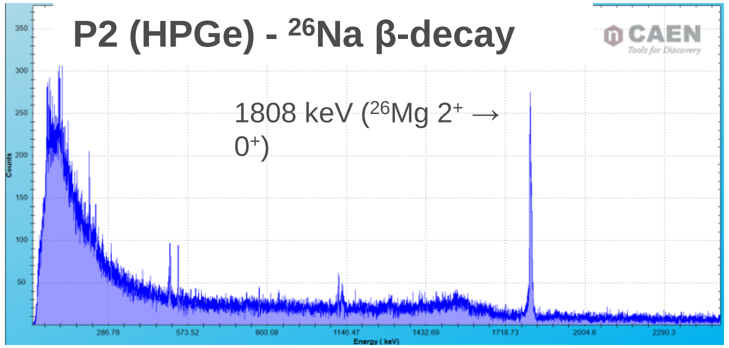
- **First measurements after LS2 (Target #638, 10.06.2021)**

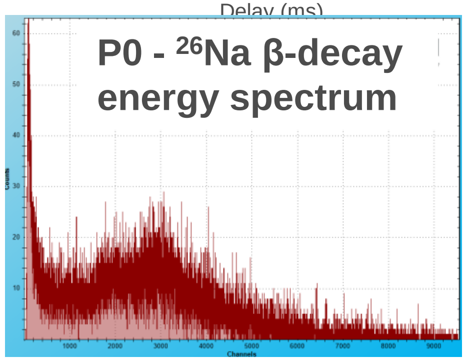
Proton scan using ^{26}Na











- **Future plans:**
  - automate the DAQ and analysis software (LabVIEW)
  - install the P2 beta detector (design finalized) ->beta / gamma
  - design the P3 position for alpha spectroscopy
  - commission the second tapestation at GLM , (seed funding requested)

ISOLDE Fast Tapestation in-beam commissioning June 2021 – a success story
Thanks to all contributors!
(EP-ISOLDE, SY-STI, BE-CEM, BE-OP, SY-BI, TE-VSC)

CERN

SY

STI