



Istituto Nazionale di Fisica Nucleare  
Laboratori Nazionali di Legnaro

# SPES: Status and Plans for Completion

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## I ragazzi di via Panisperna

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*Enrico Fermi*



- 20 Sections
- 4 national laboratories
- 4 national centres

Total staff ~6000  
Budget ~600 MEuros

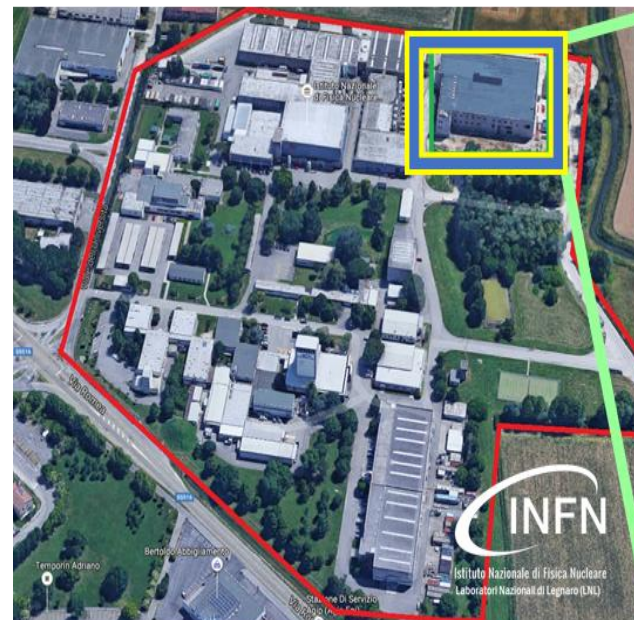




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~200.000 m<sup>2</sup>



60.000 m<sup>2</sup>

# LNL: The accelerator complex



**Tandem 15 MV**



**PIAVE  
RFQ SC**



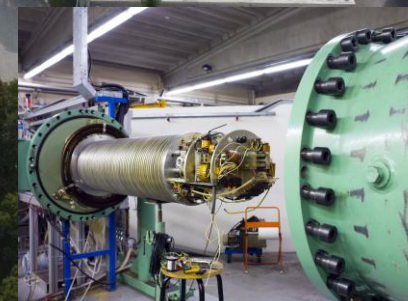
**ALPI  
LINAC SC**



**Cyclotron p 70 MeV**



**CN 6MV**



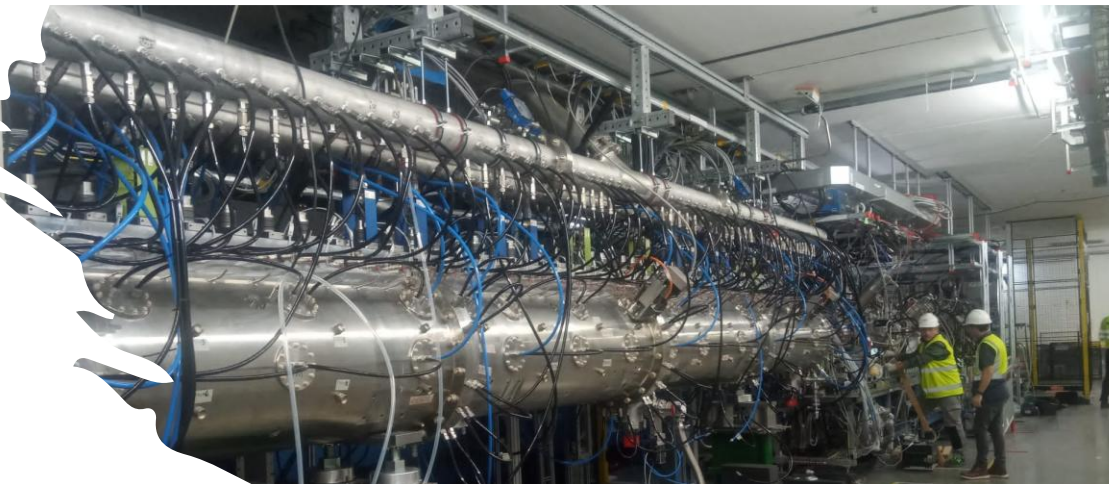
**AN2000 2MV**

# Accelerators Technology: The strength of LNL

## DTL – ESS (Sweden)

- Energy: up to 90 MeV
- Current pic: 62.5 mA
- Current average: 2.5 mA
- Beam:
  - $^1\text{H}^+$  - Proton

$P_{\text{max}} < 225 \text{ kWatt}$



## RFQ – IFMIF (Japan)

- Energy: up to 5 MeV
- Current average : 125 mA
- Beam:
  - $^2\text{H}^+$  - Deuteron

$P_{\text{max}} < 625 \text{ kWatt}$

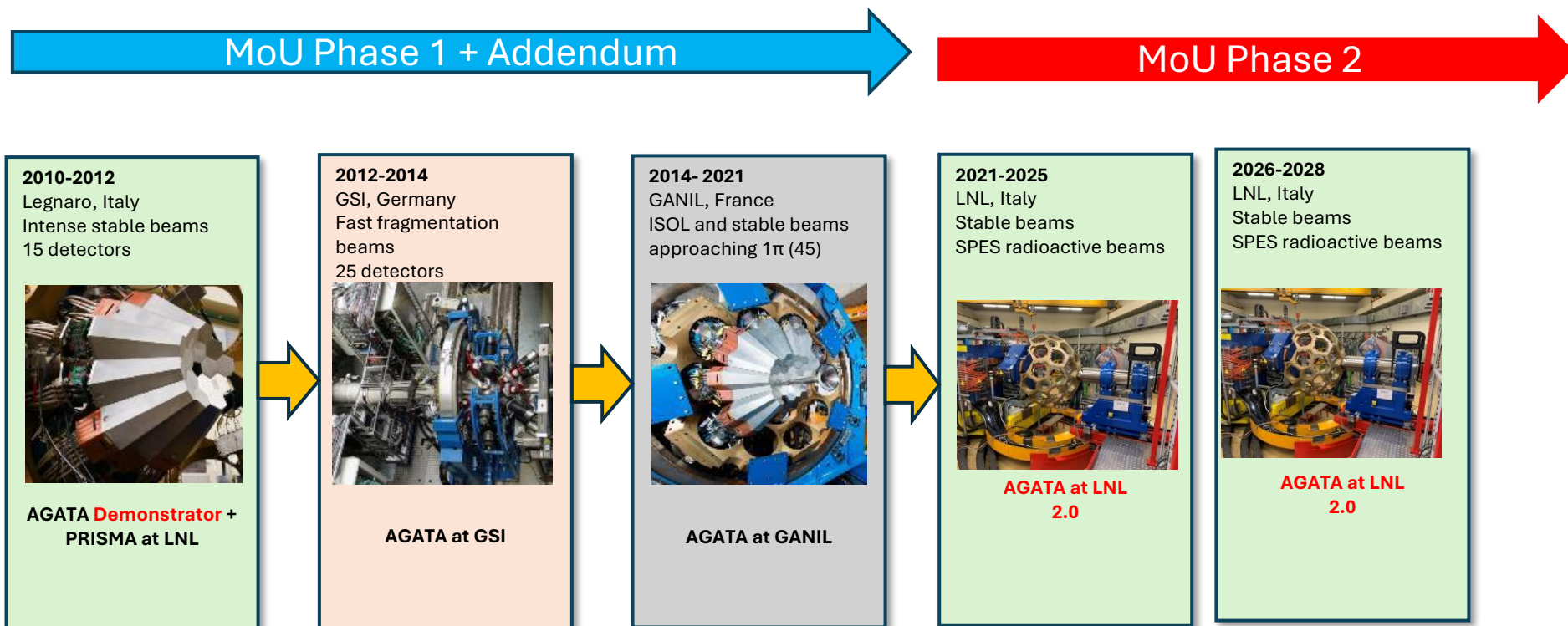


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## LNL-INFN Strategy and priorities

*Operate in the most effective way the accelerators complex and Provide the best access possible to the users.  
In this context LNL has committed to host the European Multidetector Array AGATA and subsequently  
committed to provide good quality and quantity of beam time to the community.*

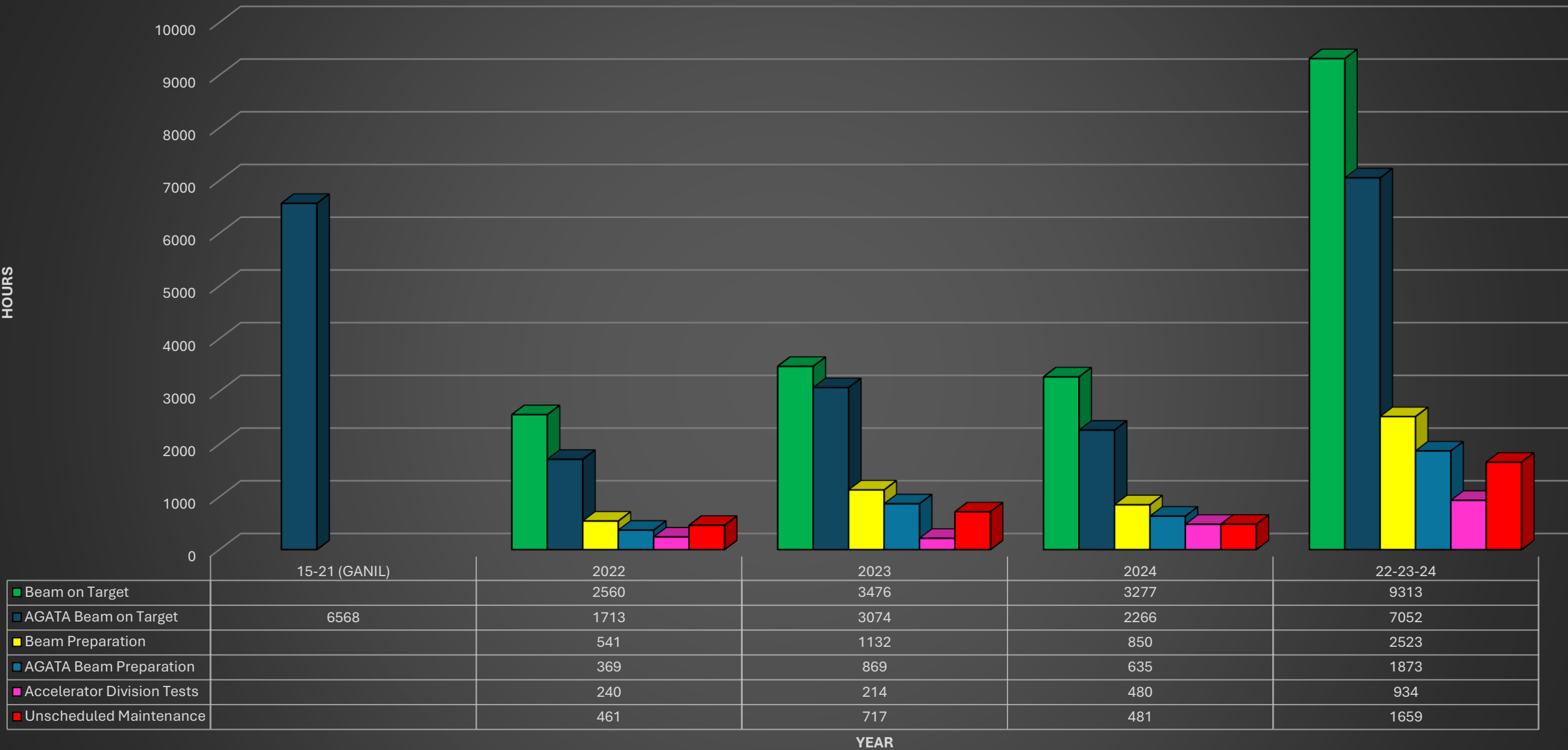
## The AGATA time line



# PTA performances



# AGATA Beam on Target



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## LNL-INFN Strategy and priorities

*Complete a long-standing project SPES in a timely manner by both completing the Radioactive Ion Beam (RIB) facility (low-energy and post-accelerated) and build the Radioisotope Production facility .*

- If we wait for the moment when everything, absolutely everything is ready, we shall never begin***

[illegible]

# Layout of the SPES facility

Phase 1

Spes Cyclotron

Phase 2

ISOL Low-Energy Radioactive Ion Beams

Phase 3

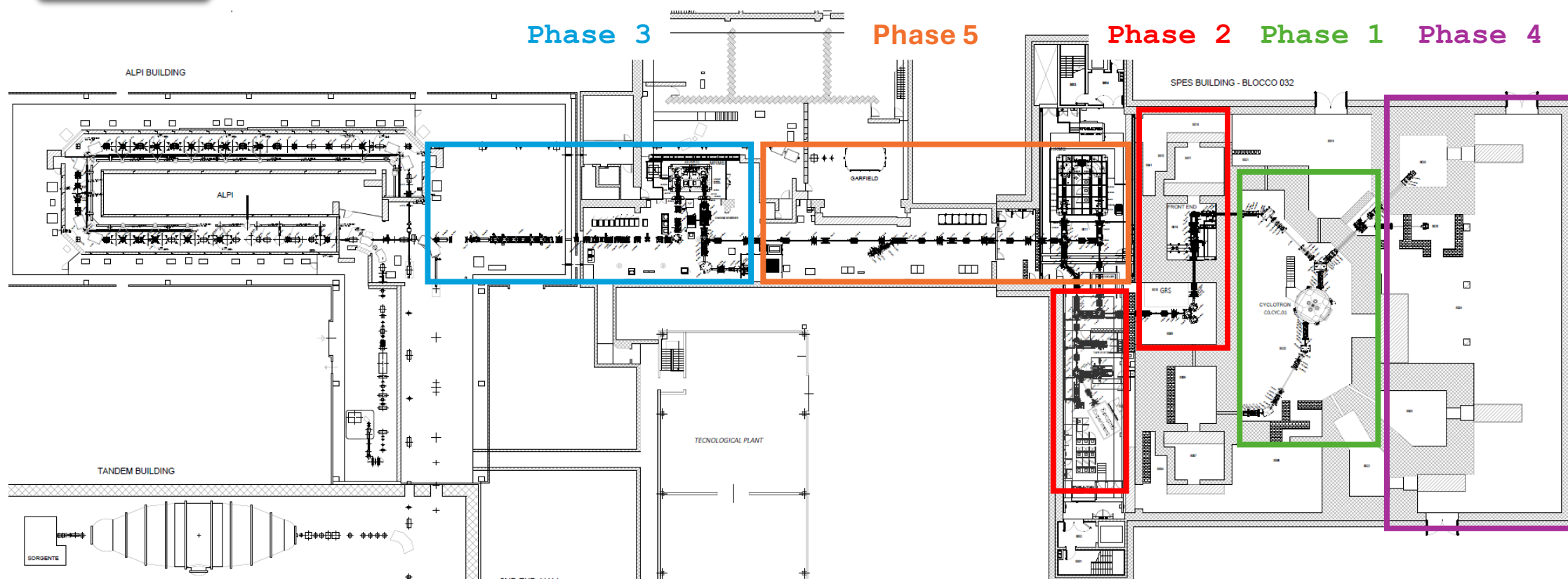
ADIGE new injector and RFQ for ALPI (SPES post-accelerator)

Phase 4

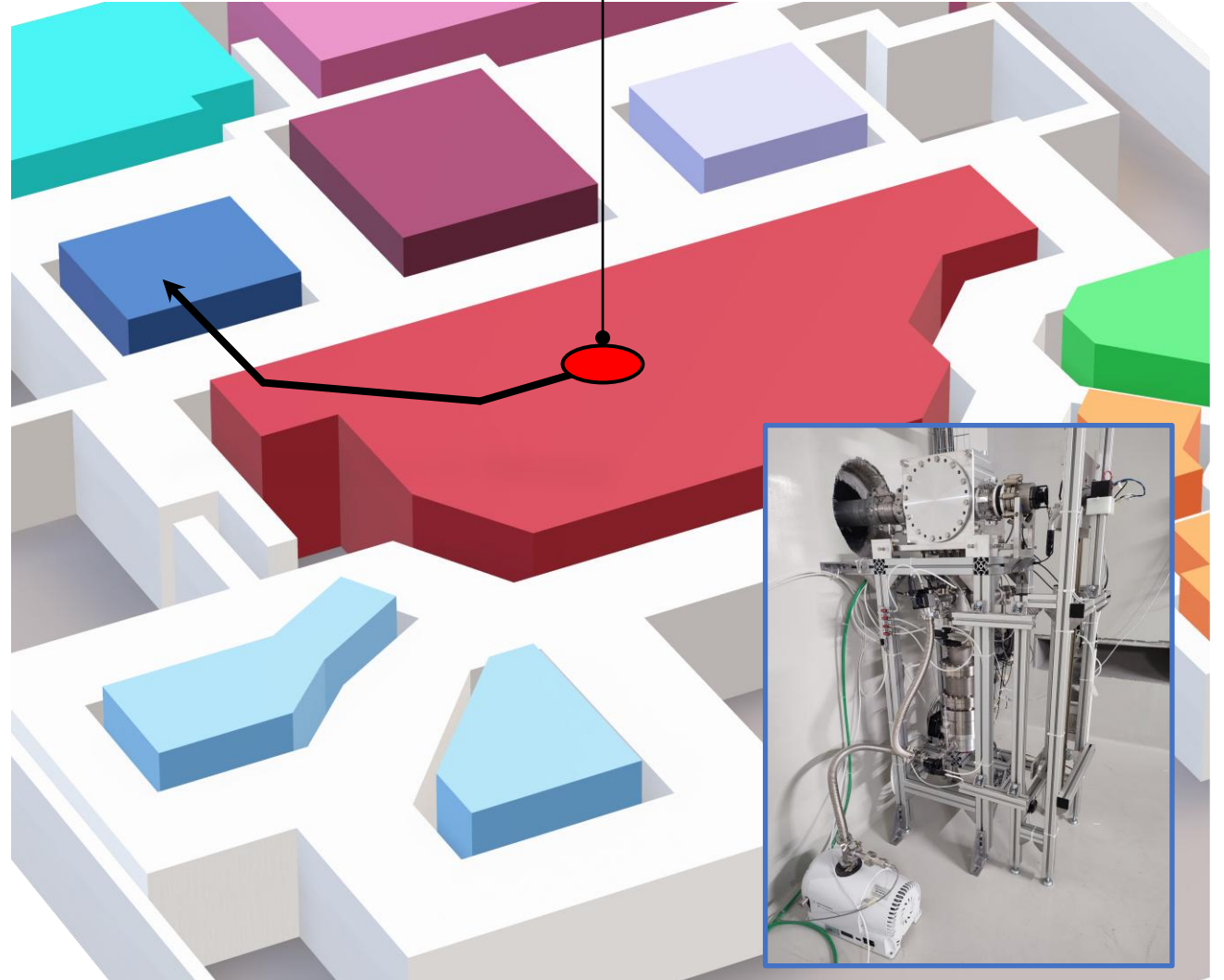
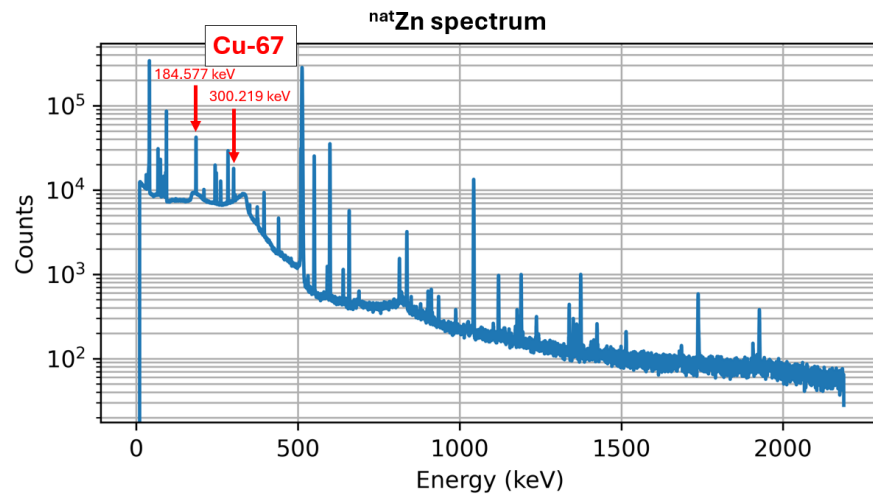
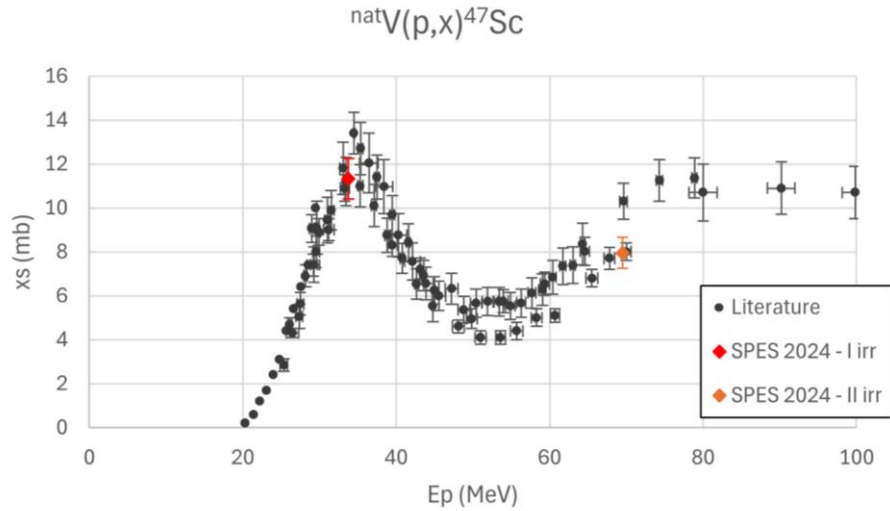
**Radioisotope production facility**

Phase 5

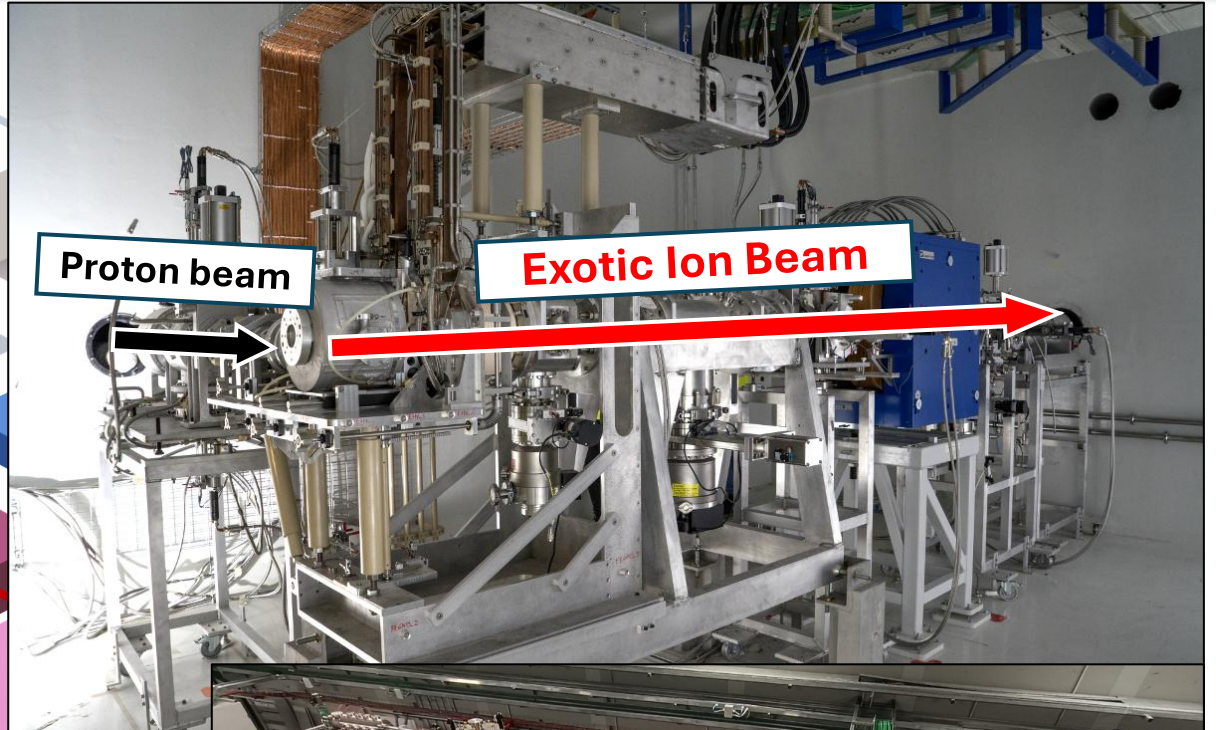
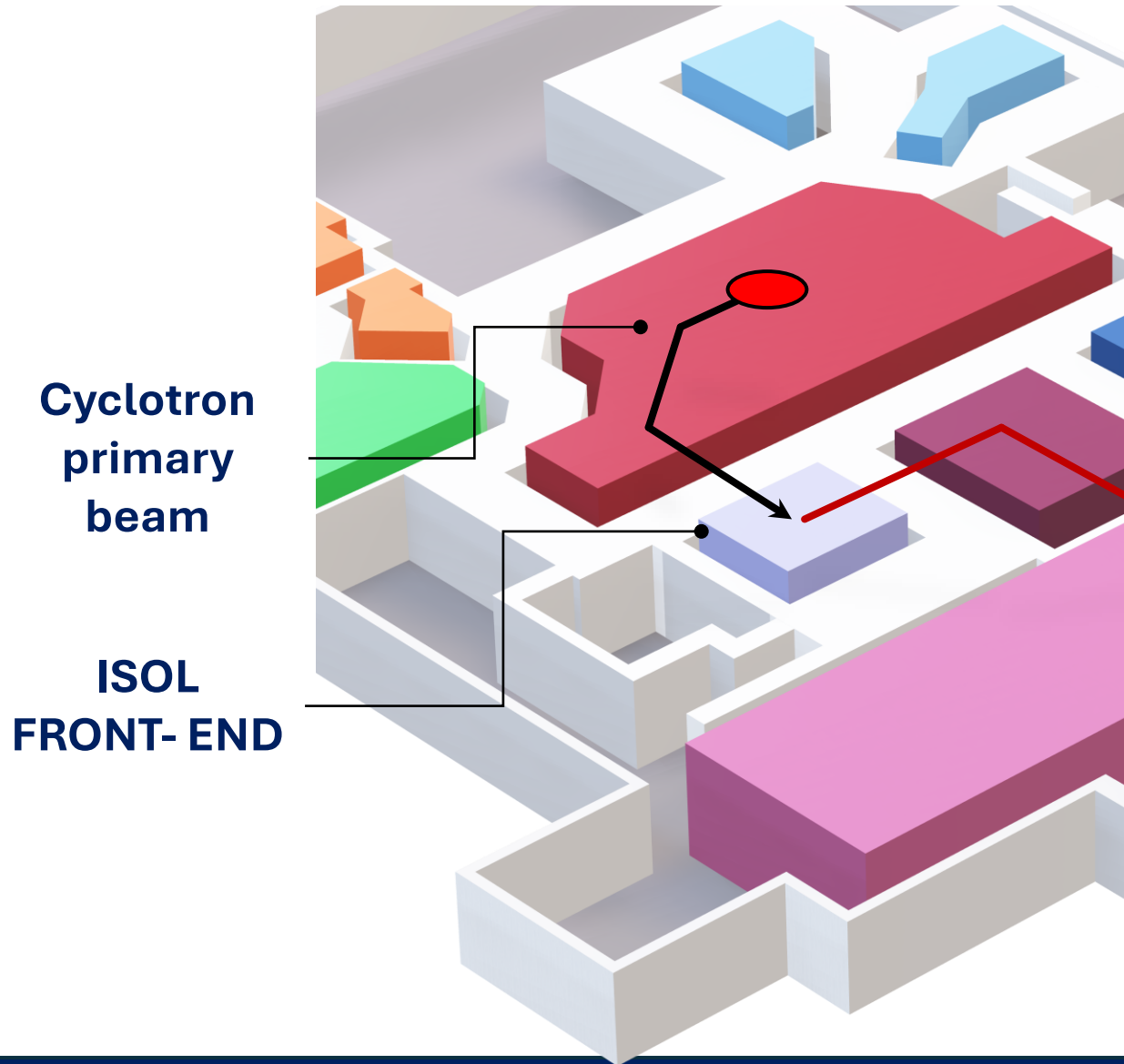
Post-accelerated Radioactive Ion Beams



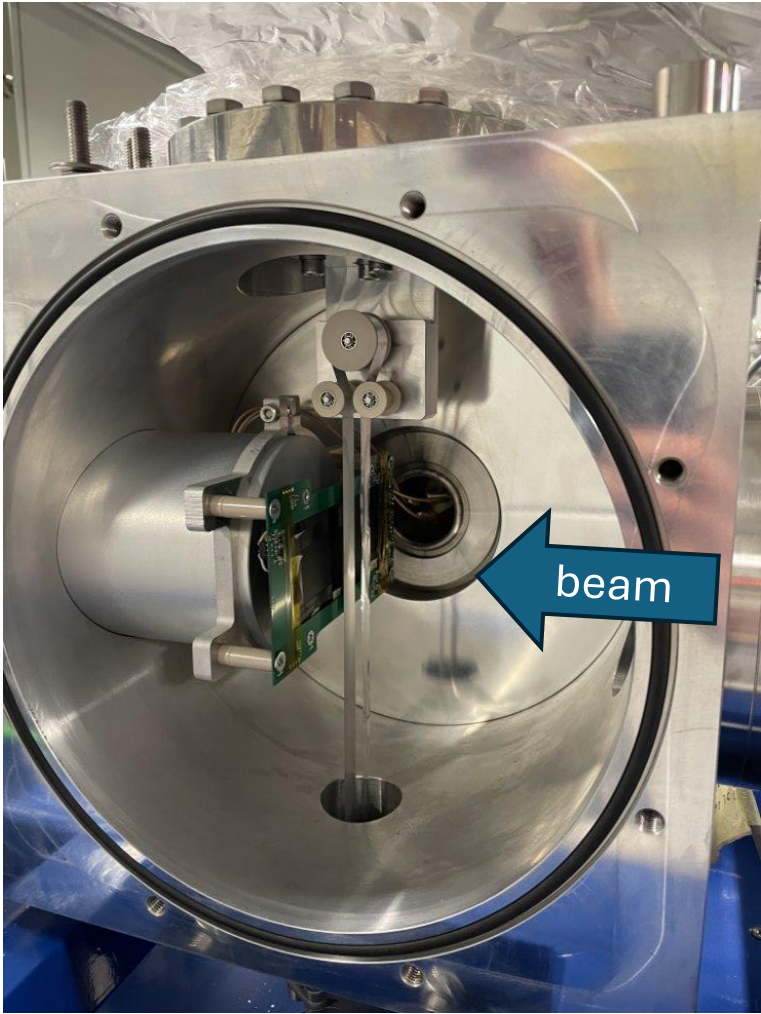
## CYCLOTRON



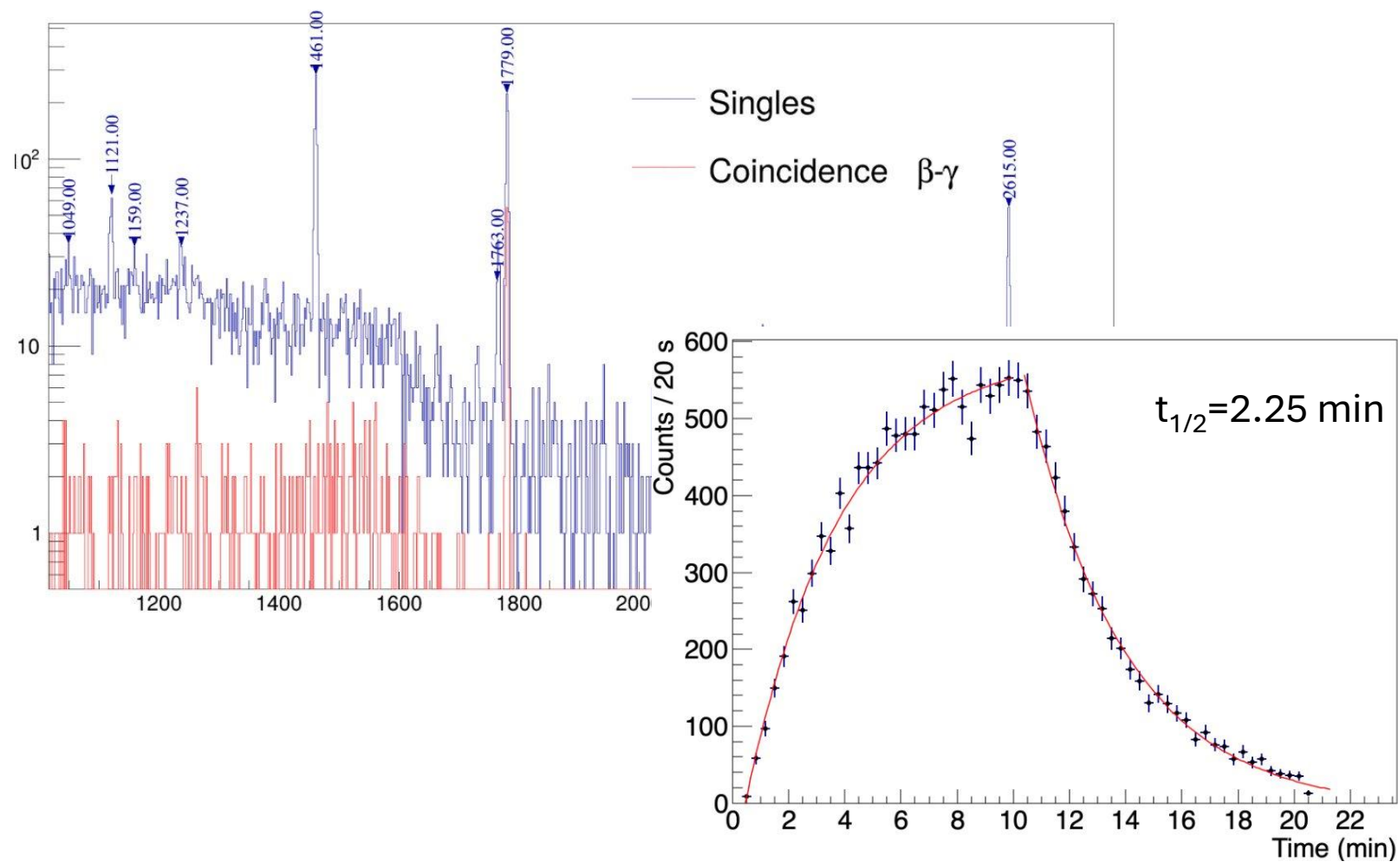
## SPES-Phase 2



# Phase 2 completion: RIB on the tape station – April 2025

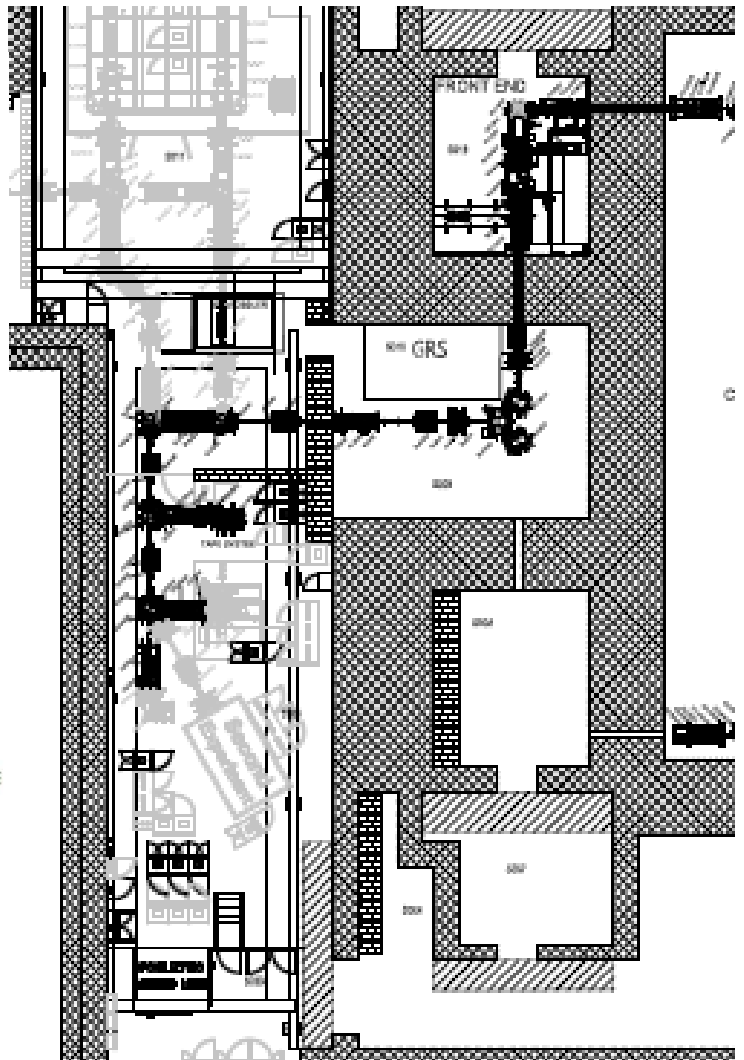
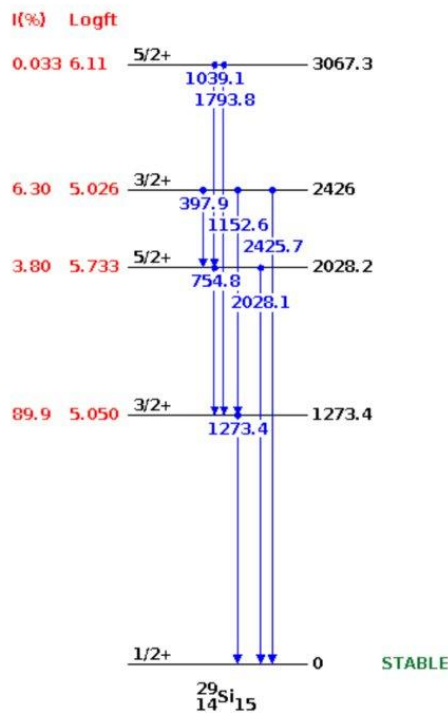
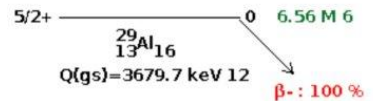
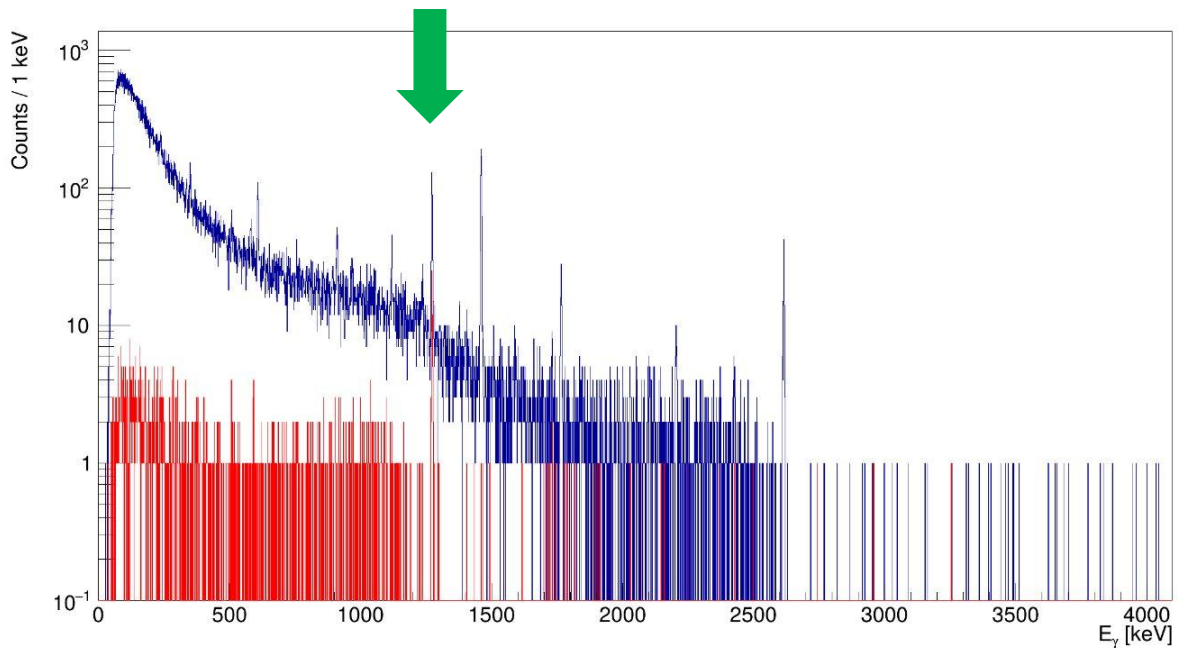


Again on mass 28:



# Completion of phase2: full LERIB facility – April 2025

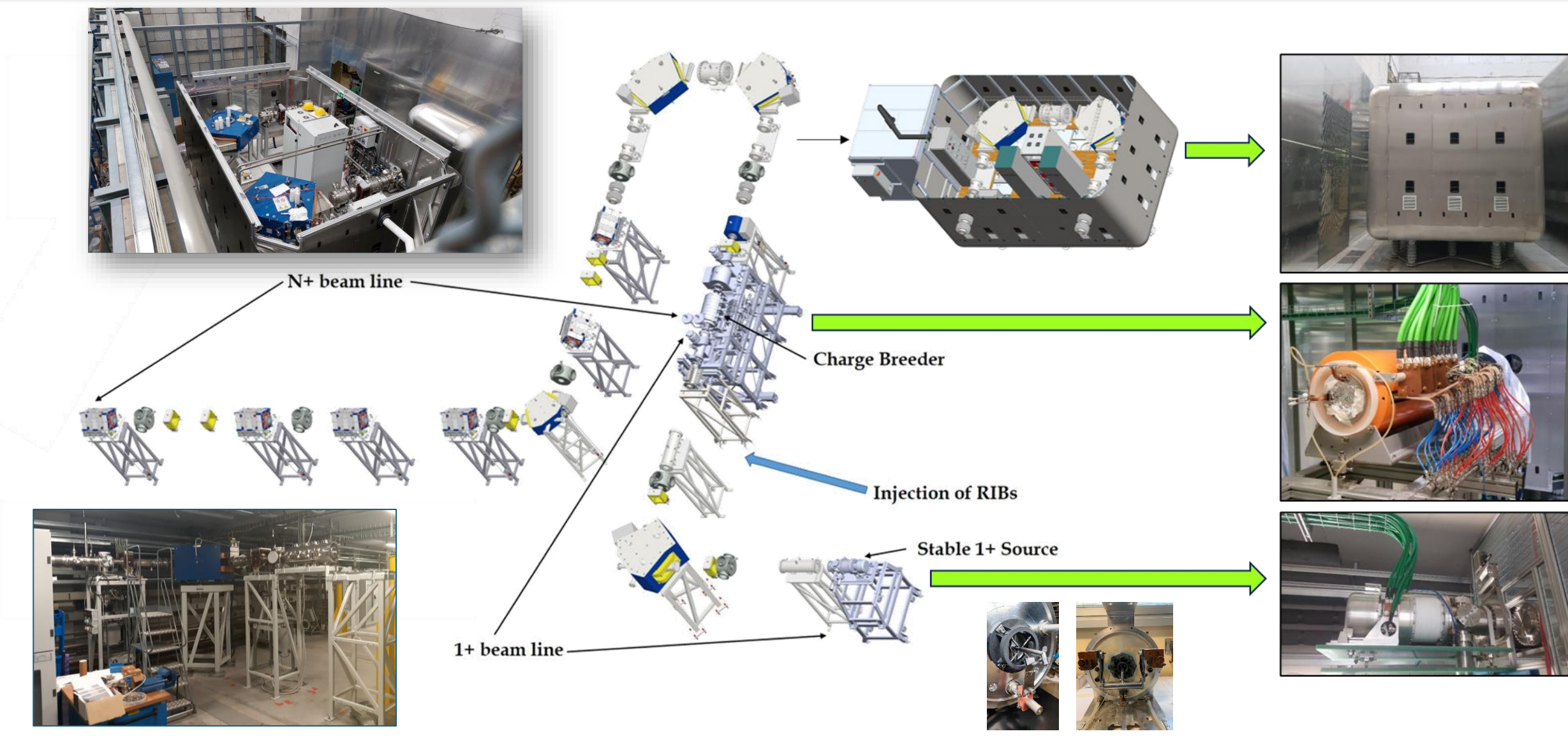
$A/q = 29$



Remote Handling of Target-Ion-Sources ready and tested



# Phase 3: ADIGE

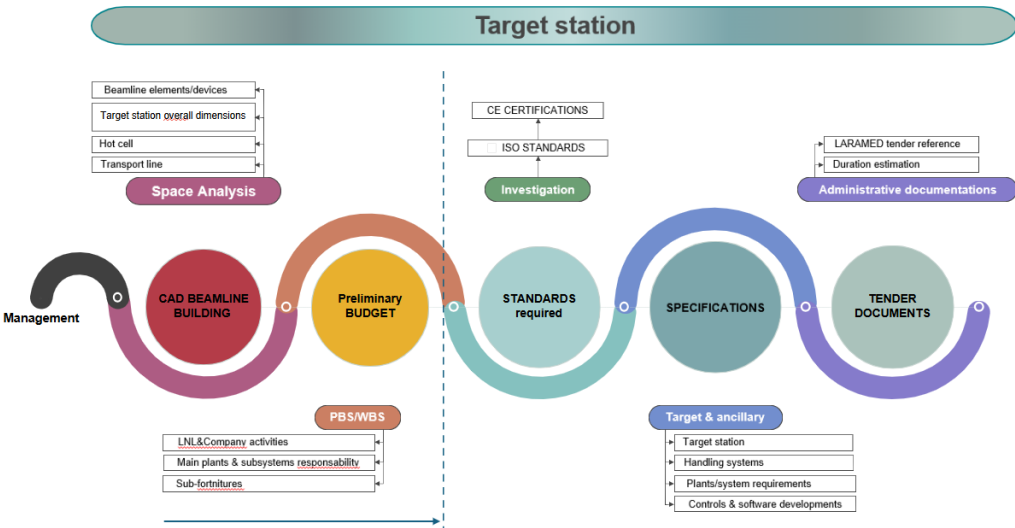
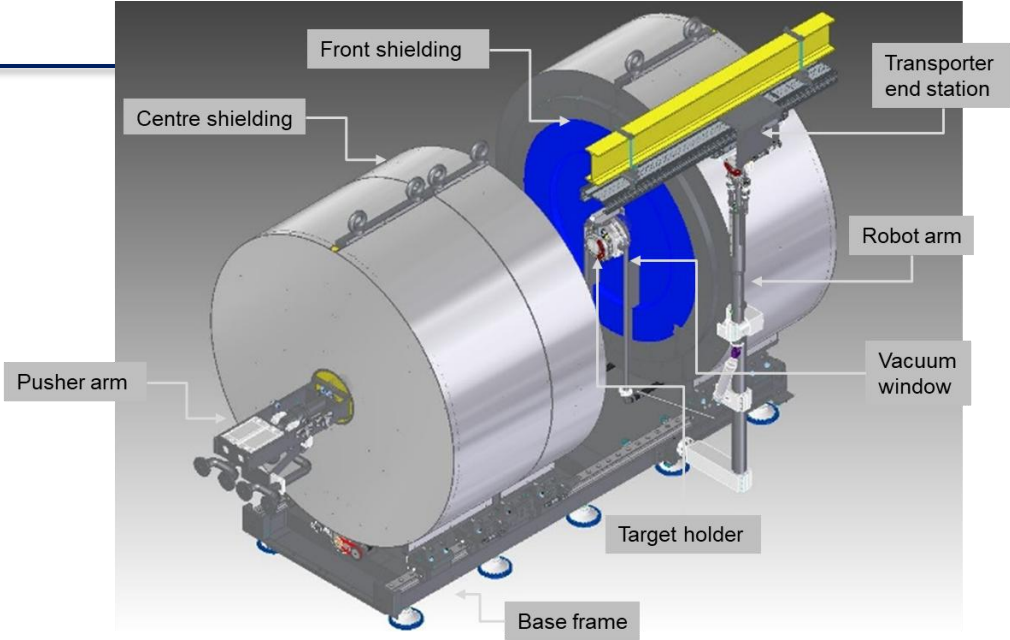
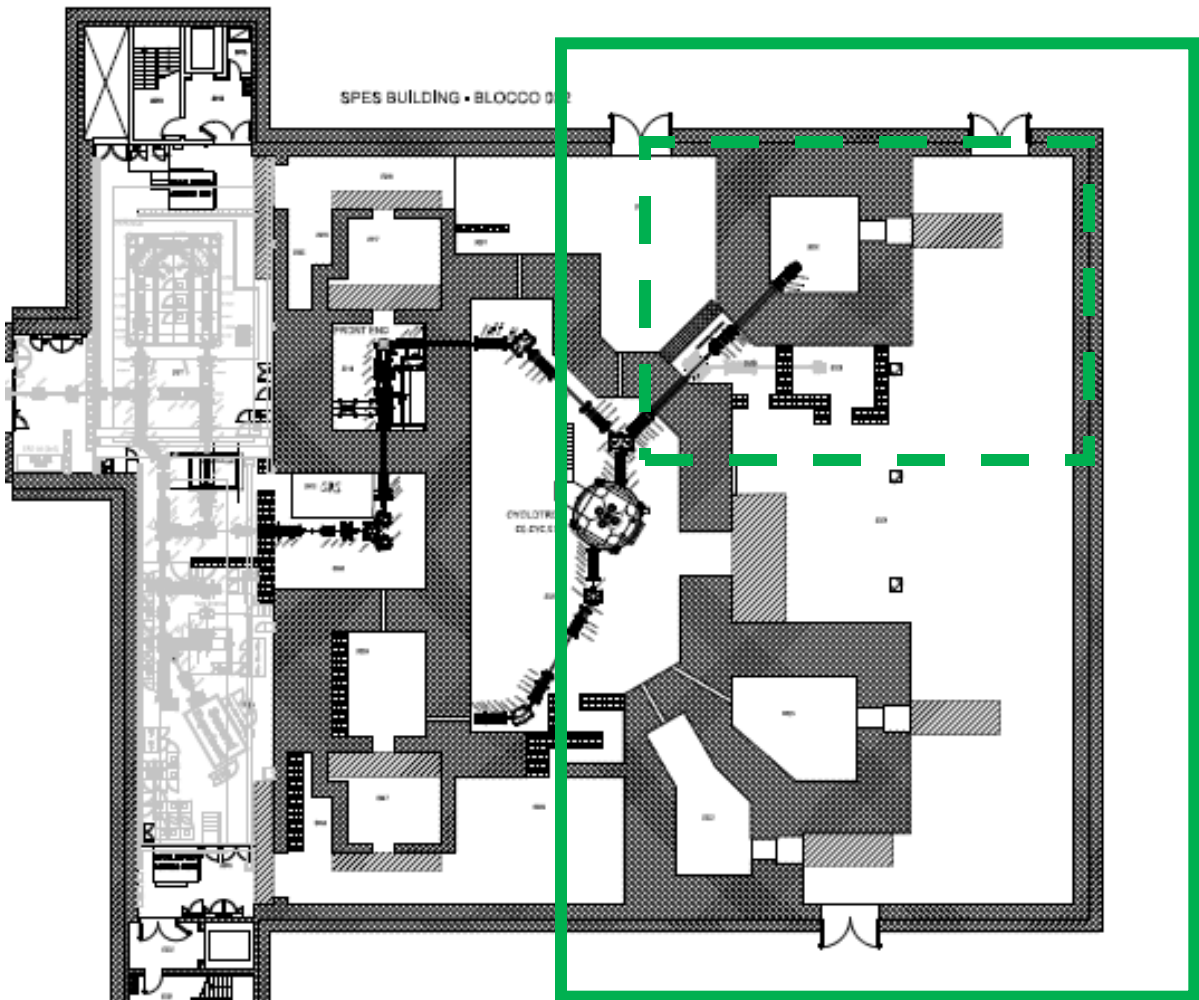


## Phase 3: RFQ

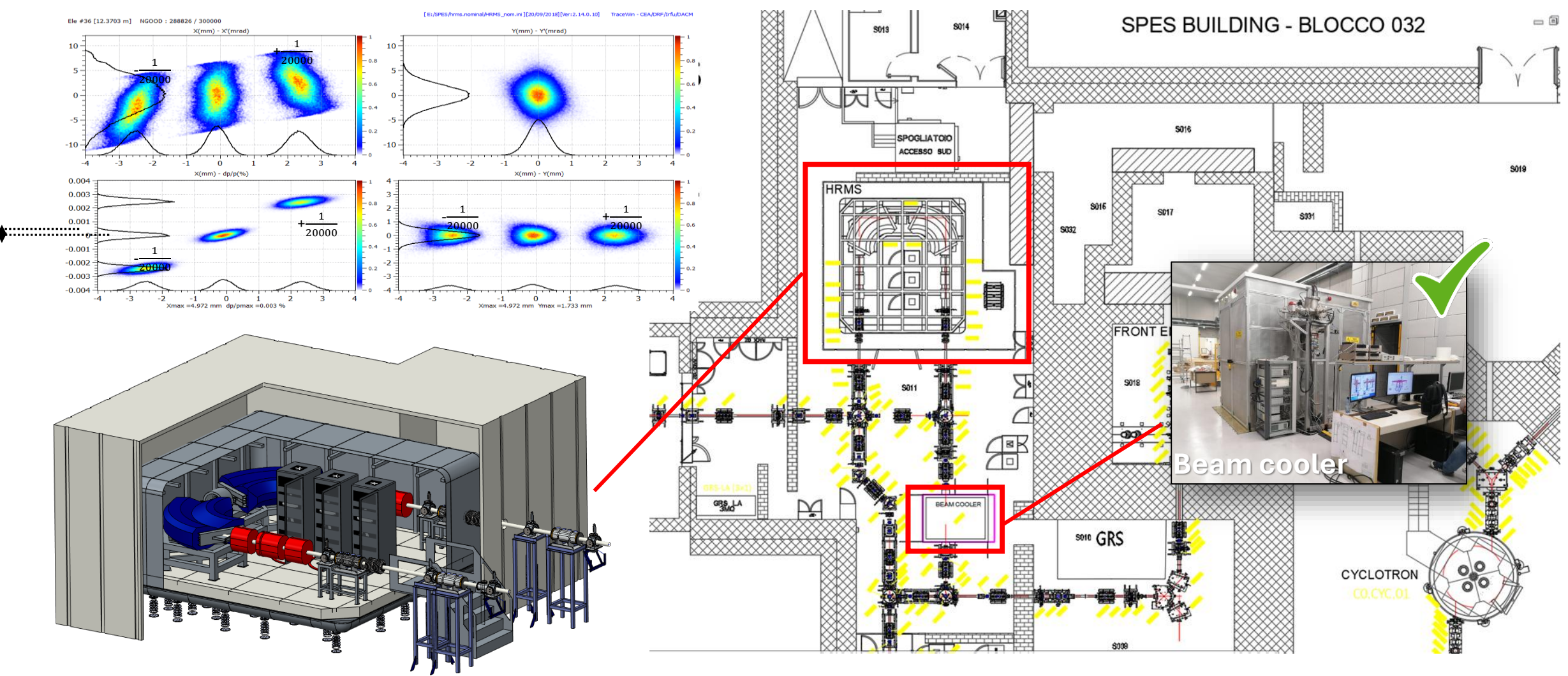
- ✓ RFQ assembly completed
- ✓ Vacuum test passed
- ✓ Bead pull measurements completed
- **End-plates and tuners under construction**
- ✓ RF amplifier tested at 200 kW CW.
- **Couplers being procured**
- ✓ Main plants completed
- Local plants to be installed



# Phase 4

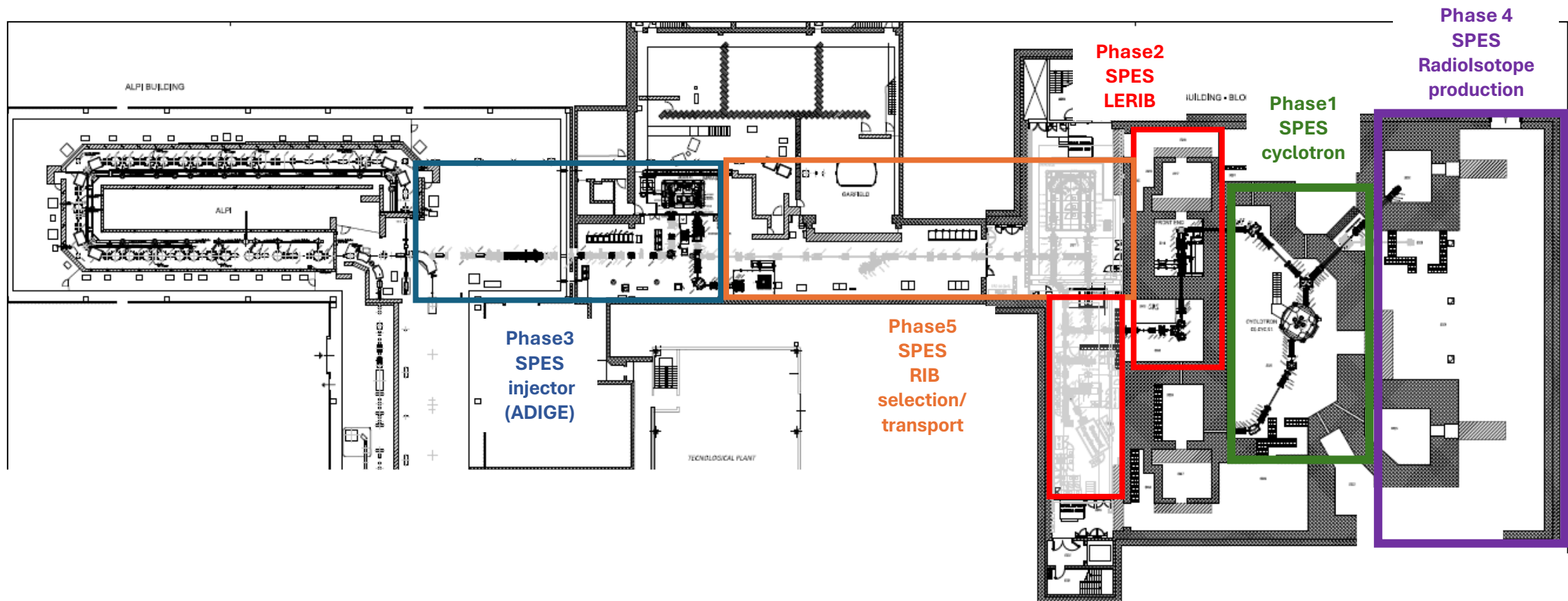


# Phase 5



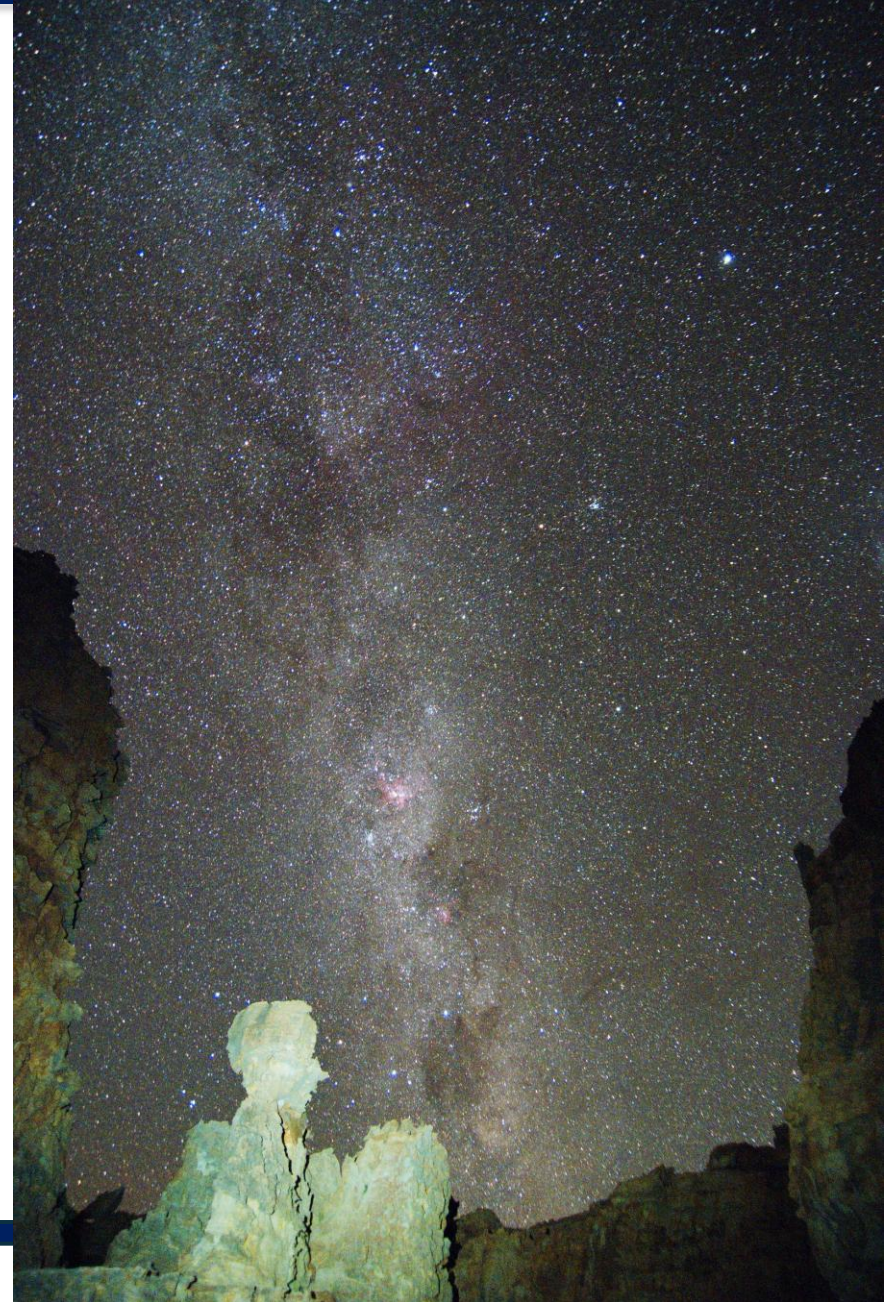
# Summary of SPES project status and future plans

- Phase1: operation of the **SPES cyclotron** April 2024 and first experiment (Mars 2024) - May 2024
- Phase2: Commissioning of **the ISOL Low-Energy Radioactive Ion Beams: Nov 2024 and April 2025**
- Phase3: Complete the **ADIGE new injector and RFQ for ALPI (SPES post-accelerator): early 2026**
- Phase4: **Radioisotope production facility: mid 2027**
- Phase 5: Commissioning of **post-accelerated Radioactive Ion Beams: mid 2027**









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**Thank you for attending the talk and for your attention**

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