

# CERN-MEDICIS

## MEDical Isotopes Collected from ISolde

# 2024 summary and draft program for 2025

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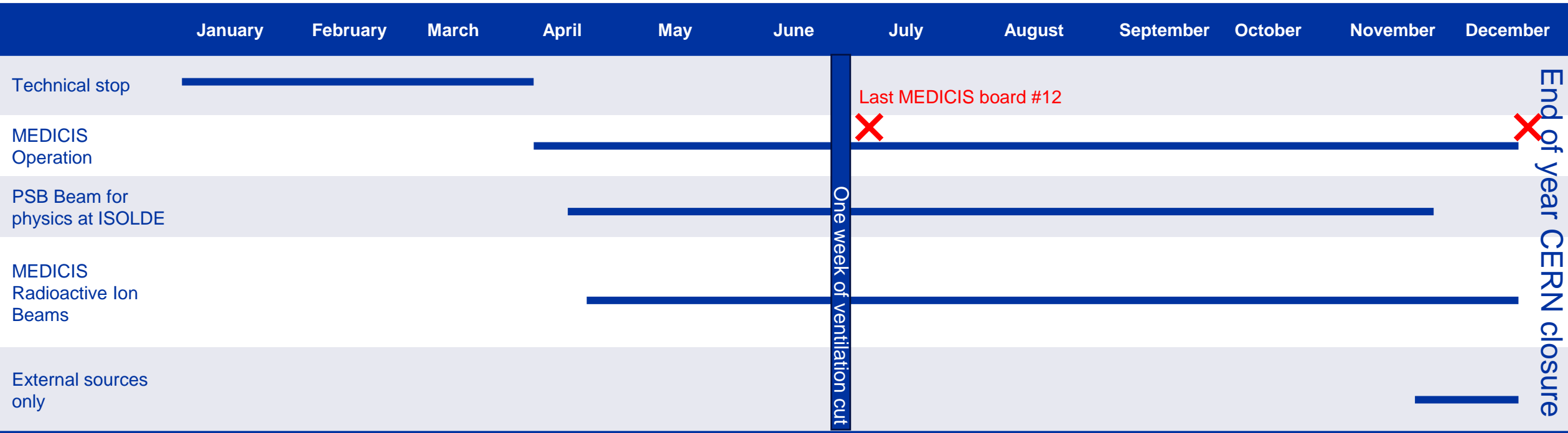
On behalf of the MEDICIS local dream-team, collaboration and all contributors

11<sup>th</sup> of December 2024

13<sup>th</sup> CERN-MEDICIS Collaboration Board





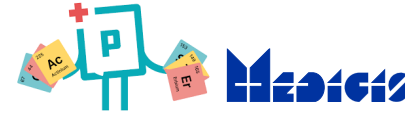
# CERN-MEDICIS – Operation Year 2024



- **Last MEDICIS board was held in July**, after few months of MEDICIS operation and after a three months maintenance period.
  1. Summary of the production shown during the last board
  2. Summary of the rest of the year
- MEDICIS is now **integrated in the yearly and weekly ISOLDE schedule** → highly helping with coordination and communication around target irradiations! 😊

# CERN-MEDICIS – summary of last board

- Continuous demand of **Ra/Ac-225** (both PRISMAP and MEDICIS)
  - Delivered twice to NPL → 2 x 110 MBq Ra/Ac-225 
  - With a **record efficiency of 52%!**
  - Delivered once to IRA → 2 MBq Ra/Ac-225 



- **Ra-224 deliveries** (x2 to 3) for PRISMAP User (Call 4)

- Delivered for this user in June 24 for the first time
  - User needed minimum 200 MBq → We produced **700 MBq**



happy user and happy MEDICIS 😊

Ra-224/225 combined productions – the two are collected at the same time – optimization of beam time and activities 😊

- **Tb-155 delivery** (x1 to x2) for PRISMAP User (Call 4) – to CHUV


- Run cancelled twice due to target failure
  - Two new targets got a water leak following irradiation ... 











- **Cu-67** collection was about to start

- **Tb-149/152/155** : Sean Collins was about to come on-site before the last board (and he was there !)

# CERN-MEDICIS – production runs in July – Dec 2024

- **Cu-67** → unsuccessful due to target vacuum issues following irradiation 
  - To be repeated as development run next year

*Note: during YETS, a forced cooling system will be put in place to reduce the heat at the MEDICIS target during passive irradiation*
- **K-43** → first collection as test run for PRISMAP: 14% efficiency obtained 
- 3x **Ra-224/225** double collections to Dresden and NPL 
- 1x **Ra-225** to JRC-Karlsruhe
- 1x **Ra-225** to KU Leuven 
- 2 x **Tb-155** for CHUV (PRISMAP) 
- 1 x **Tb-155** for NPL 
- 1 x **Tm-165** for Orleans (PRISMAP) 
- 1x **Eu-145** for NPL 
- 2x **Gd-149** for NPL 
- Development runs on Tb-155 extraction from TaC in the frame-work of Patricija’s PhD (one shipping to NPL).
- + Sc-43/44 run from external sample from PSI to end the year 😊

# CERN-MEDICIS KPI DASHBOARD 2024



## TARGETS

7 new targets built  
5 reused from previous years



## PROTONS ON TARGET

*(excluding external sources)*  
4.1E19



## ACTIVITY

2 GBq collected total



## DISPATCH TO PARTNER INSTITUTES

18 radioactive transports



## EFFICIENCY

Up to 72% (for Ra-225)



## DOSE EXPOSURE

Maximum 52  $\mu$ Sv individual  
*(700 MBq Ra-224 + 110 MBq Ra-225)*  
328  $\mu$ Sv collective over the year

# CERN-MEDICIS – now on yearly shutdown (YETS)

- MEDICIS switched-off since Monday 09<sup>th</sup> of Dec morning
- **Yearly End of the year Technical Stop (YETS 2024-25)** started on the 09<sup>th</sup> of Dec afternoon:
  - Cleaning/emptying of the **MEDICIS Glovebox**;
  - Update of **vacuum software** application;
  - **Target movement/eliminations**;
  - Installation of new module to get access to **remote HV**;



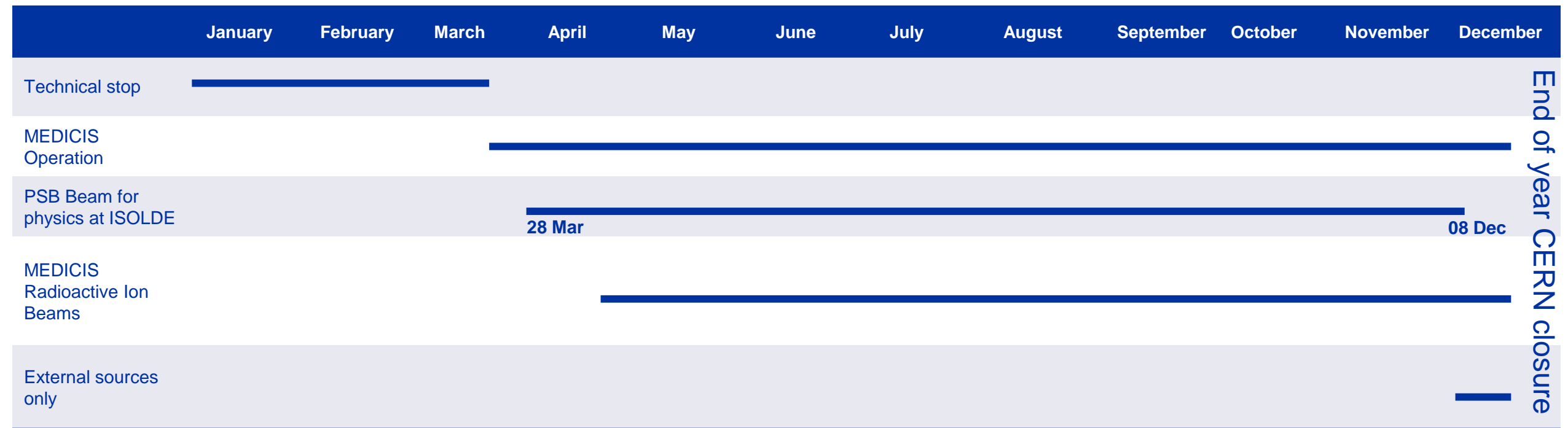
CHRISTMAS BREAK



- **Extensive maintenance of the rails/MONTRAC system** following issues we got at the end of operation year;
- 4 weeks **ventilation** cut ... for improvement & maintenance;
- **Electrical work**;
- **Frontend yearly maintenance** with change of electrode tip, **vacuum pumps** check and oil change;
- **Robot** trajectory tests & maintenance;
- Deployment of **new interlock system** – no issues so far but will be updated;
- **Faraday cups** maintenance – got stuck during the year with temporary mitigation measures put in place;
- Yearly **RP detector** checks;

**FINAL safety tests for restart green light on 14<sup>th</sup> of March 2025**

# CERN-MEDICIS – Yearly technical stop & planning 2025



- Always a period of **2 to 3 weeks of stable beam tests** before starting with radioactive ions beams (magnet calibration checks etc.)
  - Checks of the **beam position with gafchromic® films** (done every year before restarting irradiations);
  - **Planning will be based on ISOLDE schedule** as soon as released (Feb/March 2025)
    - Considering [already approved projects + PRISMAP User Projects](#)
- + [new MEDICIS projects](#) will be presented and proposed to the board members → Planning of the year to be adapted accordingly
- [External sources](#) will be scheduled all along the year (especially for Sm-153)

# CERN-MEDICIS – in the program in 2025

- Continuous high demand of **Ra/Ac-225** (both PRISMAP and MEDICIS)



- **Ra-224** delivery (x2 to x3) for PRISMAP User (Call 4)



- **Ra-223** delivery (x1) for PRISMAP User (Call 5)



*Combined productions of Ra-223/224 and Ra-224/225*

- **Ba-128** project still ongoing for CHUV



- **Tm-165** delivery (x1) for PRISMAP User (Call 1)



- **Sm-153** ~once every 6 weeks as targeted pace



- Deliveries schedule with SCK CEN will be organized as soon as schedule is release on their side (beginning of 2024).

- Requests from NPL

- **Ac-226, Tb-155, Eu-145**



## Developments

- **Sc-44/46/47** project still ongoing



- **Tb-155** improvement of the activity collected still ongoing (part of Patricija's PhD) – repeat 6% from ARRONAX would be great!



- **Cu-67** development run





# A BIG THANKS TO ALL THE PEOPLE, GROUPS, SERVICES, INSTITUTES, COLLABORATION ... INVOLVED IN MEDICIS!



**THANK YOU FOR  
YOUR ATTENTION !**



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