

# CERN-MEDICIS

MEDical Isotopes Collected from ISolde

## 2024 program

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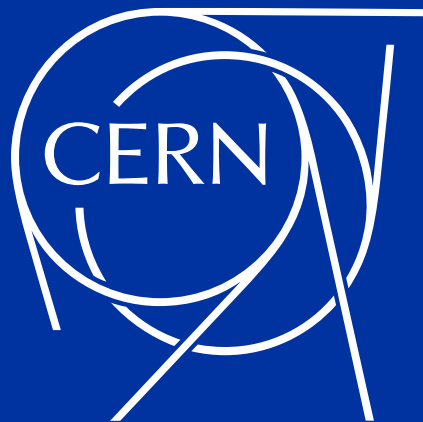
On behalf of the MEDICIS local dream-team, collaboration and all contributors

2<sup>nd</sup> of July 2024

12<sup>th</sup> Collaboration Board



# CERN-MEDICIS KPI DASHBOARD 2023



## TARGETS

9 new targets built  
6 reused from previous years



## PROTONS ON TARGET

*(excluding external sources)*  
2.4E19



## ACTIVITY

3.8 GBq collected total



## DISPATCH TO PARTNER INSTITUTES

25 radioactive transports  
Sm-153 shipped 1h after foil retrieval!



## EFFICIENCY

Up to 41% (Ra)



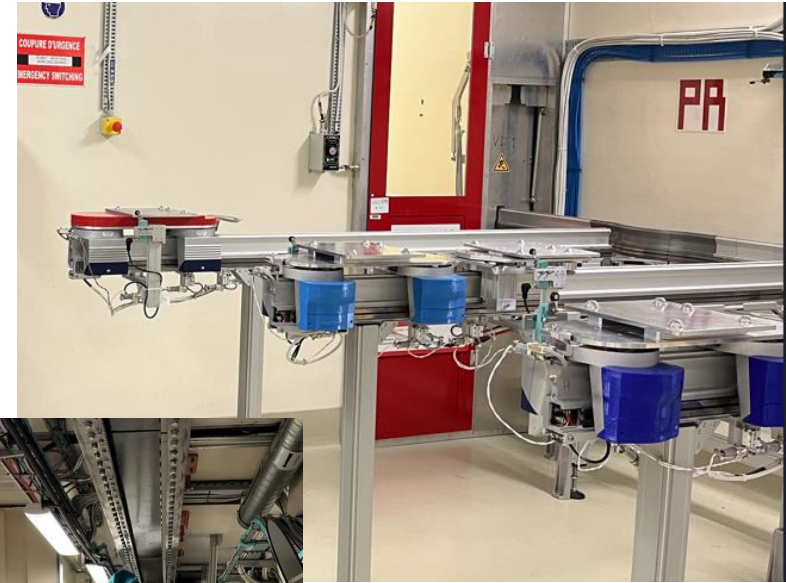
## DOSE

Maximum 41  $\mu$ Sv individual (1 GBq batch)  
179  $\mu$ Sv collective over the year

# CERN-MEDICIS – Yearly technical stop 2024

Started on 15<sup>th</sup> of December 2023 and ended before the Easter week-end

- Yearly maintenance of the **controls, hardware & Labview** updates;
- Yearly 3-weeks **ventilation** checks;
- **Electrical work** in the building – including HP Ge connection to the UPS (Uninterruptible Power Supply);
- Yearly check of the **robots, shielded shelves and MONTRAC** maintenance;
- **Gas system** checks and recalibration;
- New **Patch Panel Installation (connectors to the FE/Target)** - same as the one installed at ISOLDE and Offline;
- Yearly **electrical inspection**;
- MELISSA laser window change & annual **laser beam path** check/cleaning;
- **Liquid waste treatment and elimination**;



# CERN-MEDICIS – Yearly technical stop 2024

- **Front-end yearly inspection and maintenance**

- New extraction electrode;
- Inspection with endoscope;
- Insulator cleaning;
- Water cooling pipe fixe etc.

- **Vacuum pumps** yearly checks;

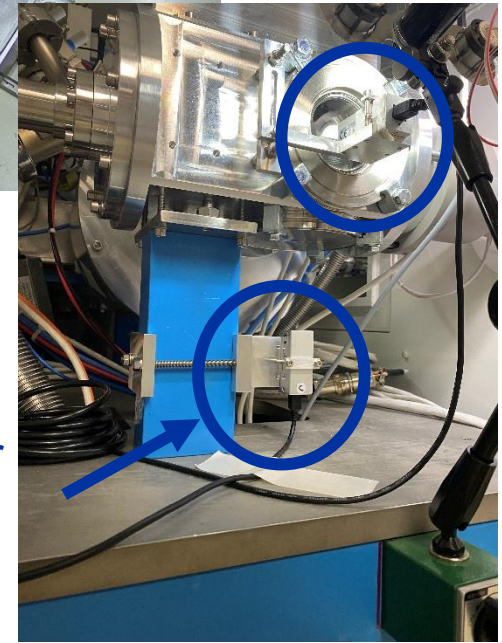
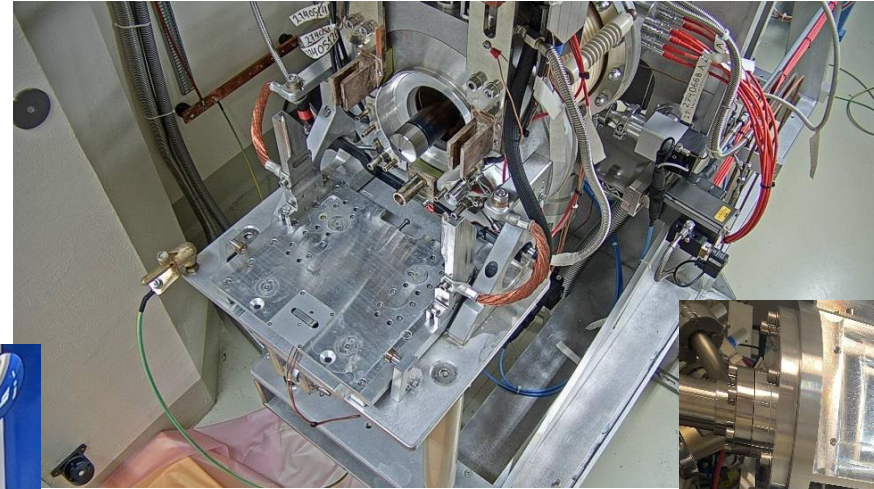
- **RP detectors** yearly checks;

- **Access system** yearly checks;

- Calibration and installation of a **2<sup>nd</sup> Kromek GR-1 detector** below the collection chamber to compensate from saturation of the 1<sup>st</sup> GR-1 for high activities (>200 MBq)

- With the help of P. Kalnina –Master student – University of Latvia
- Collimator system development – *automatization ongoing*;

- **Safety tests** from the Departemental Safety Officer (DSO) for **hardware and irradiation permits approval – Easter 2024**



# CERN-MEDICIS – commissioning of the facility

## Restart & commissioning of the facility – after Easter week-end

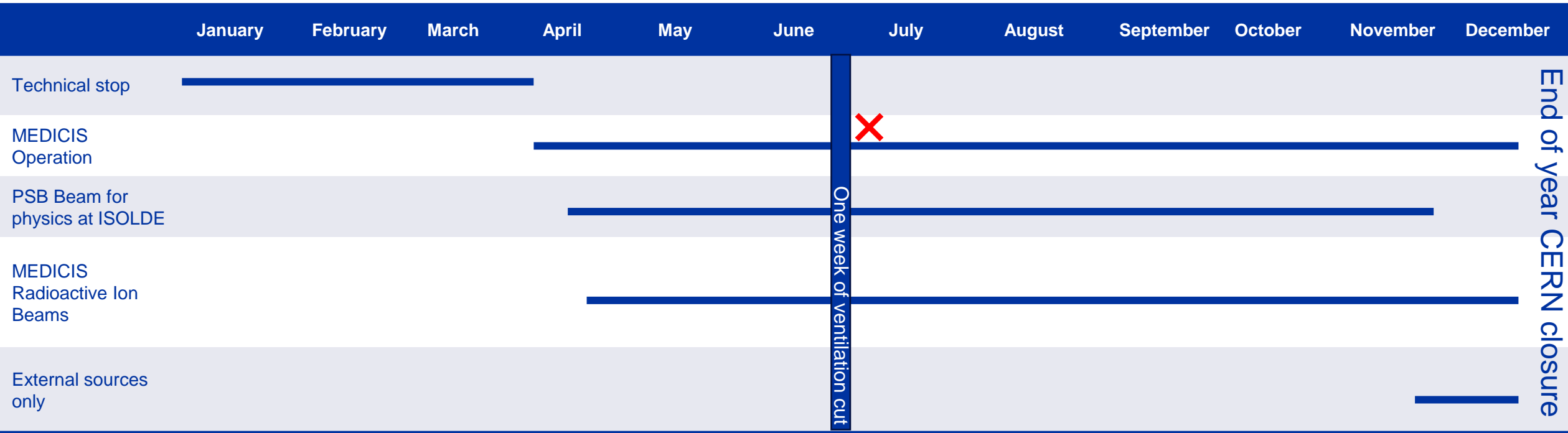
- **New targets** built and being built – some of our targets used in **2023 can be re-used**:
  - Ta rolls for Tb, Tm radionuclides;
  - ThC targets for Ra-224, Ra/Ac-225;
  - For external source loading (namely Sm);
  - UCx target for Cu beam developments + request to produce K-43 within PRISMAP.
- **Empty target unit used for commissioning** of the facility with Sm and Tb mass markers placed inside the container:
  - Conditioning of the new electrode up to 65 kV;
  - Target heating & monitoring of new electrode behavior;
  - Magnet calibration checks with Na, K, Sm, Tb at different HV;
  - Laser checks on Sm beams.
- Repeat **beam position** checks with **gafchromic films**
  - Until last year included in the yearly checks.



**!/ Irradiation opportunities will be diminished this year with the impossibility to use the GPS ISIS irradiation station**

- **Only irradiation on HRS side possible - Direct and Indirect**
- **Losing protons being sent to GPS ☹**

# CERN-MEDICIS – Operation Year 2024



- Period of **2 weeks of stable beam tests** before starting with radioactive ion beams (Sc-47 from TiC).
- **Planning is based on ISOLDE schedule** as soon as released (and MEDICIS now officially included 😊 - see NEXT SLIDE)
  - Considering already approved projects + PRISMAP User Projects + newly approved MEDICIS projects proposed to the board members in Nov 2023 → Planning of the year adapted accordingly;
  - **ISOLDE schedule released up to August 2024 for now.**
- External sources will be considered all along the year + exclusively from mid of November (stop of protons at ISOLDE)

# CERN-MEDICIS – Schedule until end of August 2024

Released until end of August 2024

Schedule 2024: weeks 14 - 35  
Version: 21/05/2024 by Hanne Heylen

**ISOLDE WEEK 19**










Day	Time	RILIS	GPS	CAO	MEDICIS - HRS	p's	Visits	other
Monday	06-05		9:00 #727M	Setup for IS678	8:30 #835 retrieval 8:30 #833M low trolley			Startup meeting
Tuesday	07-05			Setup for IS678	Direct irradiation (-10,-63)	NORMHRS (MEDICIS)		
Wednesday	08-05		TBD: Setup to GLM/GHM	Proton scan, yield checks	8:30 Change #833M to high trolley			
Thursday	09-05			IS678 - 31,32Ar - Wisard				Official CERN holiday

Weekly schedule Example of week 19

- Irradiation opportunity for MEDICIS now included in the ISOLDE schedules : annual schedule **AND** weekly schedule
- ! Less irradiations in 2024 and 2025 due to no possibility to take protons from GPS**
- MELISSA laser needs highlighted (as it is for RILIS at ISOLDE)
  - Strong support from C. Bernerd (Fellow RILIS) and R. Mancheva (PhD KUL/CERN/LISA)
  - PJAS arriving from KUL for MELISSA
- Production run or Development run week visible to highlight the importance of the irradiation
- MEDICIS and PRISMAP type of run included




July												August											
Day	GPS	HRS	RILIS	MEDICIS	MELISSA	Day	GPS	HRS	RILIS	MEDICIS	MELISSA												
27 Mon	#85-UC-MK1(Ta)	#774-LaC-MK1(Ta)		Direct from afternoon		31 Thu																	
28 Tue				Direct #872M UCx (Cu-67)		Fri																	
29 Wed				Retrieval		Sat	IS742-1328nS - ISS																
30 Thu						Sun																	
31 Fri						Mon																	
1 Sat	IS529-54Ca					Tue																	
2 Sun						Wed																	
3 Mon	#835-UC-MK1(Ta)			Direct #834M 08:30(Ra-224-225)		Thu																	
4 Tue				Direct - removal 09 am		Fri																	
5 Wed						Sat																	
6 Thu						Sun																	
7 Fri						Mon																	
8 Sat						Tue																	
9 Sun						Wed																	
10 Mon						Thu																	
11 Tue	IS725 - 228Ra coll.					Fri																	
12 Wed	GLM (no p+)					Sat																	
13 Thu	#868-UC-VD5	IS686 - 108Sn - ISS				Sun																	
14 Fri						Mon																	
15 Sat						Tue																	
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# CERN-MEDICIS – in the program in 2024

- Continuous demand of **Ra/Ac-225** (both PRISMAP and MEDICIS)
  - Delivered twice to NPL → 2 x 110 MBq Ra/Ac-225 
  - See Sean's talk this afternoon
  - With a **record efficiency of 52%**
  - Delivered once to IRA → 2 MBq Ra/Ac-225 
  - See Ruslan's talk this afternoon, completed by Jake's talk as well
- **Ra-224 deliveries** (x2 to 3) for PRISMAP User (Call 4) 
  - Delivered once to this user
    - User needed minimum 200 MBq → We produced **700 MBq** happy user and happy MEDICIS 
  - Next delivery beginning of August
  - Last delivery requested for October
- **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 ... 
    - New run in August
- **Tb-149/152/155** : Sean Collins coming on-site next week 



# CERN-MEDICIS – in the program in 2024

- **Ba-128 project** still ongoing for CHUV, but no priority for CHUV for this year
  - Limited availability due to several PRISMAP projects hosted by CHUV 
- **Tm-165 (PRISMAP)** delivery pending User's licence → ERRATUM User received his license last week!
  - Tm-165 will be at the planning as soon as possible for delivery to Orleans from September 
- No **Tm-167** for this year requested by PSI 
- **Sm-153** - once a month as targeted pace with bi-monthly deliveries towards the end of the year
  - Not before end of Summer
  - Heidelberg's situation with broken SPECT
  - Waiting green light from CERN legal service and Knowledge Transfer regarding clinical translation
  - Discussion regarding production costs at SCK CEN



# CERN-MEDICIS – in the program in 2024

- **Sc-44/46/47** project still ongoing 
  - **Record collected activity** and **efficiency** for Sc this year (see Edgars' talk in the afternoon)
  - Edgars finishing his PhD contract on the subject at the end of July

*Follow-up:*

- Patricija KALNINA starting a PhD on difficult-to-extract radionuclides in general at the beginning of August

- **New developments to continue enlarging MEDICIS' portfolio**

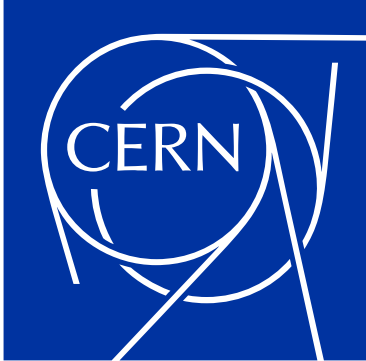
- **K-43** requested by PRISMAP (in two weeks, first test)
- Investigate our **Cu-67** capabilities → happening this week, with lasers



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



**THANK YOU FOR  
YOUR ATTENTION !**



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