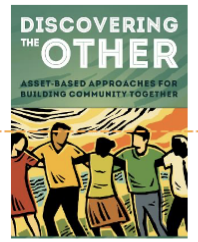
TAM EURO-LABS

A. Navin on behalf of the EURO-LABS team
Grand Accélérateur National d'Ions Lourds, Caen, France

Lord Shiva danced the Universe into existence

Cosmic dance of subatomic particles
WP2 WP3 WP4

KOM →



SAM →

TAM

Teen Age Message
Series of interstellar radio transmissions
Yevpatoria Planetary Radar

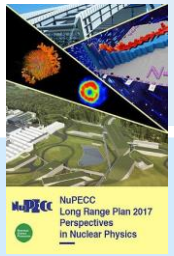
Developments→ Access → Experiments → Science-Technology → Training → Open Data

Setting the scene:
- what achieved so far,
- what is ahead

This project has received funding from the European Union's Horizon Europe Research and Innovation programme under Grant Agreement No 101057511.

EURO-LABS Structure

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES



SYNOPSIS OF THE 2021 ECFA DETECTOR RESEARCH AND DEVELOPMENT ROADMAP
by the European Committee for Future Accelerators
Detector R&D Roadmap Process Group

Integrated Access
Service Improvements

WP1
Management

INFN
Project office

WP2
Access for Physics
Stable Ion beams
Radioactive Ion beam
Neutron beams
Theoretical support
Service improvements

WP3
Access for Accelerators
Material Testing
Technology Infrastructures
Electron beams
Applications

WP4
Access for Detectors
Test beams
Detector Characterization
Irradiation facilities
Service improvements

WP5
Open Diverse and inclusive Science
Diversity & dissemination
Open data
Machine Learning
Training

Sharing Knowledge and Technology in an Open, Diverse and Inclusive manner

Facility coordinators

UoB FC Andrew Stephen
Thank you Laura Gonella
THOR FC Antonella Chiuchilo
Thanks Umberto Gambardella

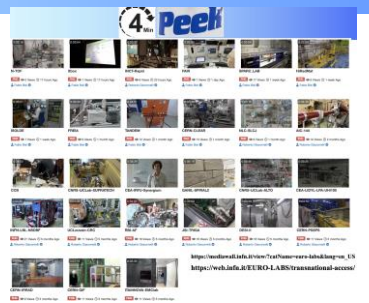
Task 2.4 leader Bira thank to GertAarts
INTRANS
Araceli Lopez-Martens
Thanks Magda Górska

Chairperson
Governing Board

Scientific Coordinator + 3 Deputies
Project Coordinator and Office: INFN

Welcome to new contributors to EURO-LABS, fulltime or otherwise

What are we going to do here ?



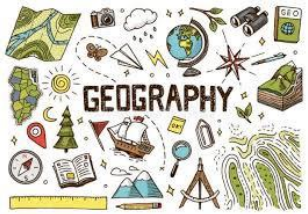
SHEERLUCK Holmes

Focus on Scientific and Technical results supported by EURO-LABS

Use of the EURO-LABS (service improvements) facilities
for results and ideas in diverse basic physics, technical and applied science

SOURCE / ECONOMY

Nuclear-themed tourism gains momentum amid summer study tour boom



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Gaining from TAM – various angles

EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

Joachim Josef Mnich

CERN Director of Research and Computing

Nuclear Physics Roadmap	*Marek Lewitowicz*	
222/R-001, CERN		10:00 - 10:30
ECFA report on HEP activities en route to the ESPP update	*Paris Sphicas*	
222/R-001, CERN		11:00 - 11:30
Challenges and R&D opportunities for the Future electron-positron Circular Collide	*Jacqueline Keintzel*	
222/R-001, CERN		11:30 - 12:00
Innovation Fostering in Accelerator Science and Technology (I.FAST) - Project Report	*Maurizio Vretenar*	
222/R-001, CERN		12:00 - 12:30
Advancement and Innovation for Detectors at Accelerators (AIDAinnova) - Project Report	*Paolo Giacomelli*	
6/2-024 - BE Auditorium Meyrin, CERN		09:00 - 09:20

Project Office Report	*Paolo Giacomelli*	
6/2-024 - BE Auditorium Meyrin, CERN		11:50 - 12:15
Lessons learned from P1 reporting	*Barbara Pezzotta*	
222/R-001, CERN		09:00 - 09:25
Steps and schedule for P2 report	*Maria Colonna*	
222/R-001, CERN		09:25 - 10:05
Report from the GB meeting	*Edda Gschwendtner*	
222/R-001, CERN		12:15 - 12:30

WP leaders will present their forward looking thoughts

R3B commissioning and Probing nucleon-nucleon correlations in atomic nuclei via (p,pd) QFS reaction	*Matt Whitehead*	
222/R-001, CERN		14:00 - 14:10
Determination of single-neutron energies and spectroscopic factors outside 132Sn	*Patrick MacGregor*	
222/R-001, CERN		14:10 - 14:20
Test of Low Gain Avalanche Diodes at the AIC-144 cyclotron	*Pawel Olko*	
222/R-001, CERN		14:20 - 14:35
Uniform beam delivery and real time dosimetry for FLASH radiotherapy applications	*Roberto Corsini*	
222/R-001, CERN		14:35 - 14:50
Search for E1 strength below the Giant Dipole Resonance from zero to finite temperature at IFIN-HH and CCB facilities		
Oliver Wieland		
Transnational Access experiments at the KIT electron synchrotron test facility KARA	*Dr Robert Ruprecht*	
222/R-001, CERN		15:00 - 15:15
tea break		
222/R-001, CERN		15:15 - 15:45
High precision 209Bi(n,γ) cross section measurement at n_TOF EAR2	*Javier Balibrea Correa*	
222/R-001, CERN		15:45 - 15:55
New fission studies at ALTO with nu-Ball2/PARIS	*Corentin HIVER*	
222/R-001, CERN		15:55 - 16:05
Irradiation of detectors to extreme neutron fluences up to 10^18 n_eq/cm^2 in the TRIGA reactor	*Igor Mandic*	
222/R-001, CERN		16:05 - 16:20
Lifetime measurements around 48Cα	*Giuseppe Andreetta*	
222/R-001, CERN		16:20 - 16:30
Lifetime measurements in the N=Z nucleus 66As	*Paul Greenlees*	
222/R-001, CERN		16:30 - 16:40
Cooling system and graphical user interface for EMC test station	*Fernando Arteche*	
222/R-001, CERN		16:40 - 16:55
Advancement and Innovation for Detectors at Accelerators (AIDAinnova) - Project Report	*Paolo Giacomelli*	
6/2-024 - BE Auditorium Meyrin, CERN		09:00 - 09:20
A direct measurement of a relativistic pair-plasma beam instability at The HiRadMat Facility (CERN)	*Dr Jack Halliday*	
6/2-024 - BE Auditorium Meyrin, CERN		09:20 - 09:35
Geoff: Applications and Developments in 2024	*Nico Madysa*	
6/2-024 - BE Auditorium Meyrin, CERN		09:35 - 09:50
Application of Machine Learning for beam profile monitoring	*Jaroslaw Szumega*	
6/2-024 - BE Auditorium Meyrin, CERN		09:50 - 10:05
Studies of proton-rich nuclei with EAGLE-NEDA-DIAMANT	*Katarzyna Hadynska-Klek*	
6/2-024 - BE Auditorium Meyrin, CERN		10:05 - 10:15

"What other skills do you obtain other than being able to answer interview questions?"

Thank in advance for the people presenting the research and developments for make it interesting for all

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

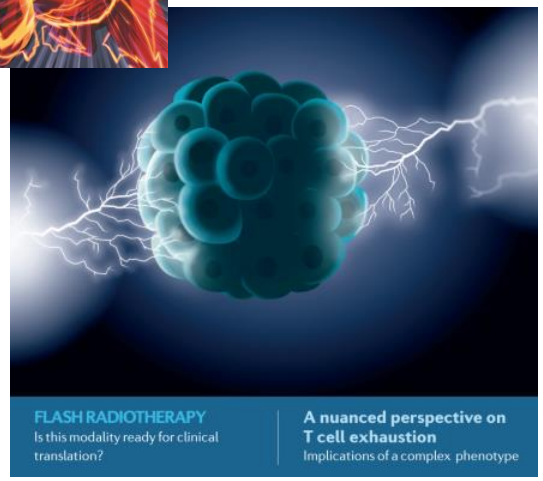
THE BIGGER PICTURE

European data strategy

Making the EU a role model for a society empowered by data

CO_2

Machine learning – faster beam tunning



UNDP
United Nations Development Programme

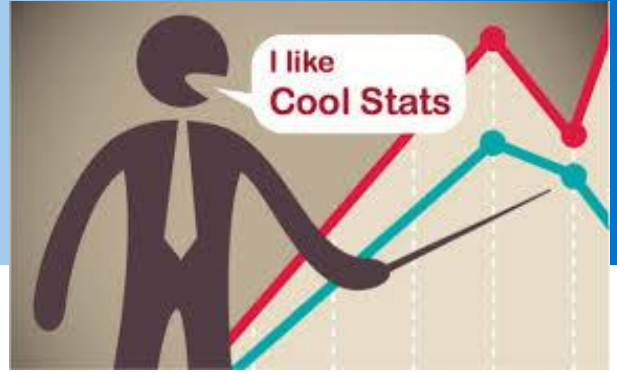
3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

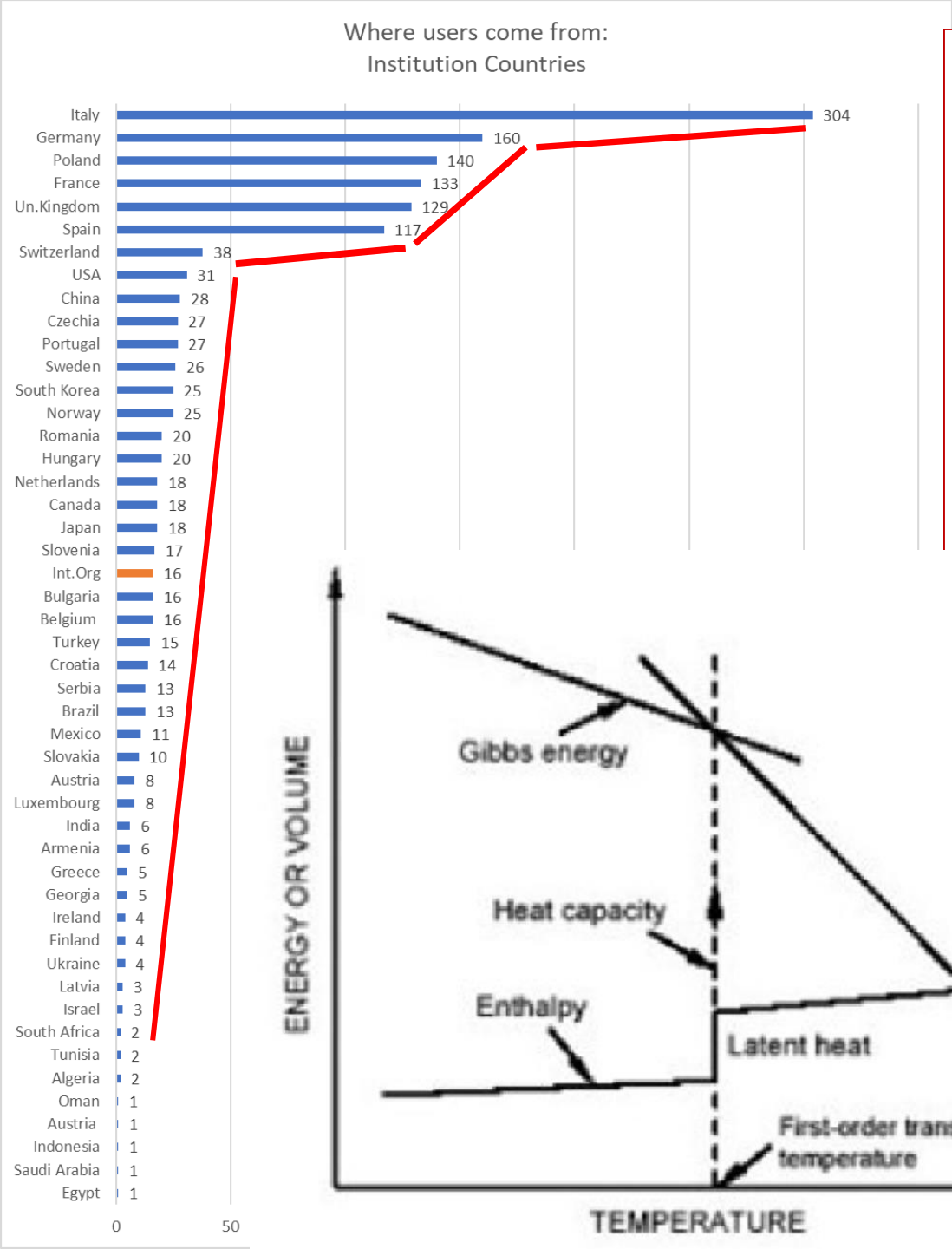
5 GENDER EQUALITY

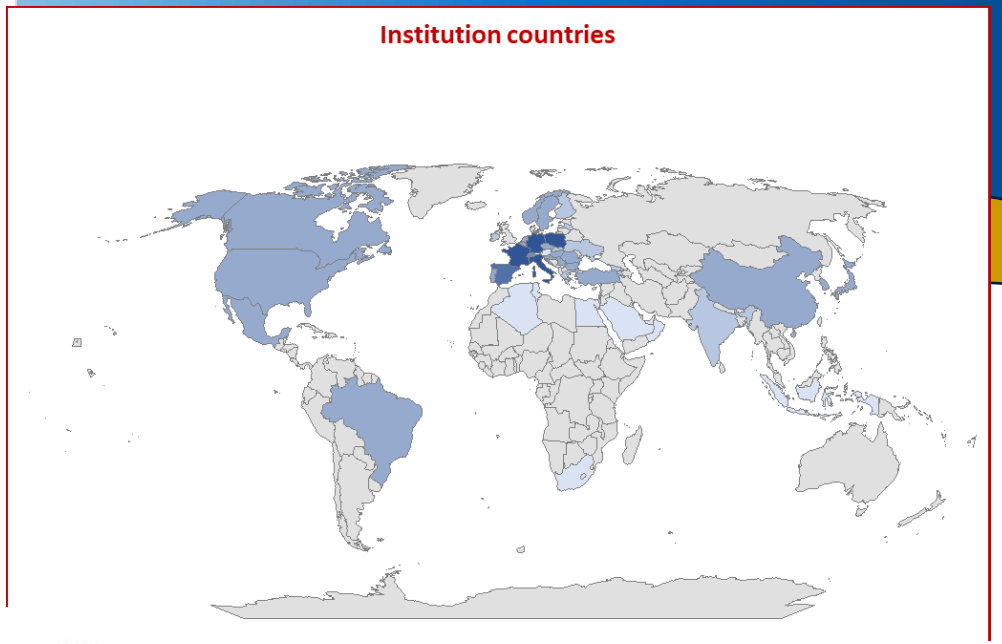
ज्ञान γνώση knowledge

EURO-LABS
EUROPEAN LABORATORIES
FOR ACCELERATOR
BASED SCIENCES

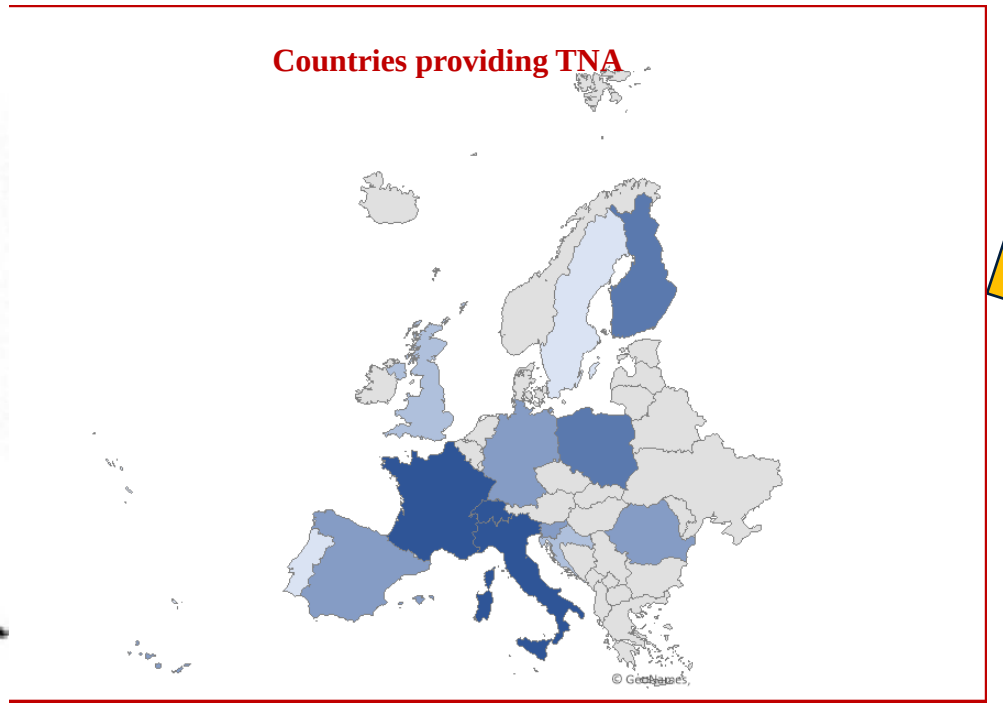


Manhattan and Pie





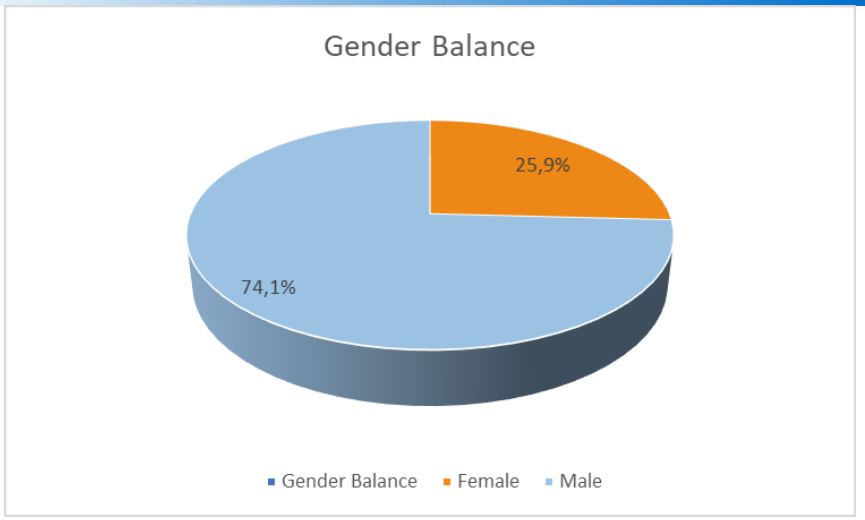
P1+P2
Based on i/p so far provided*

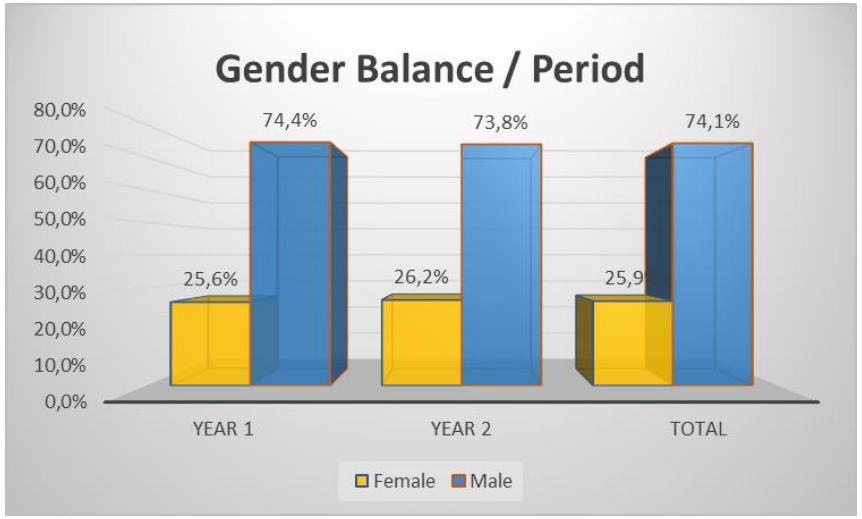


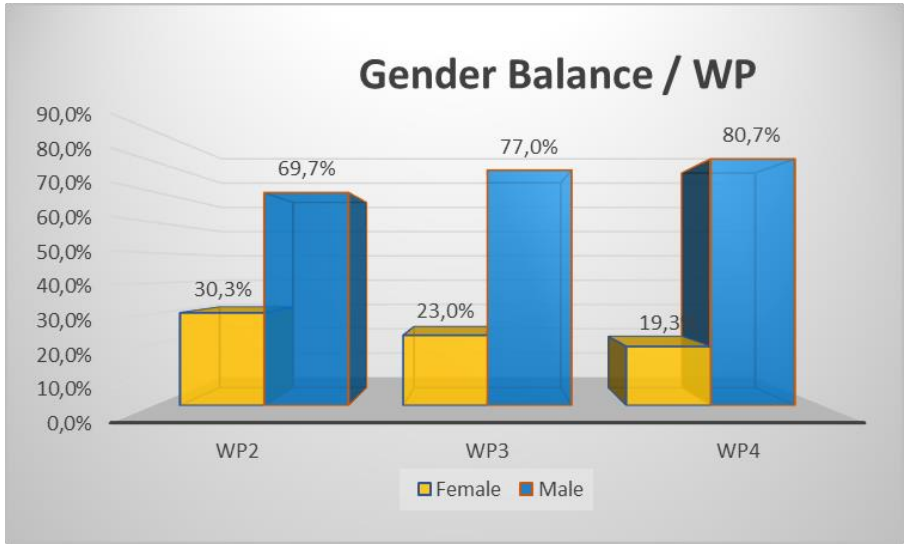
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

Period1+Period 2 *
Based on i/p so far provided*

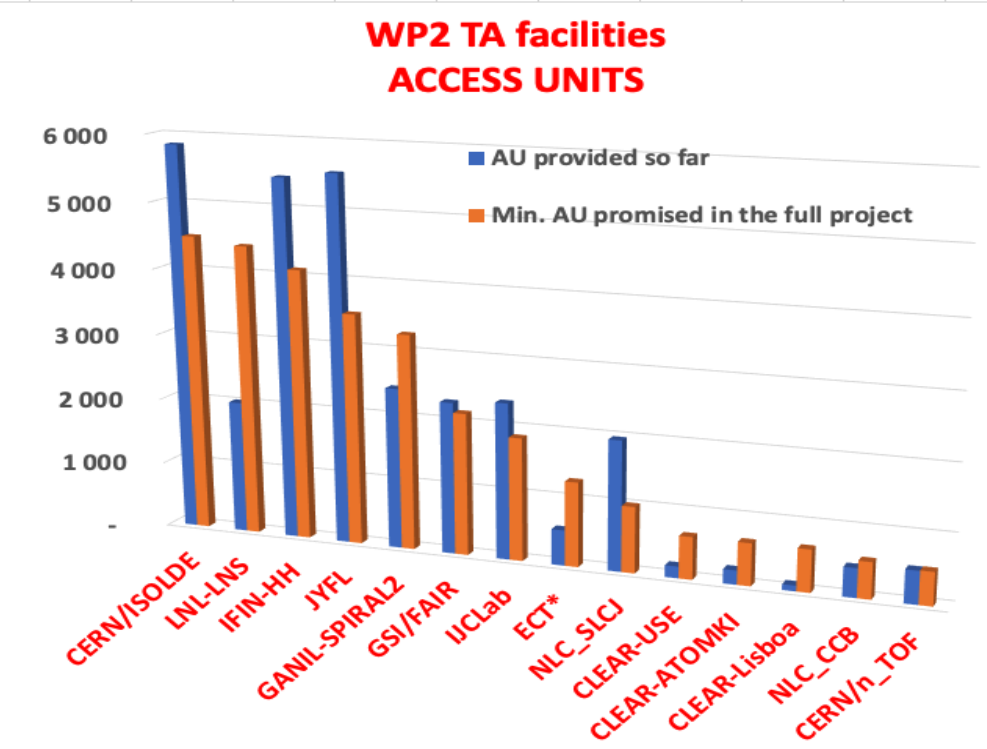
GENDER BALANCE

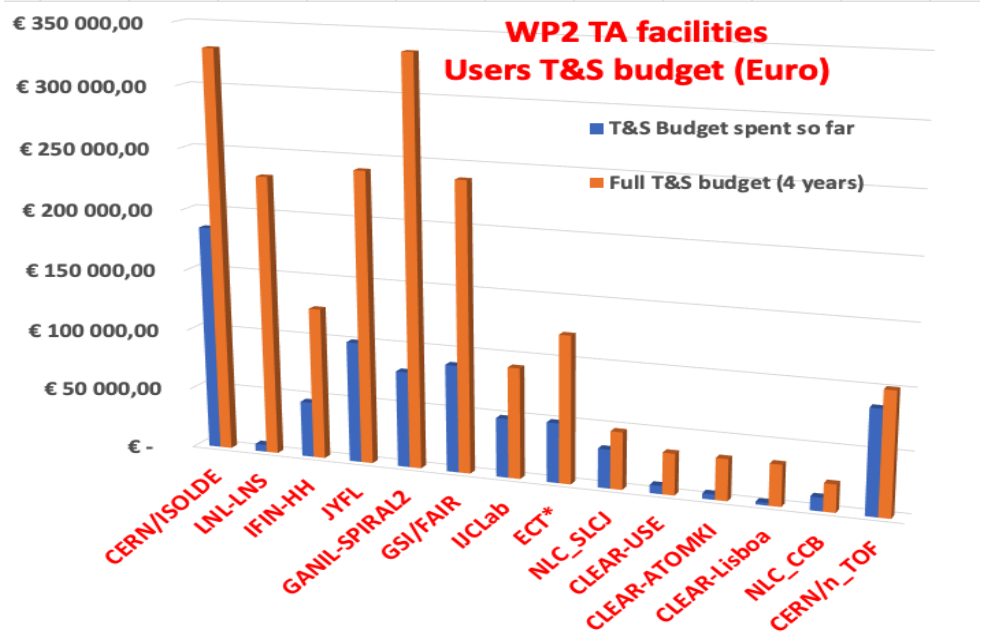


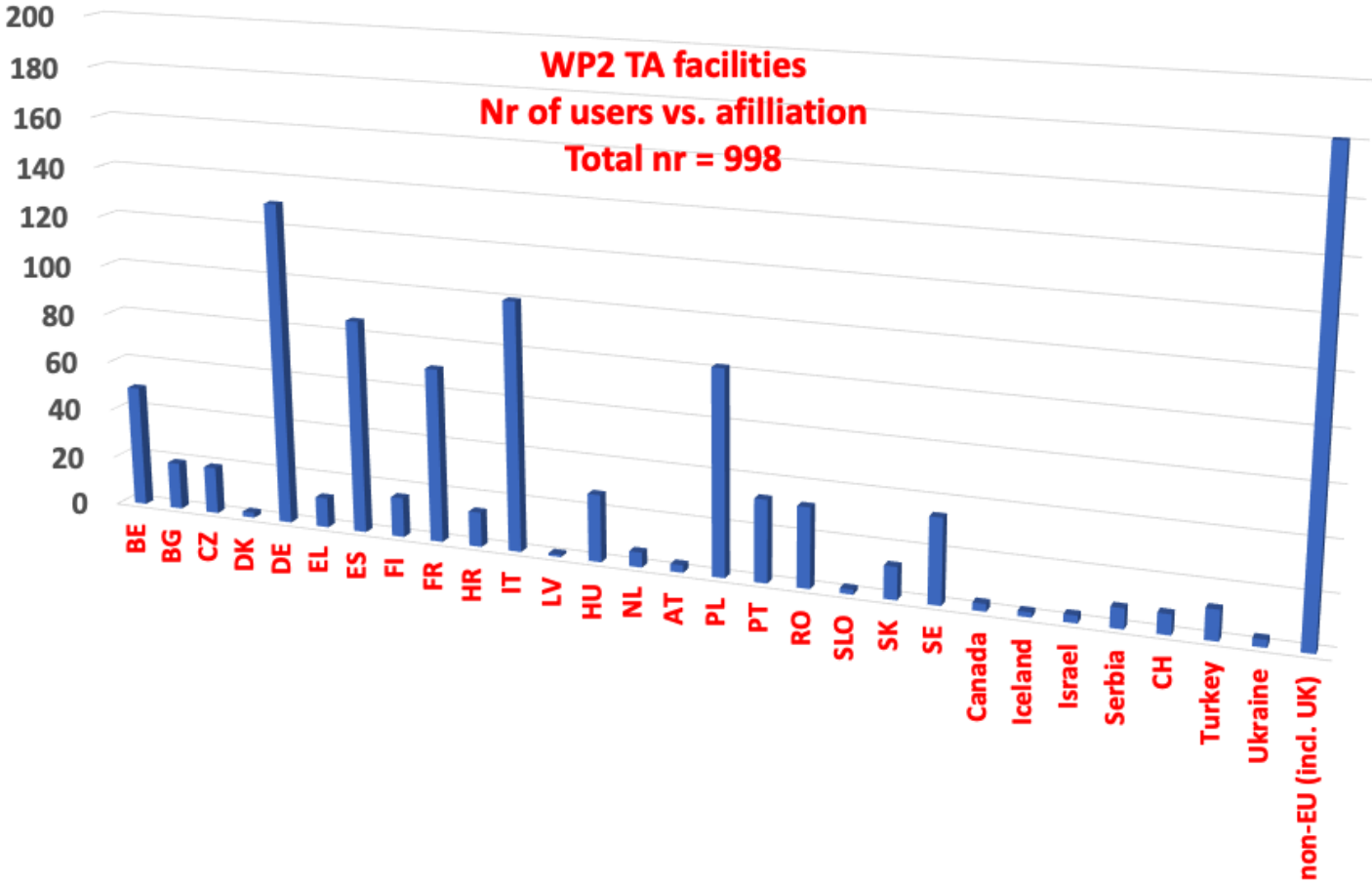




WP2 Manhattan







Review of Period 1

YEAR 3 (Sept 2024 – Aug 2025

IMPORVE OUTREACH
And visibility of the project

Prof. Edward Mitchell
Structural biology with synchrotron radiation
Head Business Development ESS
Read the report in greatest detail

Subject: Horizon Europe (HORIZON)
Project: 101057511 — EURO-LABS
Reporting period: RP 1
Interim payment (Data Sheet 4.2, Article 22.3.3)

TOUT S'EST BIEN PASSÉ

Dear Madam/Sir,

In connection with your request for interim payment, I would like to inform you that we will soon make an interim **payment** of **EUR 2 835 731.98**.

DELIVERABLES

D#	Deliverable Name	WP	Task	Due month	Delivery date (expected/ actual)
D1.1	Periodic Report-2 (Sept 2023-Feb 2025)	WP1	1.1	32	30 Apr 2025
D2.5	Services improvement Report	WP2	2.5	36	31 Aug 2025
D3.5	Report on the service improvement for material testing RIs	WP3	3.1	36	31 Aug 2025
D3.6	Report on the service improvements for Technology Infrastructures	WP3	3.2	36	31 Aug 2025
D3.7	Report on the service improvement for electron and plasma beams	WP3	3.3,3.4	36	31 Aug 2025
D5.2	EURO-LABS users' diversity final report	WP5	5.1	36	31 Aug 2025
D5.3	Release of the first functional version of the Open NP and data access tools	WP5	5.2	36	31 Aug 2025

MILESTONES

MS#	Milestone Name	WP	Task	Planned Delivery month	Delivery date (expected/ actual)	Status	Comments
MS16	Organisation of hands-on workshops & training schools	WP2	2.5	30	28 Feb 2025		
MS18	Majority of TAs attributed	WP3	3.2,3.4	36	31 Aug 2025		
MS20	Service improvements to RIs implemented	WP3	3.2,3.4	36	31 Aug 2025		
MS36	Identification of existing solutions in the EOSC ecosystem and integration of the Nuclear Physics Ecosystem	WP5	5.2	36	31 Aug 2025		

M 30th report
Feb 28th 2025

We CANNOT DO IT WITHOUT YOUR TIMELY HELP

PART B) report – descriptive

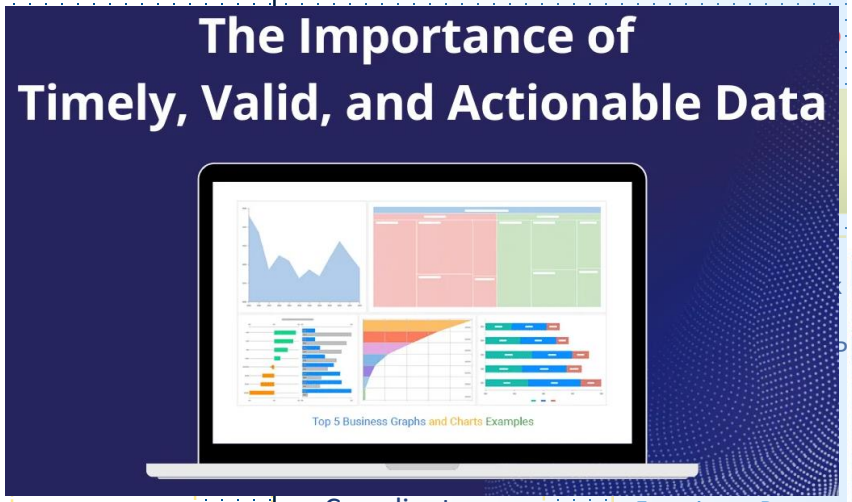
PART A) sections: Critical implementation risks and mitigation actions

Results

Dissemination activities

Facticity coordinators steps to make your life easier

for making your life easier



Coordinators

ExperimentReport.xlsx and list of publications

Also is important for of AUDIT of your facility at the end of project the Audit

Maria Colona's talk Day 3

Deliverable Milestone (Sept 23 –August 24

MS25	Prototype and software ready for lab tests	WP4	4.4.3	14	**28 Oct 2023**
MS30	Design of the shielding system including safety related aspects	WP4	4.4.7	14	**30 Oct 2023**
MS26	Electrostatic Microprobe Quadrupole Quadruplet Lens Assembly installed and tested	WP4	4.4.4	16	**19 Dec 2023**
MS8	Calls for proposals to be hosted at ECT*	WP2	2.4	18	**22 Jan 2024**
MS10	Contracted personnel for Theo4Exp VA in place and first codes available for users in the virtual facility	WP2	2.4	18	**29 Feb 2024**
MS12	Completed database containing selected features of remote-access toolkit	WP2	2.5	18	**29 Feb 2024**
MS14	Reports on FLASH detectors for different facilities	WP2	2.5	18	**22 Feb 2024**
MS31	Design of the XY table and purchase of materials and equipment for the device	WP4	4.4.8	18	**29 Feb 2024**
MS27	Cooling system developed	WP4	4.4.5	18	**27 June 2024**
MS21	a) More than 30% of AU delivered	WP4	4.1	24	**31 Aug 2024**
MS22	b) More than 30% of AU delivered	WP4	4.2	24	**31 Aug 2024**
MS23	c) More than 30% of AU delivered	WP4	4.3	24	**31 Aug 2024**
MS29	ML-based classification and evaluation of the beam profile patterns	WP4	4.4.6	24	**30 Aug 2024**
MS33	Mechanics of the setup adapted to fit into the experimental area	WP4	4.4.10	24	**30 Aug 2024**

DELIVERABLES

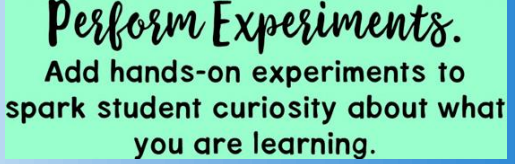
D#	Deliverable Name	WP	Task	Due month	Delivery date (expected/ actual)	Status	
D1.1	Periodic Report-1 (Sept 2022-Aug 2023)	WP1	1.1	14	**6 Nov 2023**	**Achieved**	Report
D5.1	All research infrastructures videos completed	WP5	5.1	18	**29 Feb 2024**	**Achieved**	D5.1 Report
D5.4	The new toolkit deployed at least two facilities and been used optimization	WP5	5.2	24	**01 Aug 2024**	**Achieved**	D5.4 Report
D5.5	Report on activities after 2 years, including follow-up from participants	WP5	5.4	24	**30 Aug 2024**	**Achieved**	D5.5 Report

D5.7	Data Management Plan	WP5
D6.1	Ethics – OEI – Requirement No. 1	WP6

+ Annual updates
Ethics Advisor

I would strongly suggest that you
read the many technical reports
I learnt so much and it was great fun
one can also see the strength of EURO-LABS

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES



Basic training school of 2023 BTS23

IFIN-HH, Bucharest - Măgurele

https://indico.nipne.ro/event/246/timetable/#20230913

BTS24

The Basic Training School on Accelerators 2024, HIL and INCT,
June 18-27 in Warsaw
U200-P cyclotro, INCT electron accelerators
https://www.slcj.uw.edu.pl/en/bts24

Advanced School GSI/FAIR Nov 2024
Advanced school CERN in May 2025
Basic School in Seville in June 2025
INTrasNS Florene Jan 25

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

EURO-LABS Newsletter

ISSUE No.1 | JANUARY 2024

Second Annual Meeting of EURO-LABS at Krakow, Poland, from October 9th-11th, 2023

Participants of BTS23 (IFIN-HH, Bucharest-Măgurele, Romania) in the salt mine used for low-background work

EDITORIAL
M.J.G. Borge, CSIC
B. Pezzotta, INFN

NEWS ON COMING HANDS-ON SCHOOLS

EURO-LABS ANNUAL MEETING
Maria Colonna, INFN
The 2nd Annual Meeting of EURO-LABS (SAM EURO-LABS) was held in Krakow from the 9th to 11th October 2023, hosted by IFJ PAN

BASIC TRAINING SCHOOL BTS23
Livius Trache, IFIN-HH
The first basic training School held at IFIN-HH in February 2023

RADIATIVE DECAY OF THE ^{229}Th CLOCK ISOMER
Sean Freeman, CERN

AGATA
JJ Valiente-Dobon, INFN

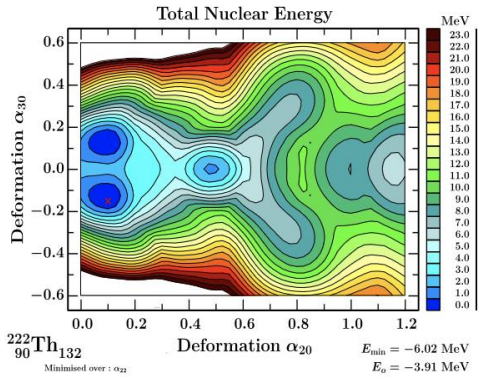
D-MAPS in EURO-LABS
Marko Mikuž, JSI

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101057511.

EURO-LABS Newsletter

ISSUE No.2 | JULY 2024

The Students of the ATSOA school at CERN June 2-7, 2024



Contour plot of the energy of ^{222}Th as function of quadrupole and octupole deformation parameters.

EDITORIAL
M.J.G. BORGE, CSIC
B. PEZZOTTA, INFN

HIGHLIGHTS
- **ATSOA** (Advanced Training School on Operation of Accelerators): CERN, June 2024

UPCOMING EVENTS:
- Advanced Training: Open Science and Data Management school in November 2024 in Germany
- **TAM MEETING**: CERN, October 28th - 30th 2024

CONTENT

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101057511.

Next one Dec 15th

Contributions requested

New Editor Newsletter
Maria Colonna

Thanks Maria Borges

Ideas/interpretation for experiments

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

Training +

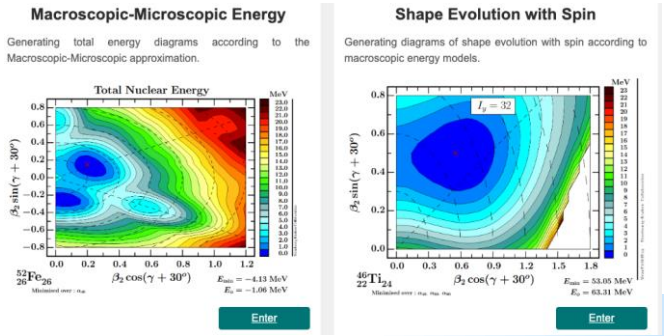
ECT*, Trento (Italy)

UNIVERSIDAD D SEVILLA 1505 · IPHC Institut Pluridisciplinaire Hubert CURIEN STRASBOURG · UNIVERSITÀ DEGLI STUDI DI MILANO

THEO4EXP

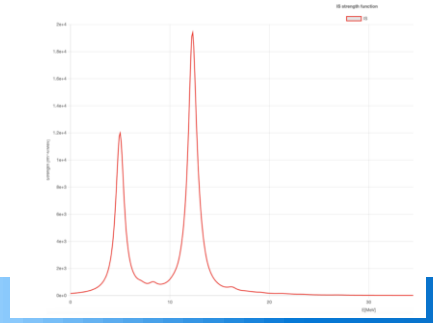
A FACILITY PROVIDING VIRTUAL ACCESS TO NUCLEAR THEORY TOOLS

MeanField4Exp



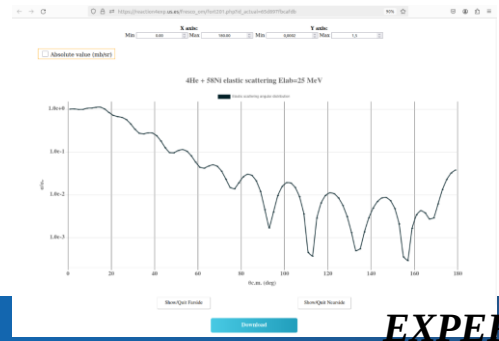
Structure4Exp

VIRTUAL ACCESS



REACTIO4EXP

VIRTUAL ACCESS INFRAESTRUCTURE - UNIVERSITY OF SEVILLE



EXPERT HELP

MS30 WP4

EURO-LABS

DESIGN OF A CADMIUM SHIELD IN THE TANGENTIAL CHANNEL OF THE JSI TRIGA REACTOR

Milestone: MS30

Date: 30/10/2023

Design of a cadmium shield device aimed at reducing material activation in
samples irradiated in the Large object irradiation facility in the JSI TRIGA reactor due to thermal neutrons.

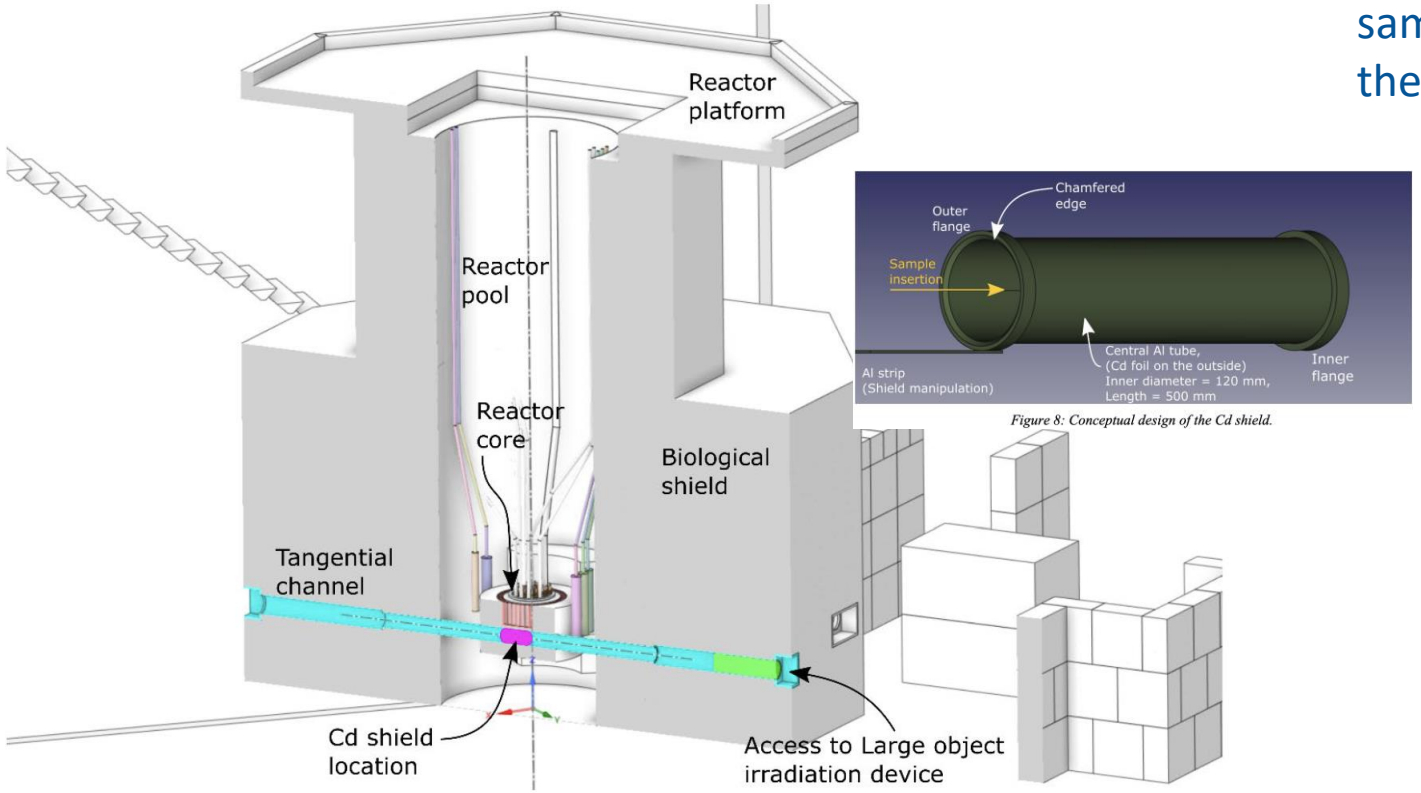


Figure 1: Schematic drawing of the Large object irradiation device in the reactor core.

Figure 8: Conceptual design of the Cd shield.

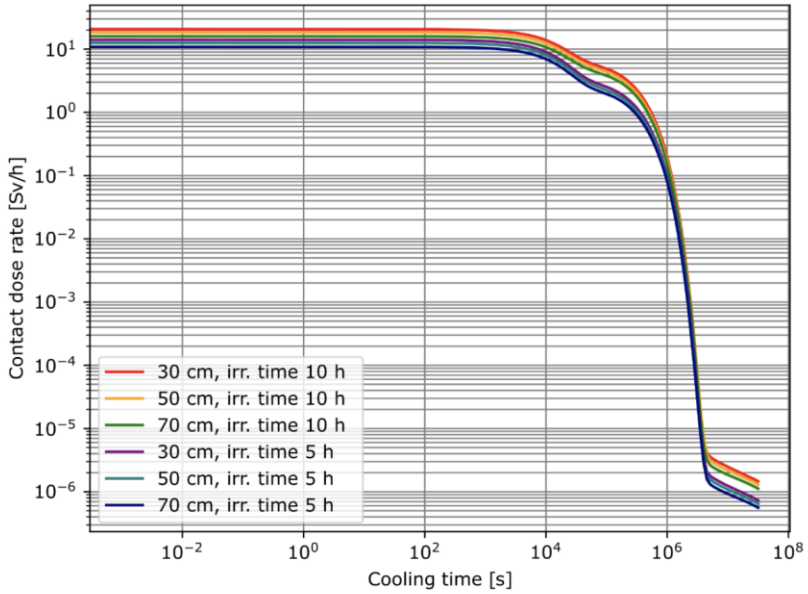


Figure 7: calculated contact dose rates for cadmium shields of different lengths vs. time for full power operation times of 5 h and 10 h.

REPORT ON THE ELECTROSTATIC MICROPROBE QUADRUPOLE QUADRUPLET LENS ASSEMBLY INSTALLED AND TESTED

A 2D scanning table

A 2D scanning table has been designed ,assembled, installed, tested, and put in operation at the irradiation line of the AIC- 144 cyclotron
at the Institute of Nuclear Physics of the Polish Academy of Sciences (IFJ PAN) in Kraków.

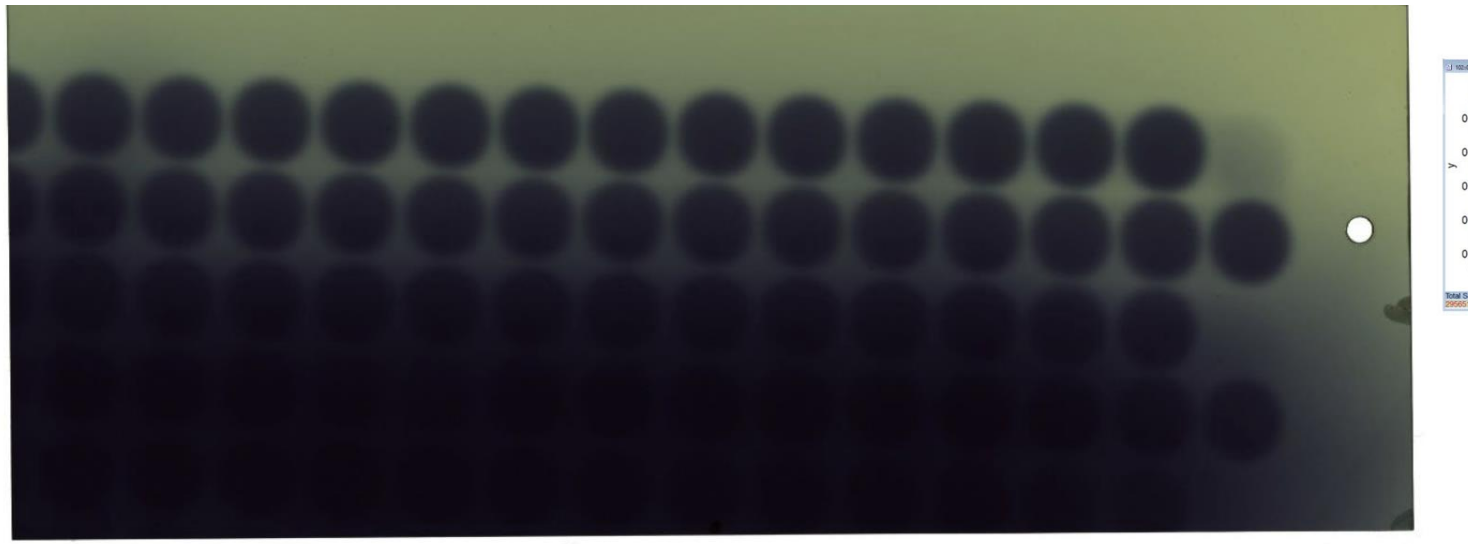


Fig. 18 Results of irradiation of Gafromic film with collimated 60 MeV proton beam in step-shoot mode.

Fig. 17 Irradiation setup for film 2and 3.

Functionalisation of solid surfaces by low-energy ion beams

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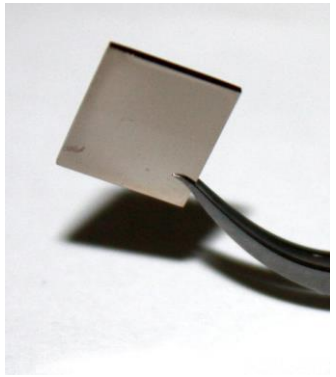
HUN REN | atomki DEBRECEN

Functionalisation: the upper surface (5-200 nm depth) of a medical/industrial sample is modified for one, well-selected goal.
In the Atomki ECRIS Laboratory we irradiated dental implants (Ti, ZrO2) by non-standard (Au, Ca, Si) ion beams.

new multiply-charged ion (MCI) beams were developed in the Atomki ECRIS Laboratory (e.g. Au, Ag, Ca, Si, Mg, P) and dental implants were irradiated with different energy and dose.



A. After gold irradiation and heat treatment the formed GNPs (Gold Nano-Particles) can chemically bond many types of biomolecules.

B. The implanted Ca ions can increase and accelerate the adherence of the human tissue due to diffusion.

C. ZrO2 (non-silica-) based restorations have become very popular in the dentistry (esthetic). Silicon implantation was done in order to bond polymer molecules to the ceramic.

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Machine Learning

Objective:

- Use Machine Learning (ML) methods to improve beam quality, transport efficiency and reproducibility.

  Shared and tackled by different facilities

  - The Project focuses on open tools and platforms:

    Developing a virtually accessible beam diagnostic data base and optimizer toolkit

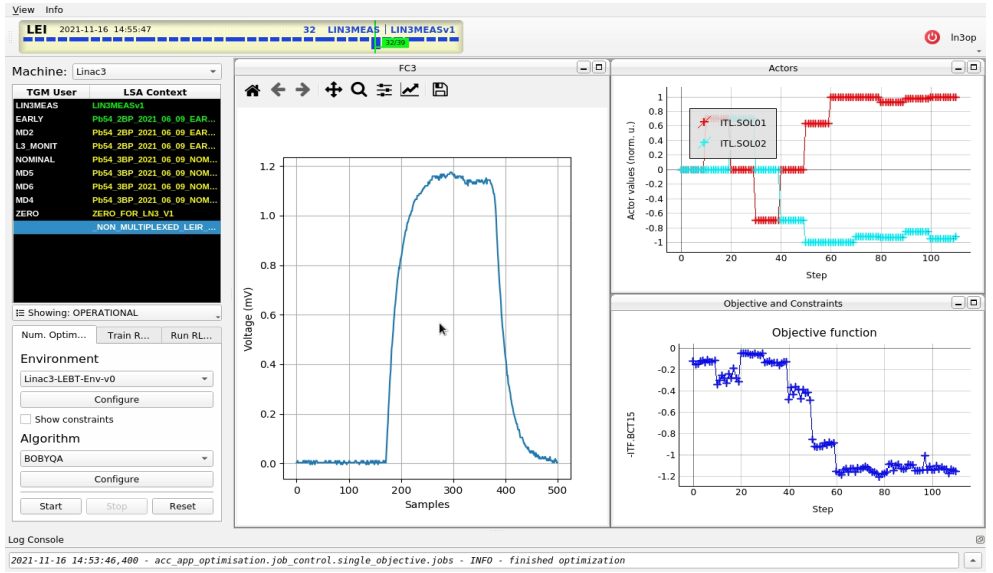
Generic Optimization Frontend & Framework (GeOFF) is a widely used framework for testing automation at CERN

- Python-based framework with use of pjlsa

- *Adaption of code quickly and on-the-fly during shift:*
- *Flexibility of framework made this easy*

At CERN, where with GeOFF the slow extraction could setup in several minutes.
The manual adjustment has takes before up to 8 hours.

FRagment Seperator at GSI : Automatic online steering
Oṇline beam steering in 50 iteration and took 18 minutes



Open source: Each centre make its compatible with their needs

Courtesy Sabrina Appel

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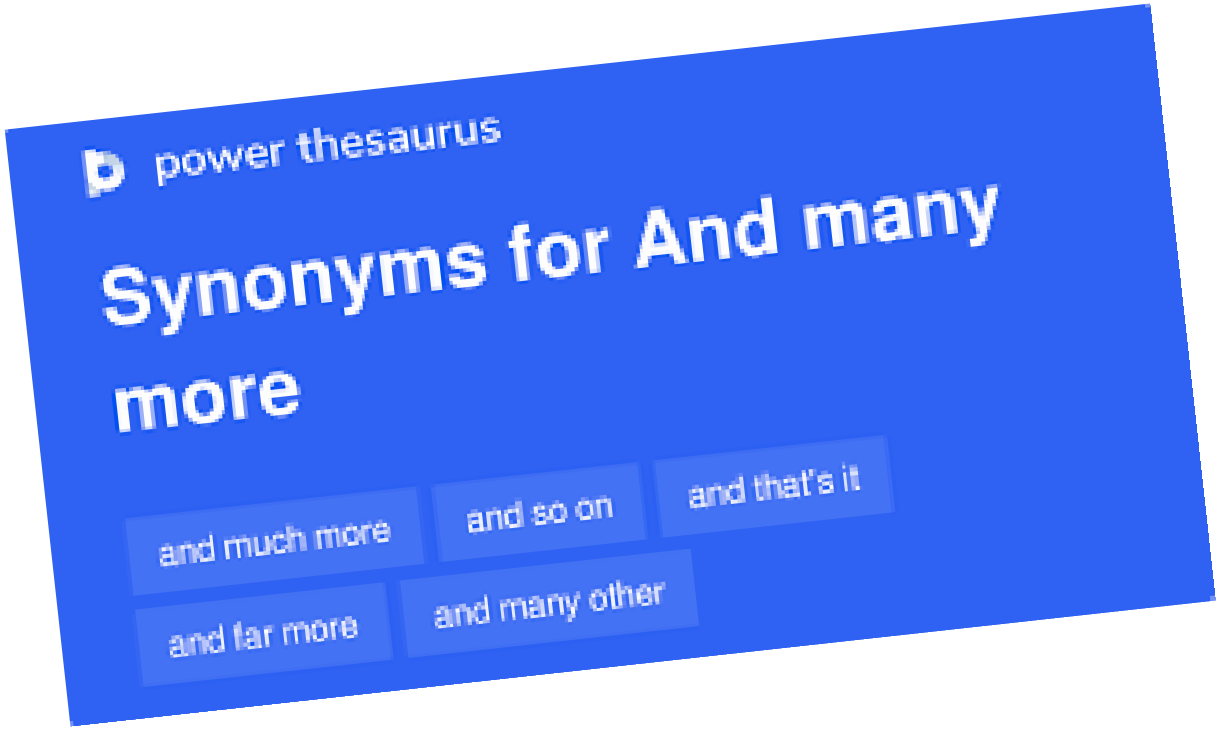

Already to plan beyond 1st Sept 2026

Research Infrastructures

Draft program related to us

HORIZON-INFRA-2025-01-SERV-03: Research infrastructure services advancing frontier knowledge – RIAs – 20M€

- *Area 1: Environment: atmospheric chemistry and dynamics*
- *Area 2: Physical sciences and engineering: particle and nuclear physics (including hadron physics). While further federation inside communities are within the scope of this topic, the neighbouring fields of particle and nuclear physics can further benefit from collaboration and identification of common developments. Proposers are encouraged to exploit transversal links across the particle and nuclear physics communities that were also created within earlier Horizon projects*

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101057511.

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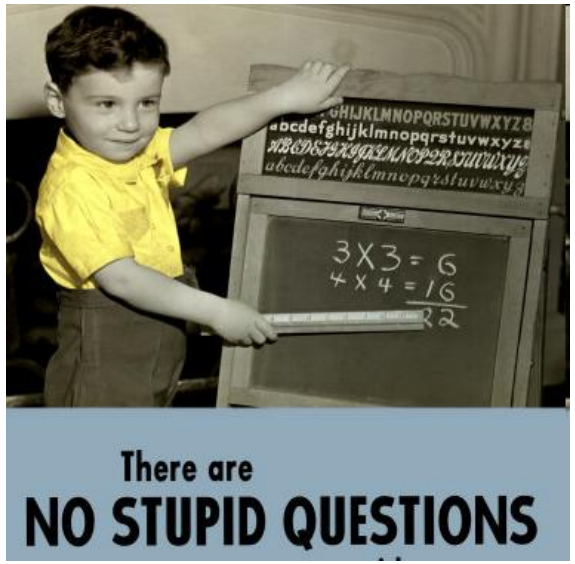
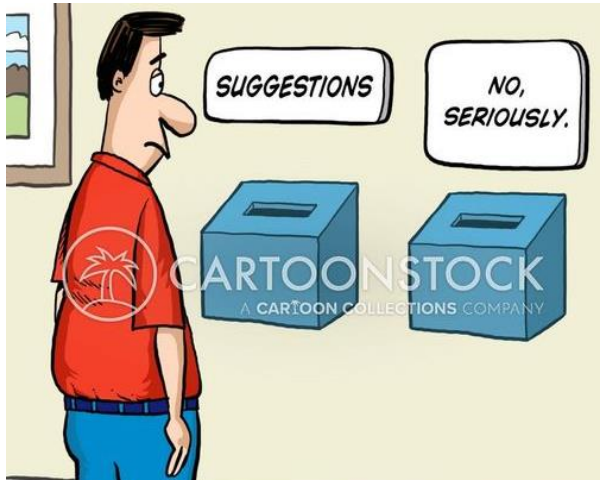
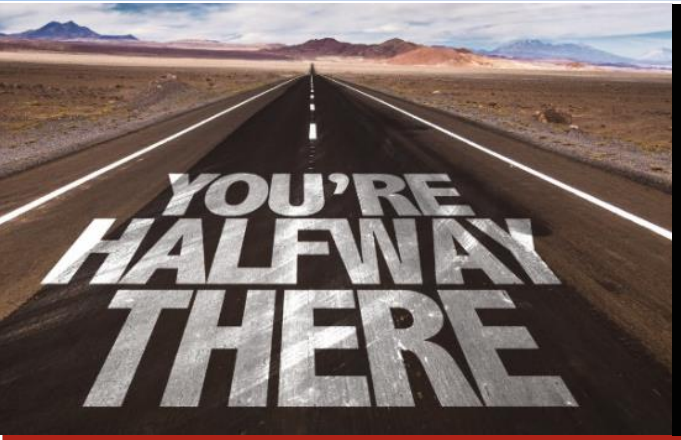
Tomorrow is another great day







46° 02′ 34.3"N 14° 29′ 15.2" E

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