
EURO-LABS
EUROPEAN LABORATORY FOR ACCELERATOR BASED SCIENCE
WP2
„Access to nuclear physics facilities”
Report and looking ahead program
ADAM MAJ
IFJ PAN KRAKOW
SERVICE IMPROVEMENTS

Map of Nuclear Physics facilities in WP2

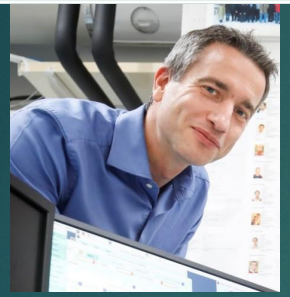
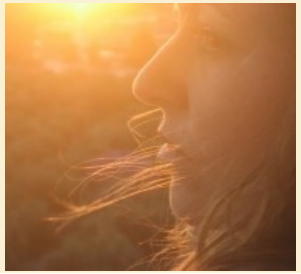
17 TA/VA facilities
in 9 countries

16 beneficiaries
in 11 countries

Community: 2500-3000 scientists and highly qualified engineers

Organization of WP2

WP2 coordination: Adam Maj (IFJ PAN Krakow)

Task	WP2.1 Stable Ion Beam Facilities	WP2.2 Radioactive Ion Beams Facilities	WP2.3 Neutron Beam Facilities	WP2.4 Theoretical Support for Experiments	WP2.5 Service Improvements
Coordinator	**Paul Greenlees** JYFL Jyvaskyla	**Iulian Stefan** IJCLab Orsay	**Alberto Mengoni** CERN	**Bira van Kolck** IJCLab & ECT*	**Marco Durante** GSI
					
RI	• JYFL (Finland) • LNL-LNS (Italy) • GANIL-SPIRAL2 (France) ALTO (France) • GSI/FAIR (Germany) • NCL-SLCJ (Poland) • NLC-CCB (Poland) • IFIN Tandem (Romania) • USE-CLEAR (Spain) • ATOMKI-CLEAR (Hungary) • IST-CLEAR (Portugal)	• ALTO (France) • ISOLDE (CERN) • GSI/FAIR (Germany) • GANIL-SPIRAL2 (France) • LNL-LNS (Italy) • JYFL (Finland)	• n-TOF (CERN) • GANIL-SPIRAL2 (France) • ALTO (France) • LNL-LNS (Italy) • USE-CLEAR (Spain) • ATOMKI-CLEAR (Hungary)	• ECT* (Italy) • VA Theo4Exp: MeanField4Exp (Poland) Reaction4Exp (Spain) Structure4Exp (Italy) **Manuela Rodriguez-Gallardo** (U. Sevilla, Spain) 	• Streamlined procedures + Remote access • Bio medical • Ion source improvements • Target developments • Traveling detectors
	TA	TA	TA	TA/VA	

TA Facilities Coordinators

LNL/LNS	Tommaso Marchi, Allesia di Pietro
GANIL-SPIRAL2	Emanuel Clement
IJCLab ALTO	Jon Wilson
GSI/FAIR	Christoph Scheidenberger, Chrristine Hornung
ISOLDE@CERN	Sean Freeman
n-TOF@CERN	Alberto Mengoni
JYFL	Paul Greenlees
NLC-SLCJ	Katarzyna Hadynsla-Klęk, Paweł Napiorkowski
NLC_CCB	Maria Kmiecik
IFIN-HH	Constantin Mihai
CLEAR USE Sevilla	Joaquin Gomez Camacho
CLEAR ATOMKI Debrecen	Sandor Biri
Clear IST Lisboa	Victoria Corregidor Berdasco
ECT*	Bira van Kolck

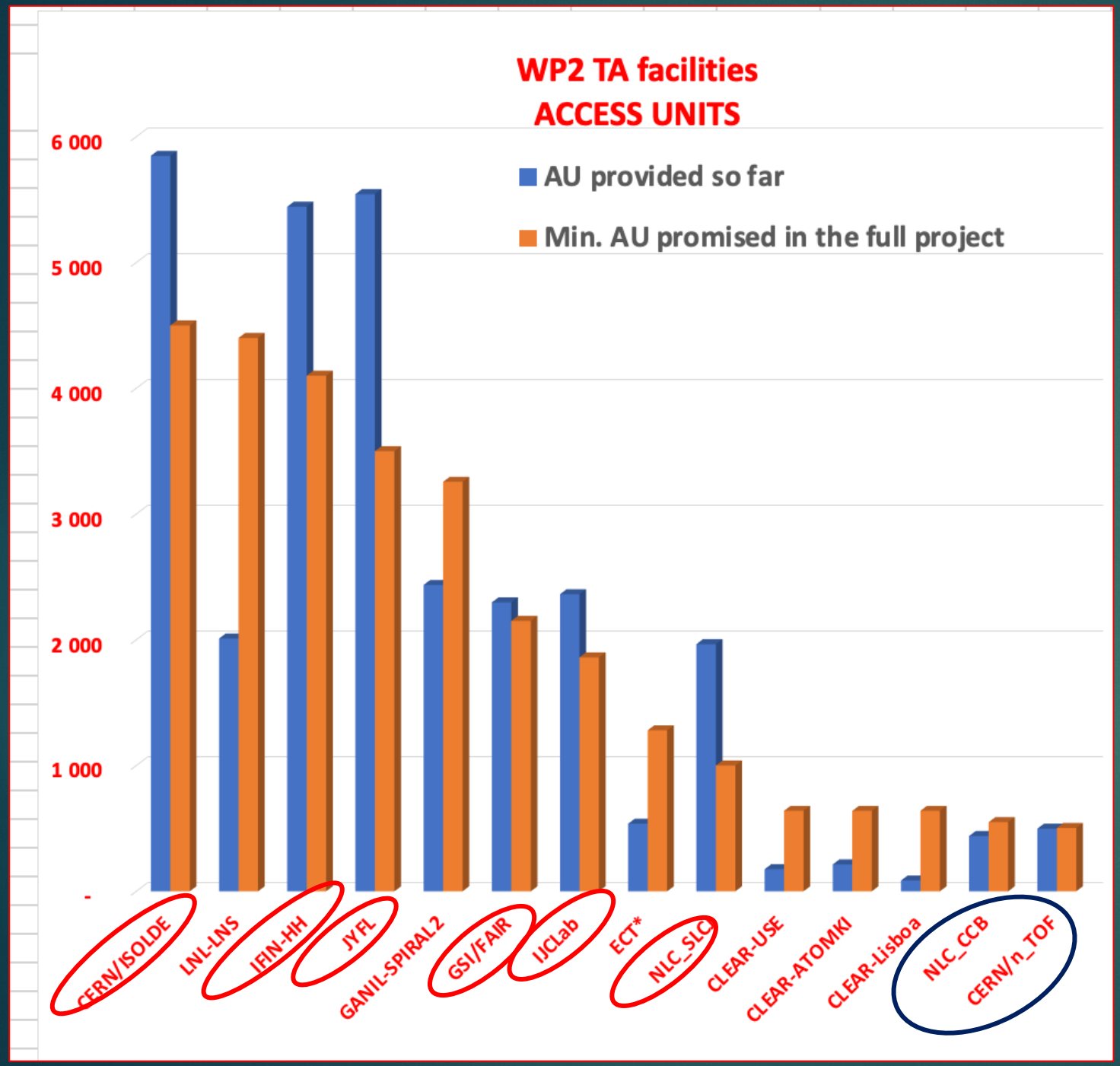
VA Facility coorrdinators

Theo4Exp	Manuella Gallardo	(Reactions4Exp)
	Jerzy Dudek, Piotr Bednarczyk	(MeanField4Exp)
	Gianluca Colo	(Structure4Exp)

WP2 Service improvements

- Streamlined and remote access - coord. Paweł Napiorkowski (Warsaw), Helena Albers (GSI)
- Targets - coord. Manuela Cavallarro (LNS)
- FLASH - coord. Marco Durante (GSI)
- ERIBS - coord. Hannu Koivisto (JYFL)
- INTRANS - coord. Araceli Lopes_Martens (IJCLab Orsay)

Some statistics from 2 years of EURO-LABS

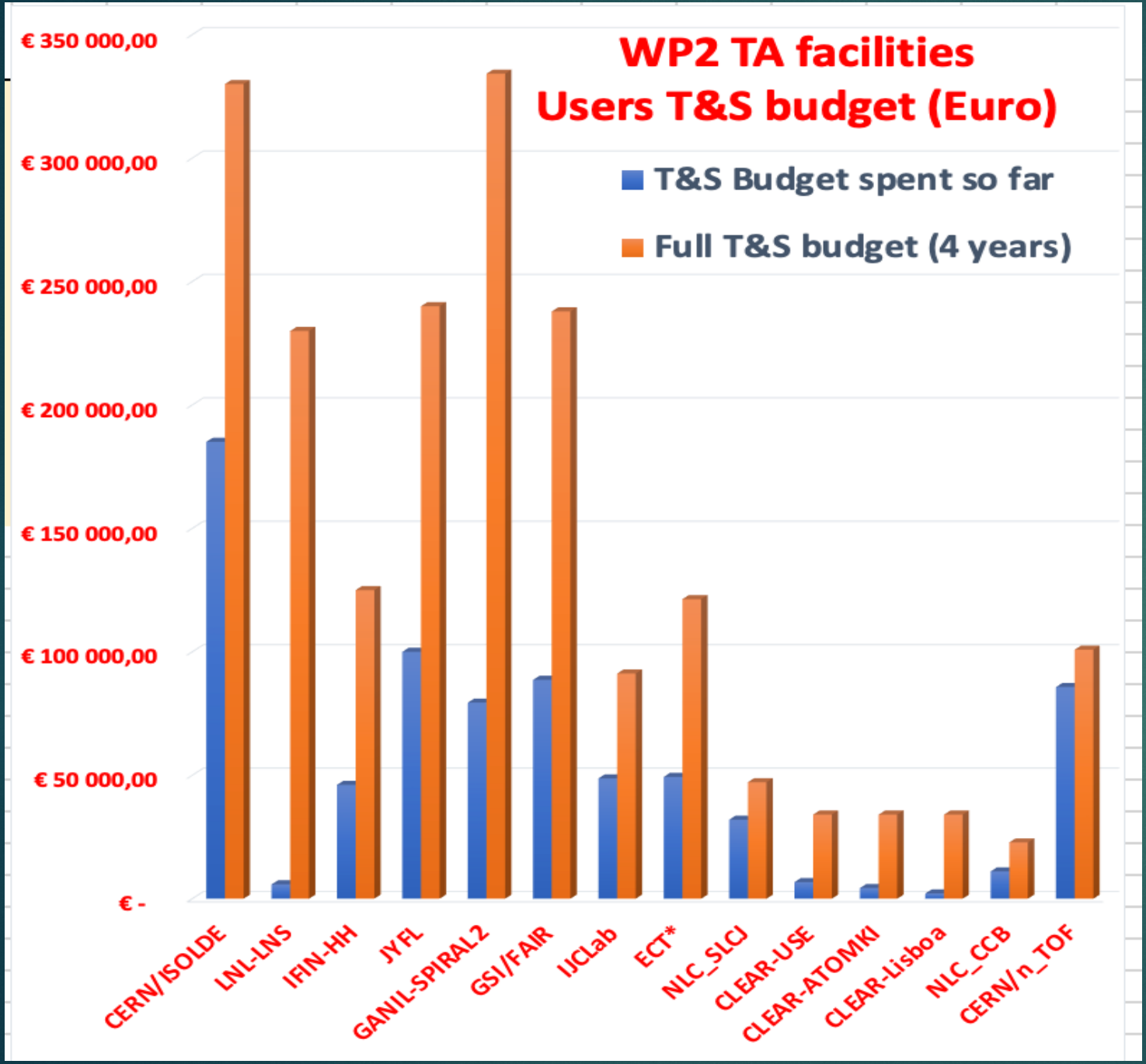


6 facilities already exceeded the whole project AUs

2 facilities arr close to the 100% AUs

Nuclear Physics TA facilities are in high demand

How to proceed in next 2 years?

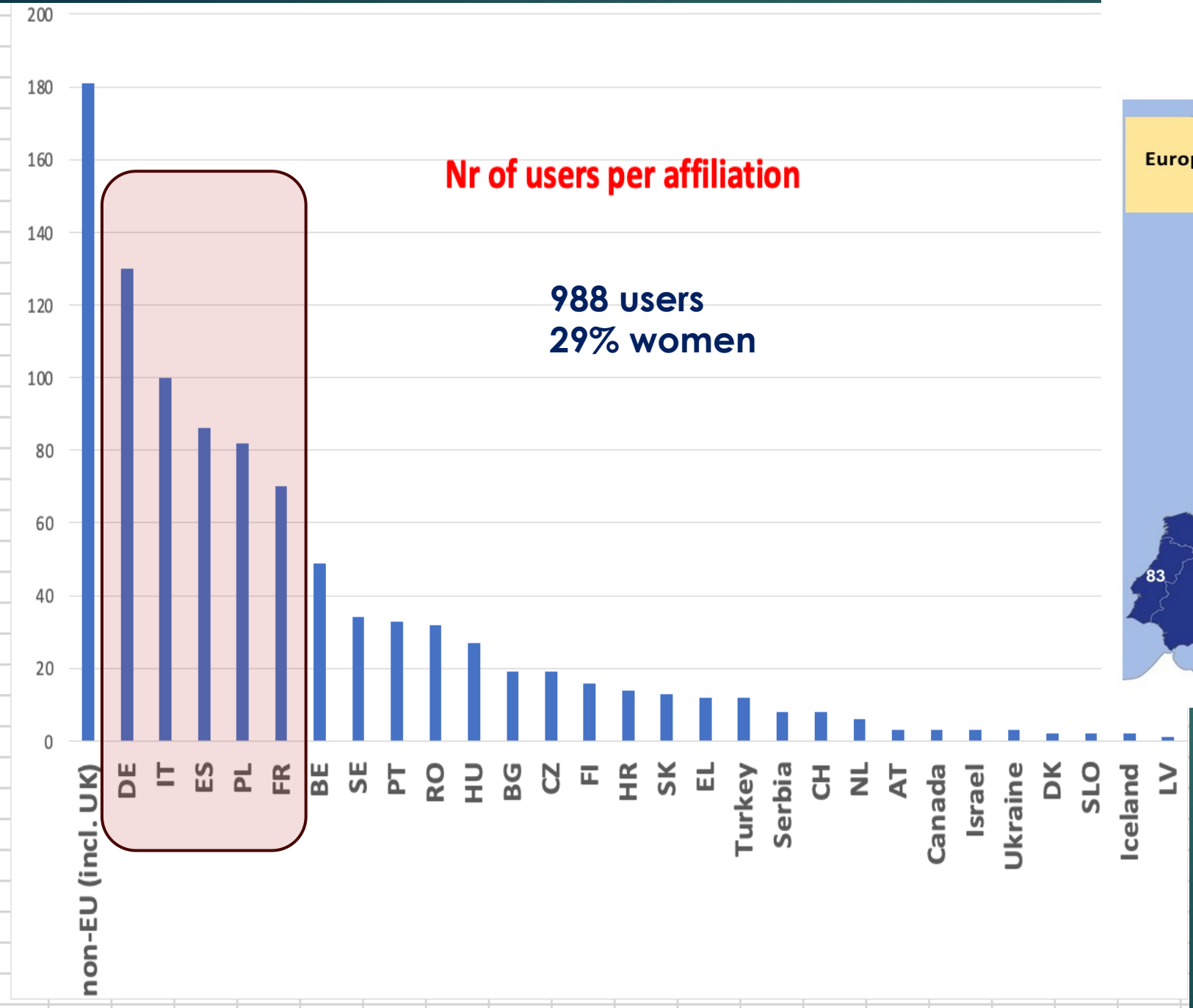


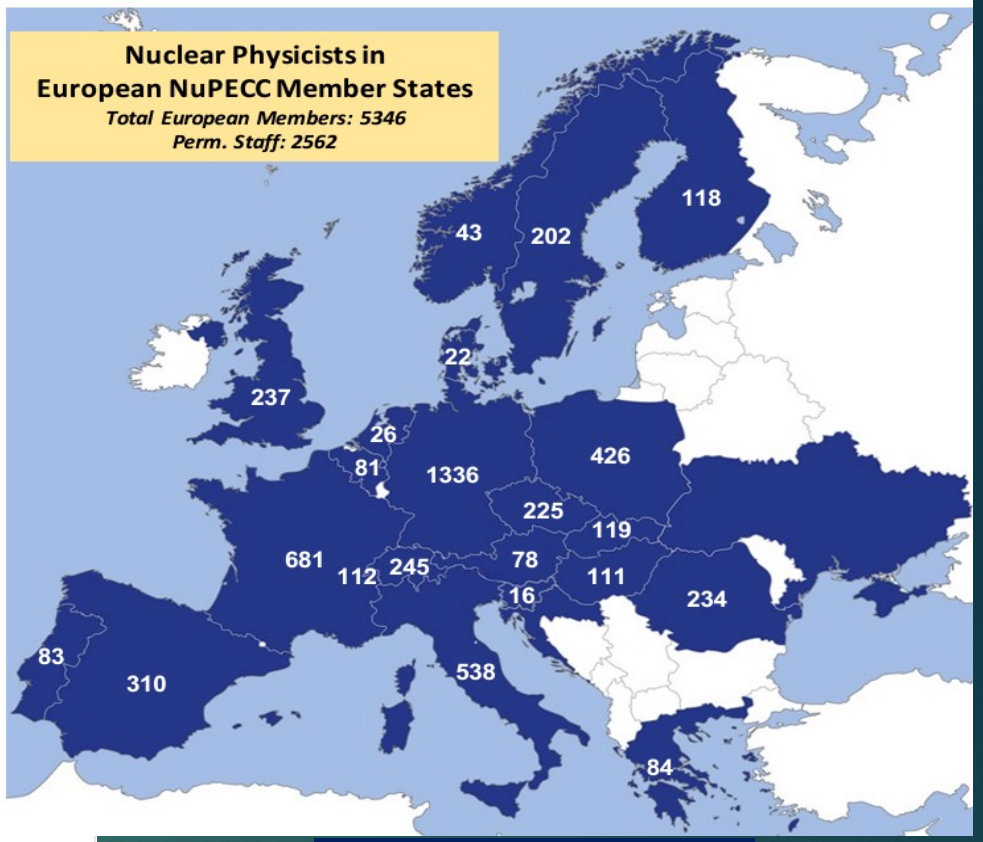
In general good spending of the T&S budget

2 facilities (SLCJ, n-TOF) close to 100%

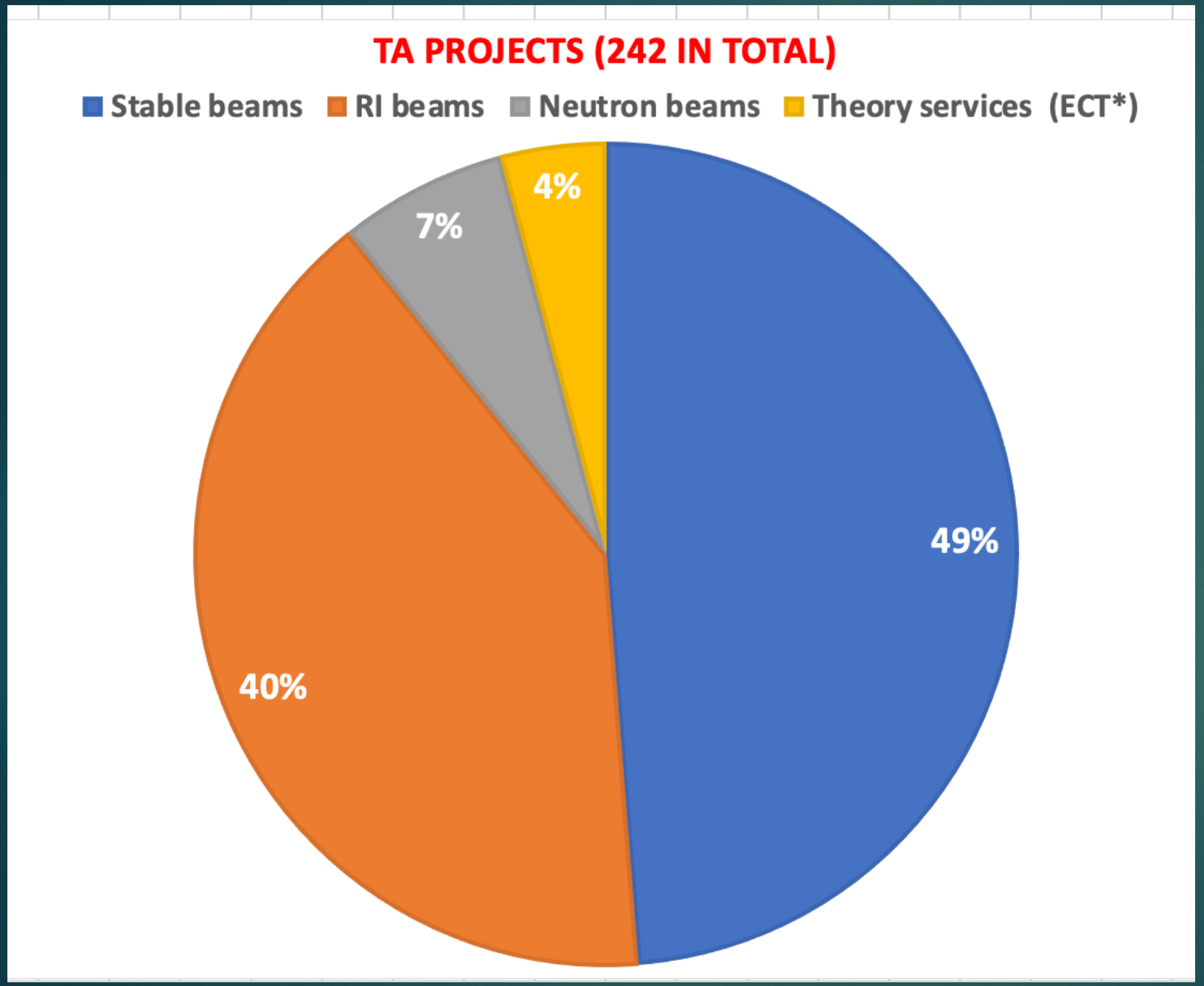
Some issues in LNL-LNS and CLEAR (already the measures how to solve problems were taken)

Nuclear Physics Workforce in Europe





cf. Marek Lewitowicz talk


TA PROJECTS (242 IN TOTAL)
Stable beams
RI beams
Neutron beams
Theory services (ECT*)
49%
40%
7%
4%

Theo4Exp VA Infrastructure

https://institucional.us.es/theo4exp

Services available

- **MeanField4Exp (Krakow/Strasbourg)**
  - Single Particle Energies
  - Nuclear Energy Diagrams
  - Macroscopic-Microscopic energy
  - Shape Evolution with Spin
  - 3D Cranking
  - 3D Nuclear Surfaces
- **Reaction4Exp (Sevilla)**
  - Coulomb breakup using EPM
  - Elastic scattering using OM and semiclassic.
  - Inelastic scattering using CC formalism
- **Structure4Exp (Milano)**
  - Self-consistent HF plus RPA
  - HF+BCS+RPA
  - Shell Model with KSHELL

Open to users from past 1st February 2024

VA facilities	AUs provided (9 months)	Estimated AUs (whole project)	%		Nr of users (9 months)	Estimated Nr of users (whole project)	%
MeanField4Exp	225	360	63%		24	40	60%
Reaction4Exp	117	400	29%		41	80	51%
Structure4Exp	65	160	41%		12	20	60%
Total	407	920	44%		77	140	55%

- **11 services (projects) available already**
- **More services in preparation – soon available**
- **Advertising the THEO4EXP VA – „Hands-on" workshop in CERN July 7-9 , 2025**

Milestones (Year 1 and 2)

MS13	Production of a report to define the state of the art in the field (targets for NP) and collect the requests from the community	WP2	2.5	3	**12 Dec 2022**	**Achieved**	MS13 Report
MS2	Preparation of calls for submission of proposals to stable beam access facilities completed	WP2	2.1	6	**28 Feb 2023**	**Achieved**	MS2 Report
MS4	Preparation of the call for submission of projects to access each of the RIs providing radioactive-ion beams	WP2	2.2	6	**28 Feb 2023**	**Achieved**	MS4 Report
MS6	Preparation of the call for submission of projects to access each of the RIs providing neutron beams	WP2	2.3	6	**28 Feb 2023**	**Achieved**	MS6 Report
MS15	Conceptual plan for online monitoring of long-term operation beam stability	WP2	2.5	12	**01 Aug 2023**	**Achieved**	MS15 Report
MS8	Calls for proposals to be hosted at ECT*	WP2	2.4	18	**22 Jan 2024**	**Achieved**	MS8 Report
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**	**Achieved**	MS10 Report
MS12	Completed database containing selected features of remote-access toolkit	WP2	2.5	18	**29 Feb 2024**	**Achieved**	Survey on Remote Access (WP2.5) MS12 Report
MS14	Reports on FLASH detectors for different facilities	WP2	2.5	18	**22 Feb 2024**	**Achieved**	MS14 Report

Planned milestones (Year3 and 4)

MS16	Organisation of hands-on workshops & training schools	WP2	2.5	30	28 Feb 2025		
MS9	EURO-LABS-related workshops carried out at ECT*	WP2	2.4	42	28 Feb 2026		
MS11	All codes installed at Theo4Exp VA and interoperability among different nodes established	WP2	2.4	42	28 Feb 2026		
MS3	All provision of access offered completed	WP2	2.1	46	30 Jun 2026		
MS5	a) Completion of all the experiments proposed	WP2	2.2	46	30 Jun 2026		
MS7	b) Completion of all the experiments proposed	WP2	2.3	46	30 Jun 2026		

Planned deliverables (Year3 and 4)

D2.1	Report on Access to Stable Beam Facilities	WP2	2.1	46	30 Jun 2026		Report
D2.2	Report on Access to Radioactive-ion Beam Facilities	WP2	2.2	46	30 Jun 2026		Report
D2.3	Report on the research activities and the main results obtained in each of the RI providing neutron beams	WP2	2.3	46	30 Jun 2026		Report
D2.4	Report on access to the Theory for Experiments facilities	WP2	2.4	46	30 Jun 2026		Report

Flash overview of TA/VA facilities and service improvement tasks

INFN LNL-LNS

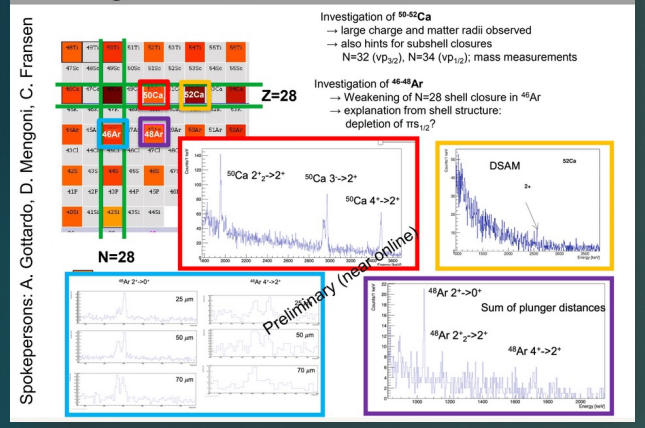
LNL: TANDEM-PIAVE-ALPI stable beams provided, mainly to the PRISMA-AGATA setup.

2000 h stable beams delivered to EUROLABS users since the beginning ofthe project;

~1150 in the last 12months

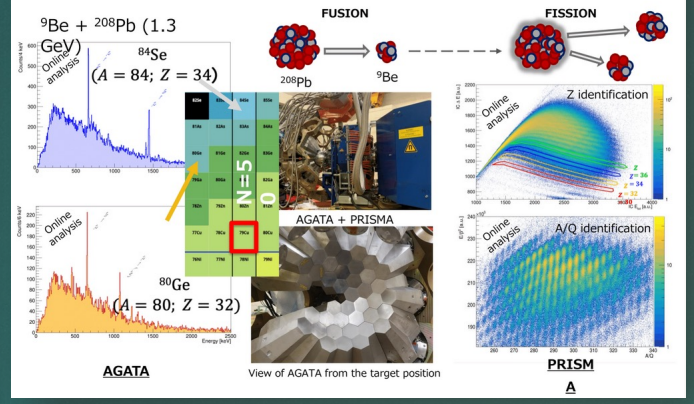
Shell evolution around ^{48}Ca

^{48}Ca @ 520 MeV onto ^{238}U



Fusion-fission for N=50 studies

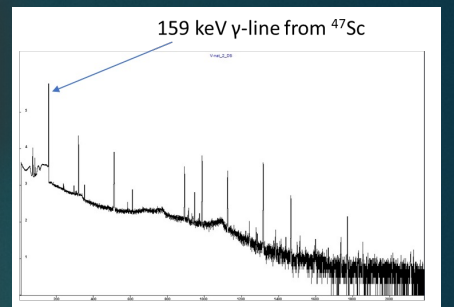
Analised by: F. Angelini



Shell evolution around ^{48}Ca

^{48}Ca @ 520 MeV onto ^{238}U

See G. Andreetta's talk



Gamma-spectrometry of the ^{nat}V sample irradiated with 35 MeV (semilog scale)

May 2024: SPES cyclotron operation. Commissioning of the second beamline using activation benchmarks.

2-years outlook

2024: TANDEM stable beams ~2500hr

2025: TANDEM stable beams + ALPI U beams

Delivery of first SPES beams (40 keV)

LNS: The facility underwent a major upgrade, no beam has been available for EUROLABS so far.

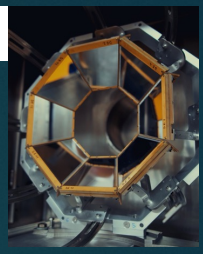
TANDEM accelerator.
Beam commissioning around June 2025.
Bam for the users end of 2025 or early 2026.

SUPERCONDUCTING CYCLOTRON.
Beam commissioning around June 2026. Bam for the users early 2027.

GANIL – Stable/RI beams from low to high energy, from neutron to ^{238}U

Civil construction of DESIR has started
Op. : ~2027-2028

Fission program at VAMOS++ and PISTA with the new (^{232}Th) beam



2 dedicated tests in 2024
^{58}Ni primary beam with a focuss on ^{56}Ni and Co isotopes
^{129}Xe primary beam – exploratory test
→Observation of massive MNT channel (+1 proton in Cs isotopes)

SPIRAL1

MEDLEY
n-induced reactions

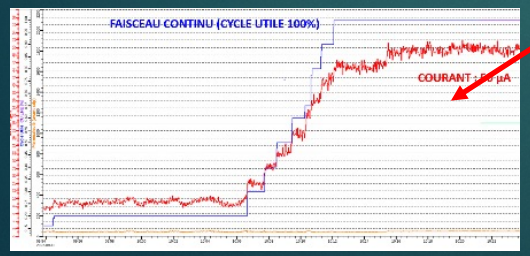
LISE – Frag. Separator
MUGAST/EXOGAM/ZDD

Transfer reactions (d,p), (p,d), (d,t), (d,3He), (p,3He)

Impact of neutron excess on near-barrier fusion in ^{19,20}O + ^{12}C (R. De Souza et al, Performed in June 2023, published in 2024 in PRC)

Li-Alpha» - Measurement of ^{8}Li(alpha,n)^{11}B cross section with ACTAR Pellegriti Maria Grazia – performed in 2024
NEW LEB-Line G21

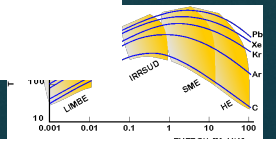
NEWGAIN
NEW GANIL INJECTOR
First beam 2028



November 2022 : ^{40}Ar^{14+} 80µA, 7 MeV/nucleon

Commissioning of the Super Separator Spectrometer (S3) starting in 2024

- Interdisciplinary research program at the cyclotron (~15%)
- Industrial application (~15 %)



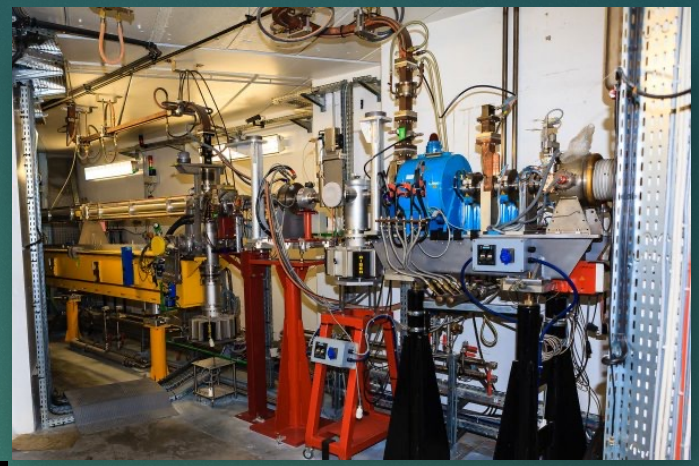
CSS complex (C→U)

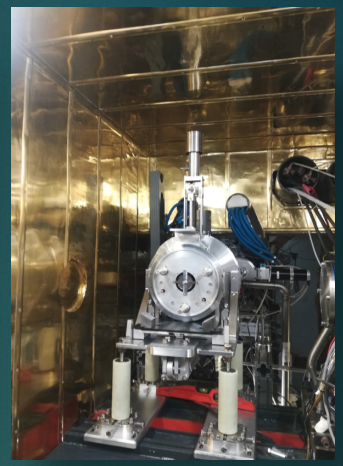
CYREN : CYCLOTRON RENOVATION PROJECT
PREPARE THE CYCLOTRON FOR THE NEXT 2 DECADES

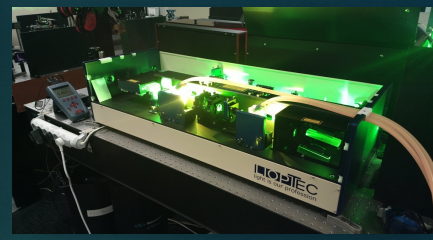
The ALTO facility of IJC Lab, Orsay

ALTO
Accélérateur Linéaire auprès du Tandem d'Orsay

IJCLab
Irène Joliot-Curie
Laboratoire de Physique des 2 Infinis







High energy **Stable Beams**

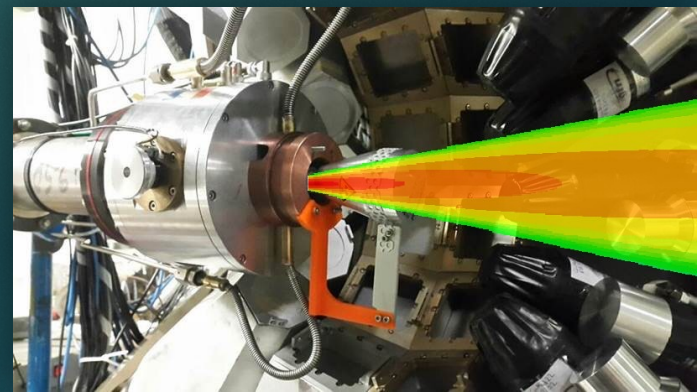
- 15 MV tandem accelerator
- H, ^{3}He, ^{4}He, ..., ^{14}C, ... up to ^{127}I
- Pulsed beams: 100 ns - 100 µs period. 1-2 ns width
- Rare beams (^{3}He, ^{14}C, ^{24}Mg, ^{40}Ca)

Low energy **Radioactive beams**

- Electron linear accelerator 50 MeV & 10 µA + Ucx target (~70 g)
- Isotope Separation Online (ISOL) photofission of ^{238}U (~10^{11} f/s)
- RIALTO : Laser ion source → Z selection
- Dipole magnet PARRNe → Mass separation (M/ΔM = 1500)

Naturally directional **Neutron Beams**

- LICORNE neutron converter (hydrogen gas target)
- Up to 800 nA ^{7}Li primary beam: p(7Li,n) reaction
- Up to 10^{8} neutrons/second in 1 steradian

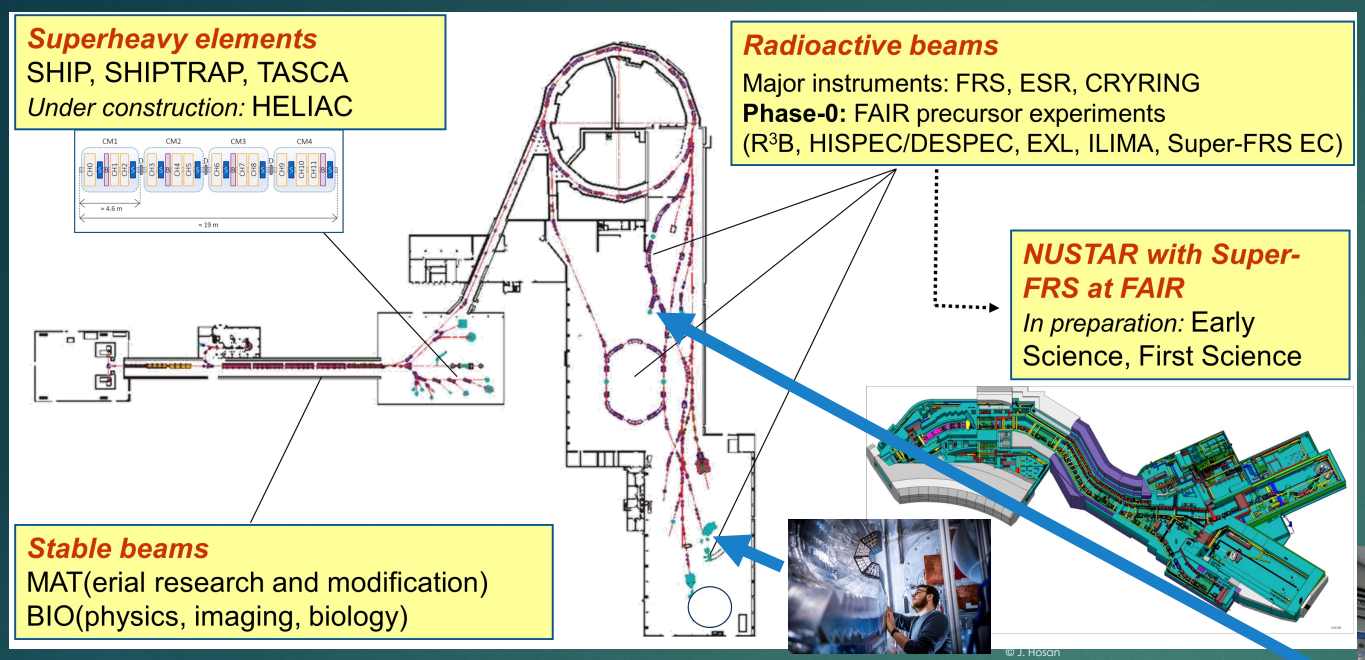


GSI-FAIR: stable and radioactive beams

Superheavy elements
SHIP, SHIPTRAP, TASCA
Under construction: HELIAC

Radioactive beams
Major instruments: FRS, ESR, CRYRING
Phase-0: FAIR precursor experiments
(R^3B, HISPEC/DESPEC, EXL, ILIMA, Super-FRS EC)

NUSTAR with Super-FRS at FAIR
In preparation: Early Science, First Science



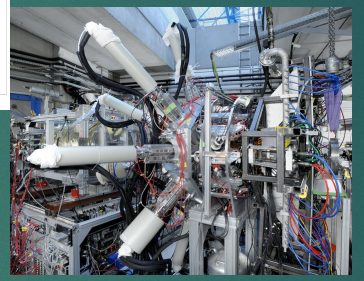
Stable beams
MAT(erial research and modification)
BIO(physics, imaging, biology)

Beams: H…U, parallel operation of different „virtual accelerators“
Energies: keV/u…MeV/u…GeV/u, stopped secondary beams, incl. SHE
Fusion, fragmentation, fission
In-flight separation (vacuum and gas-filled separators)
Dressed and highly-charged resp. bare ions up to uranium
Storage-cooler rings

Experiment highlight G-22-00091/118: R3B comissioning and Probing nucleon-nucleon correlations in atomic nuclei via (p,pd) QFS reaction (talk by M. Whitehead, York)

Experiment highlight G-22-00100:
Structure of neutron-rich, rare-earth nuclei far from stability (H. M. Albers, GSI)

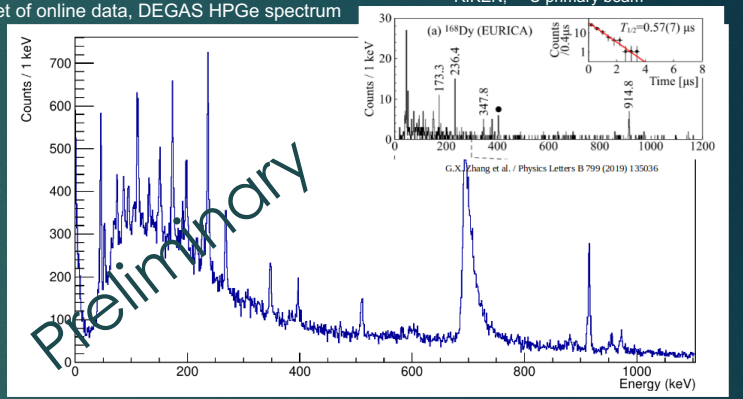
- Rare-earth nuclei mid-way between Z=50,82 and N=82,126 are highly collective
- ^{170}Dy (N=104), doubly-midshell
- Smooth decrease of 2^+-energies towards N=104 not observed
- ‘Rare-Earth’ peak of r-process abundances influenced by structure of deformed neutron-rich, rare-earth isotopes



DESPEC Hybrid DEGAS + FATIMA Gamma Array, Photo courtesy G. Otto

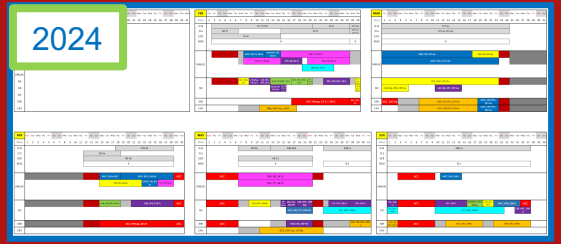
Subset of online data, DEGAS HPGe spectrum

Measured with EURICA spectrometer at RIKEN, ^{238}U primary beam

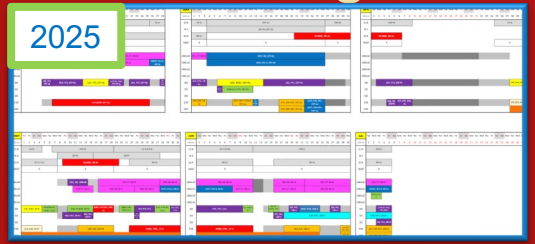


GSI-FAIR beam-time schedule during Euro-Labs and USP 2023/24

2024



2025

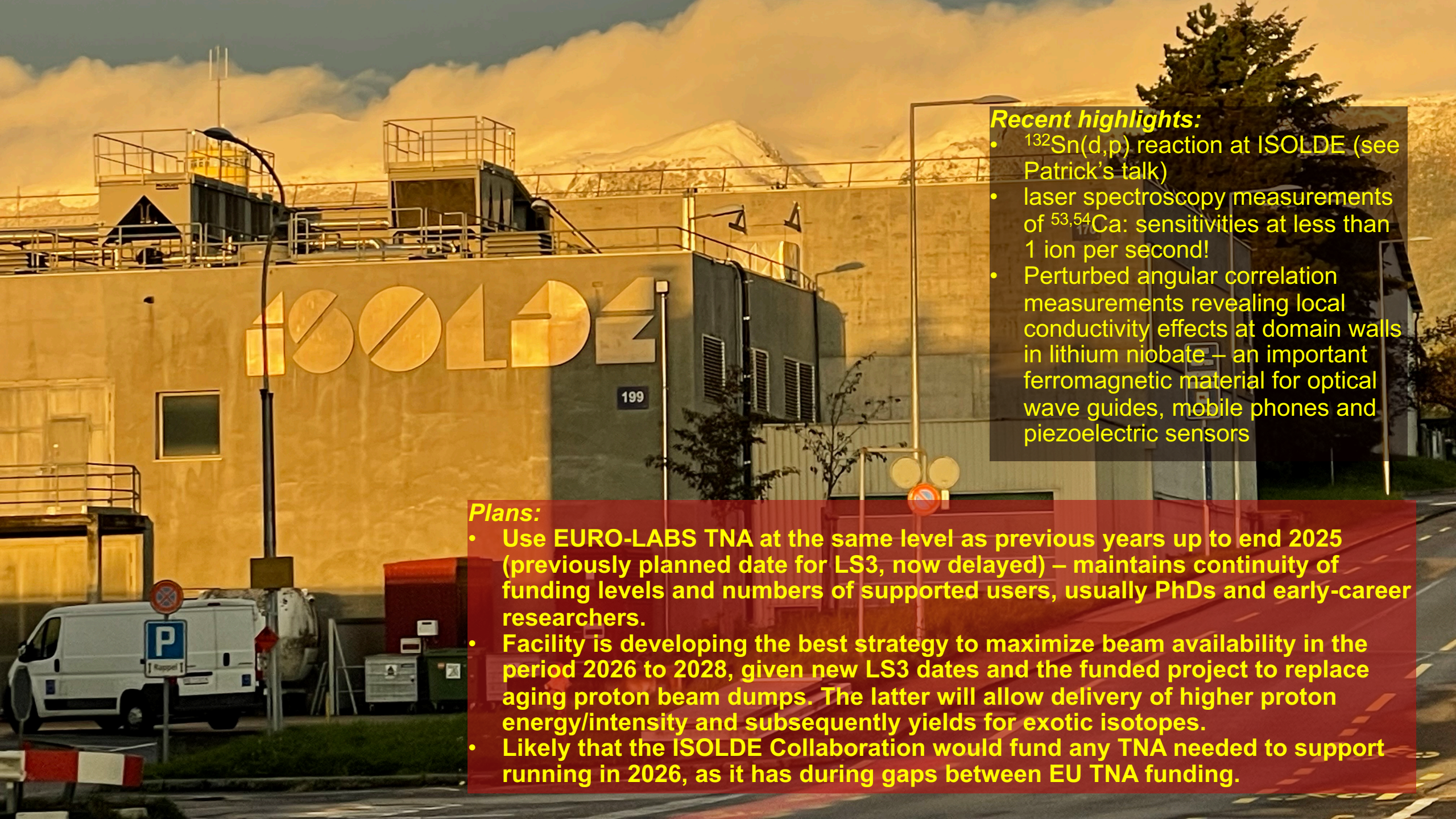


2026

- Beamtime planned in autumn 2026 (after end of EURO-LABS project)
- Next G-PAC meeting: early in 2025

31 user projects approved:
- 14 stable-beam projects
- 17 radioactive-beam projects

37% of available budget disbursed
92% of available budget allocated



Recent highlights:

- ^{132}Sn(d,p) reaction at ISOLDE (see Patrick's talk)
- laser spectroscopy measurements of ^{53,54}Ca: sensitivities at less than 1 ion per second!
- Perturbed angular correlation measurements revealing local conductivity effects at domain walls in lithium niobate – an important ferromagnetic material for optical wave guides, mobile phones and piezoelectric sensors

Plans:

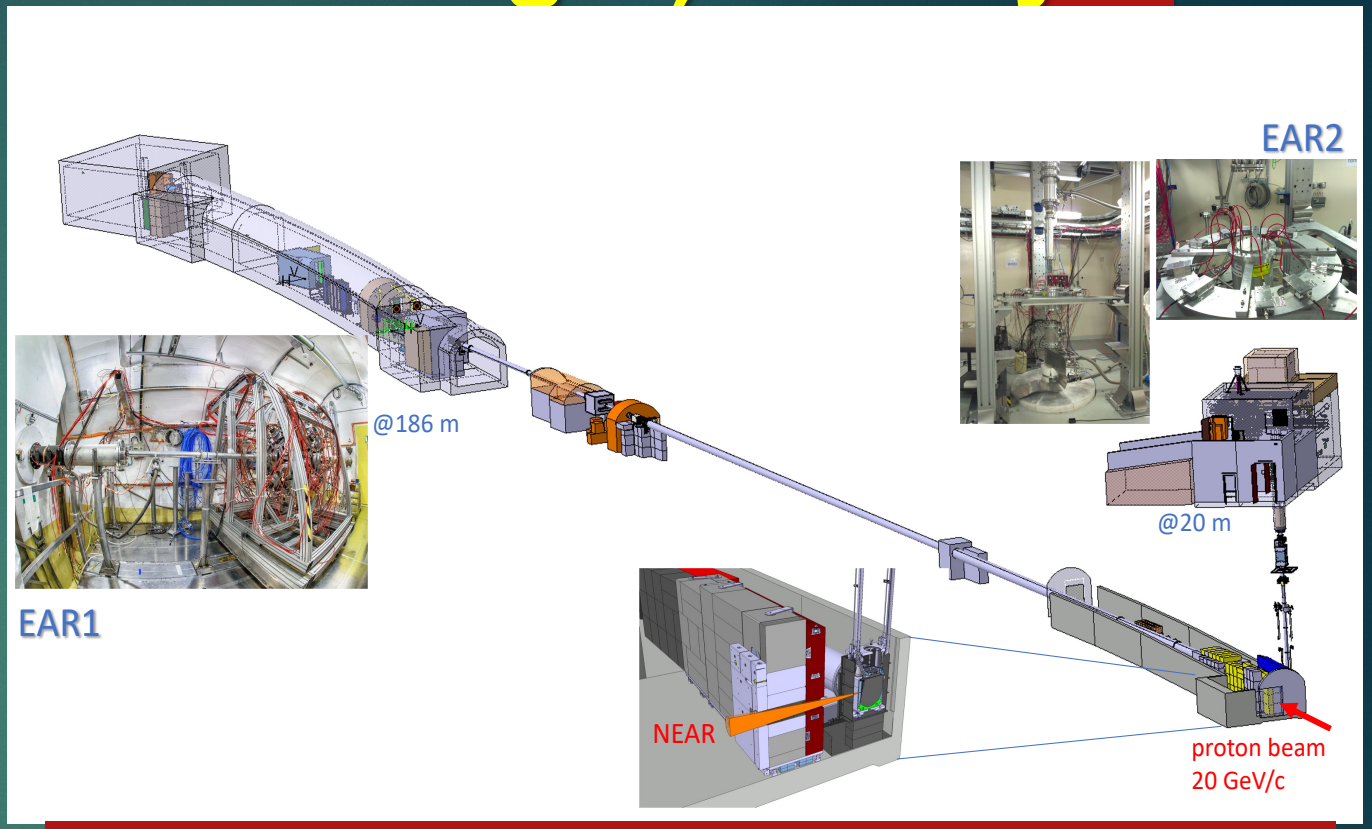
- **Use EURO-LABS TNA at the same level as previous years up to end 2025 (previously planned date for LS3, now delayed) – maintains continuity of funding levels and numbers of supported users, usually PhDs and early-career researchers.**
- **Facility is developing the best strategy to maximize beam availability in the period 2026 to 2028, given new LS3 dates and the funded project to replace aging proton beam dumps. The latter will allow delivery of higher proton energy/intensity and subsequently yields for exotic isotopes.**
- **Likely that the ISOLDE Collaboration would fund any TNA needed to support running in 2026, as it has during gaps between EU TNA funding.**

CERN n_TOF (neutron time-of-flight) facility

- 3 beam lines
- 3 experimental areas
  (2 RP controlled work sectors)
- Up-to-date experimental equipment
- Fully embedded in the CERN research infrastructure
- 20+ years operation experience

2024 experiments:

- ^{40}K(n,α) and ^{40}K(n,p)
- Ce(n,f)
- ^{24}Mg(n,n')
- ^{40}Ar(n,γ), ^{65}Cu(n,γ), ^{238}U(n,γ), ^{28,29}Si(n,γ), ^{88}Zr(n,γ), ^{166,167}Er(n,γ), ^{146}Nd(n,γ), ^{209}Bi(n,γ)



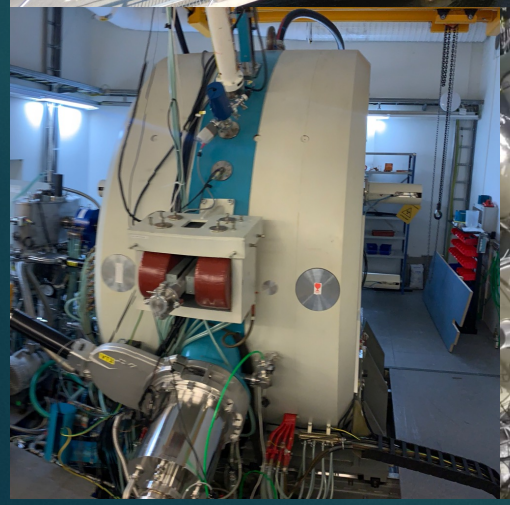
Optimistic perspectives for the future

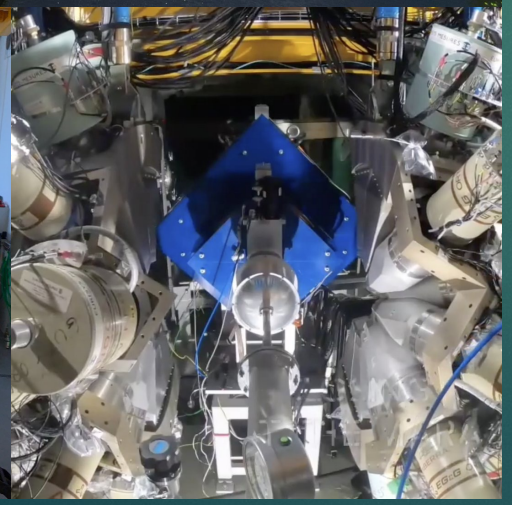
Experimental plan formulated till LS3 (2027-2028)
Running plans for post-LS3 presented
Perspectives for activities at a new target facility (BDF) on the CERN-SPS

Status

140 researchers
40 research institutions/teams
20 PhD students/year
involved in 4 EU-funded projects (SANDA, ARIEL, EURO-LABS, APRENDE)

JYU / JYFL-ACCLAB



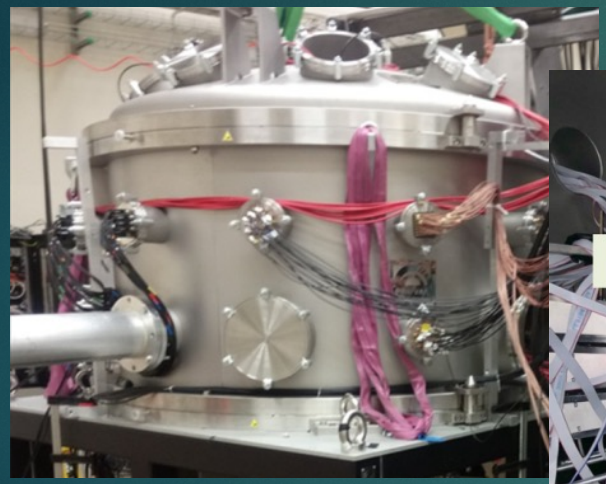


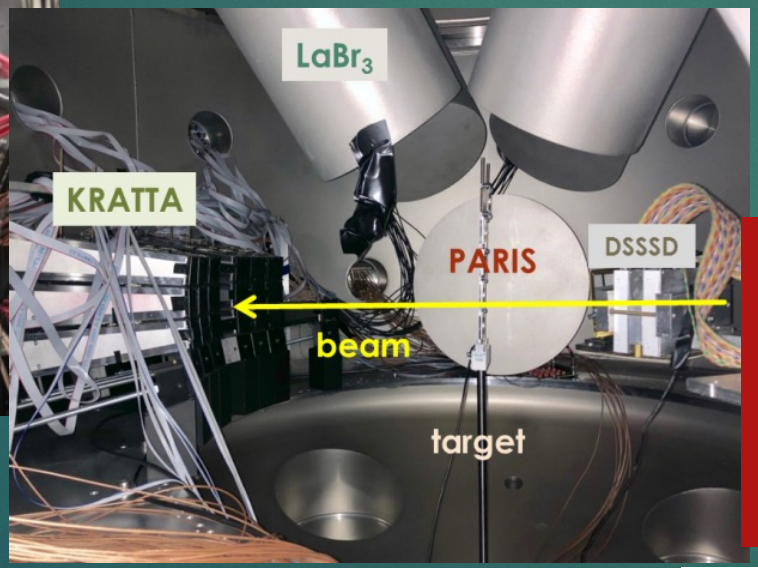
- Over 5500 hours / 27 projects / 128 visits supported
- Current rate of experiments / support can continue through project
- Highlights: Gamma-ray spectroscopy campaigns at RITU/MARA
- Highlights: Mass measurements of Fission Isomers and N=Z nuclei
- **Future: hope to have MCC30 running in 2025/2026 – more beam time available**
- **Future: progress being made on MARA-LEB (now fully funded)**
- **Future: major reconstruction of Target Hall in 2025 to allow siting of 3MV Tandem Platform**
- **Future: Development of neutron beams at 3MV platform**

NLC_CCB Kraków

Medical proton therapy facility, Beam: protons, E=70-230 MeV

- Nuclear physics experiments:
  - Gamma decay from high-lying states and giant resonances excited via (p,p'γ)
  - Dynamics of few-nucleon systems
  - Study of high-lying single-particle states
  - Investigation of the mechanism of proton-induced fission and spallation
- In-beam testing of detectors





Detectors:

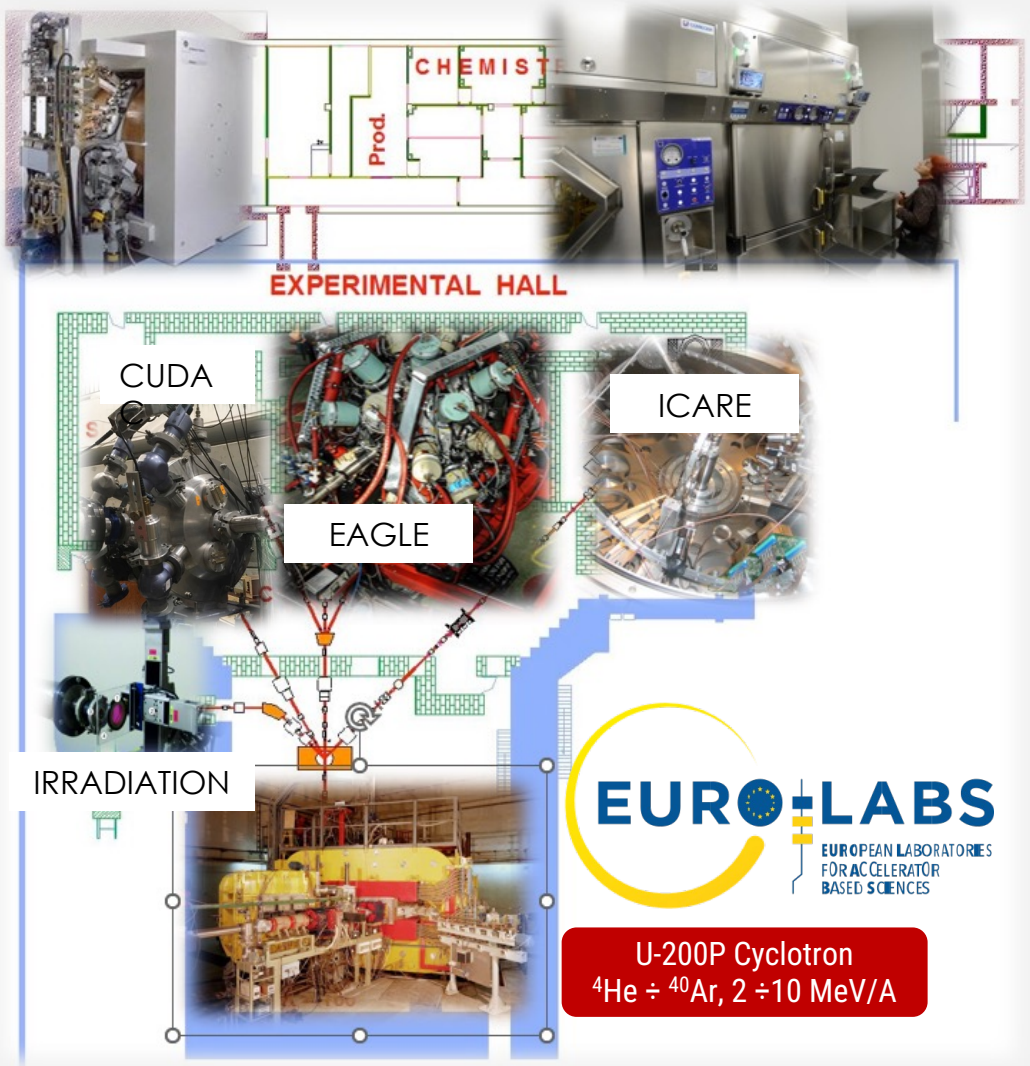
- **KRATTA (CsI telesopes)**
- **DSSSD**
- **PARIS (phoswiches $LaBr_3$+NaI or $CeBr_3$+NaI)**
- **4 large volume $Labr_3$**
- **BINA charged particle array**

5 proposals accepted by IAC for 1.9.23-31.8.24
(4 eligible for EURO-LABS)
7 proposals accepted by IAC for 1.9.24-31.8.25
(5 eligible for EURO-LABS)
Plans to upgrade detectors and electronics

from 1.09.2022 to 31.08.2024
440 AU provided (80%)
4 experiments supported
18 users supported (49%)

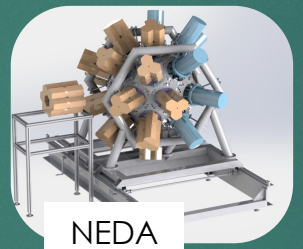
NLC_SLCJ:
Heavy Ion Laboratory, University of Warsaw, Poland

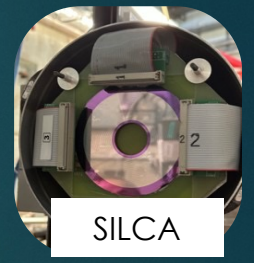
GE PetTrace, beams: proton (16.5 MeV) and deuteron (8 MeV)



1. Gamma-ray spectroscopy studies with EAGLE + ancilliary devices

- **EAGLE** - 15 HPGe in ACS - total photopeak efficiency of the array is 1.4%
- **NEDA**–- 52 neutron detectors placed in the EAGLE frame. 1n det. eff. = 30%, 2n = ~6%.
- **DIAMANT** - a 4π light charged particle detector array: 54 CsI(T1) scintillators, 3 mm thick, solid angle of 95% of 4 π. Detection eff.: for protons ~60% and for alpha particles ~40%.
- **SiICA** - a new particle array under development at HIL for the Coulomb excitation studies - based on a DSSD detector to register back-scattered projectiles (~124-157° LAB)
- **ULESE** – a conversion-electron spectrometer for the in-beam measurements -efficiency up to 12% at the energy of 300 keV, good energy resolution < 1% at 1 MeV, and good suppression of delta electrons, positrons, and photons emitted from the target
- **Plunger**





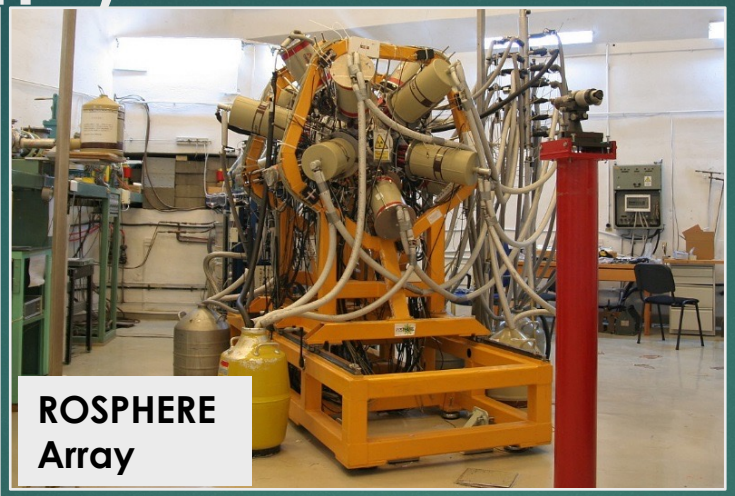
2. Two setups at HIL Warsaw are used for the barrier distributions measurements, reaction mechanism studies and the novel detectors' tests:

- **CUDAC** - 30 PIN diodes (1cm x 1cm) at the backward angles (125°, 135°, 145°) and 4 PIN diodes the forward angles of 35°
- **ICARE** - 1m diameter reaction chamber - can accommodate various detectors (Si, E-ΔE gas and semiconductor telescopes and others). An array of 19 silicon detectors combined with a MCP detector placed at the backward angle of 142 degrees allow the identification in mass by exploiting the different energy and Time of Flight (ToF) of the products; an E-ΔE telescope, placed at the same angle, provides their charge identification

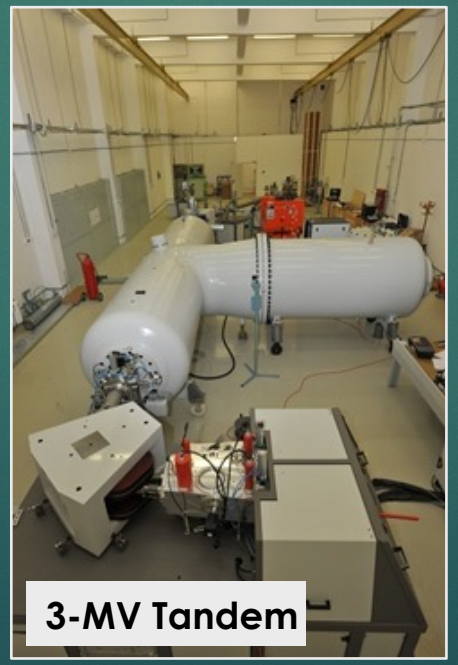
Perspective upgrades:
Recoil Filter Detector, Fast timing array, Wien filter

IFIN-HH, Romania: Tandem accelerators, HPLS (ELI-NP)


9-MV Tandem


ROSPHERE Array


HPLS (ELI-NP)


3-MV Tandem

- Available infrastructure:
  - 9 MV – Nuclear structure/nuclear reaction experiments. Available beams: stable ions from p to Au. Two pulsing systems available (millisecond/nanosecond).
  - 3 MV – Nuclear astrophysics experiments, applications.
  - 1 MV – AMS
  - 2x10PW high power laser system HPLS (ELI-NP)
- The ROSPHERE array at the 9-MV Tandem: 25 HPGe and/or $LaBr_3$ detectors; γ spectroscopy, lifetime measurements using plunger and electronic methods, coincidences, particle detectors, etc.
- The 9-MV Tandem runs on the average 5500 h/year.
- Common PAC for the 3 tandems: 1-2 meetings/year

https://www.nipne.ro

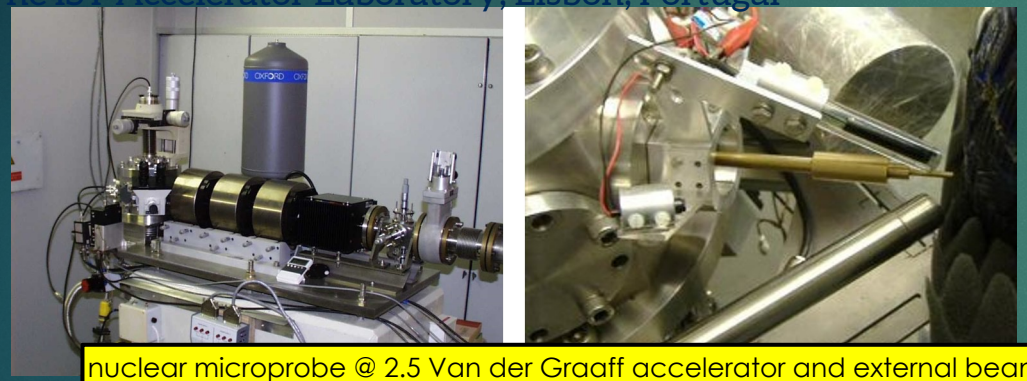
CLEAR: CNA-IST-ATOMKI

The National Center of Accelerators, CNA, Seville, Spain

3 MV tándem with 7 beam lines

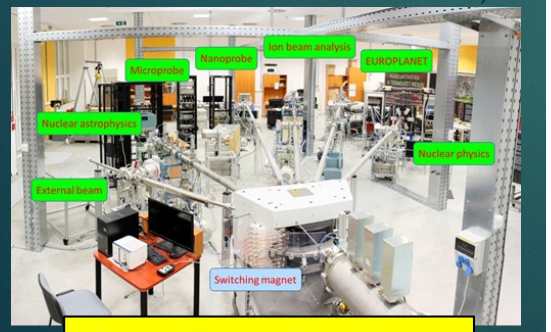
Accelerator mass Spectrometry

The IST Accelerator Laboratory, Lisbon, Portugal

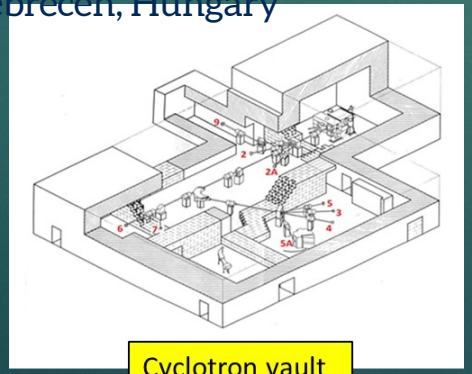


nuclear microprobe @ 2.5 Van der Graaff accelerator and external beam

The Atomki Accelerator Center, Debrecen, Hungary



The Tandetron beamlines



Cyclotron vault

CLEAR: Cluster of Low Energy Accelerators for Research is a consortium comprising:

- **ATOMKI in Debrecen**
- **CNA in Seville**
- **IST in Lisbon**

Each facility offers 640 hours of Transnational Access to stable-ion and neutron beams, in total.

The consortium operates under a unified Program Advisory Committee and holds three proposal calls per year.

As of September 2024, 10 proposals have been successfully completed, meeting criteria such as scientific excellence, cross-disciplinary relevance, and training opportunities.

Many proposals came from first-time users, broadening the international reach and collaborations of the CLEAR facilities.

More information in the poster session

https://institucional.us.es/clear/

ECT*

FONDAZIONE BRUNO KESSLER

ECT*
EUROPEAN CENTRE
FOR THEORETICAL STUDIES
IN NUCLEAR PHYSICS AND RELATED AREAS

A venue for the community
to scrutinize new ideas and charter new directions in nuclear theory, experiment, and related areas, as well as to train the next generation

BIRA VAN KOLCK, INCOMING DIRECTOR

2024: 7 workshops supported by

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

Electric dipole moments, optical potentials, high-power lasers, hadron tomography, QCD phase diagram, QCD plasma, neutrino oscillations

Highlight

Doctoral Training Program
Nuclear Theory for Astrophysics

15 July - 02 Aug 2024
Organizers:
- A. Arcones (Darmstadt)
- B. Giacomazzo (Milano-Bicocca)
- J. Piekarewicz (Florida State)

26 participants selected from 51 applicants

2025: 33 workshop + 2 DTP proposals; selection in progress

Upcoming highlight

7-9 July 2025

G. Colò, J. Dudek, M. Rodríguez-Gallardo,
Theory Service for the Low-Energy Nuclear Physics Community: a hands-on workshop

EURO-LABS Theo4Exp

Theo4EXP VA facility

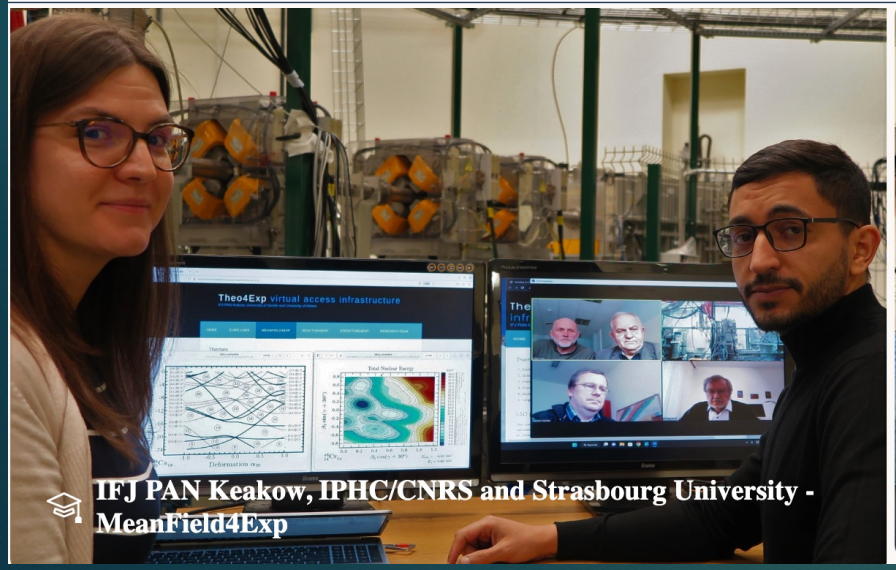
THEO4EXP

HOME | EURO-LABS | MEANFIELD4EXP | REACTION4EXP | STRUCTURE4EXP | RESEARCH TEAM

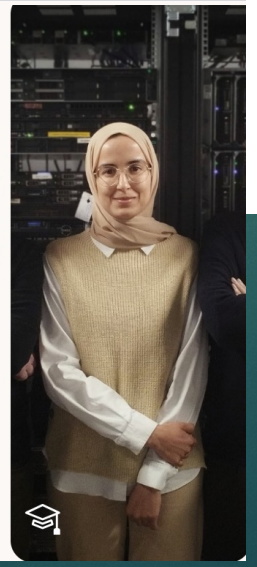
A facility providing virtual access to nuclear theory tools

THEO4EXP

EURO-LABS | UNIVERSIDAD D SEVILLA 1505 | IFJ | IPHC Institut Pluridisciplinaire Hubert CURIEN STRASBOURG | UNIVERSITÀ DEGLI STUDI DI MILANO



IFJ PAN Keakow, IPHC/CNRS and Strasbourg University - MeanField4Exp



EURO-LABS *Newsletter*
ISSUE No.2 | JULY 2024

EURO-LABS

Theo4Exp: a theory service provided by EURO-LABS

Manuela Rodríguez-Gallardo, Gianluca Colò and Jerzy Dudek, on behalf of the Theo4Exp team

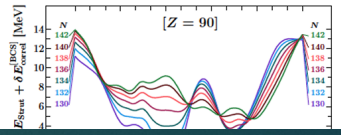
In the last few years, the nuclear scientific community has been moving towards open science: open access publications, accessibility to experimental data and codes, etc. In this context, the creation of user-friendly platforms, in which non-expert users can perform calculations using well-established theory codes, represents a significant and long-awaited advancement. The new virtual access facility **Theo4Exp**, created as part of the EURO-LABS, addresses this need, by providing a variety of easily accessible computer codes for low energy nuclear structure and reactions, to researchers worldwide. The use of these codes is made simple by the adoption of clear interfaces and the implementation of graphical tools. Results can be easily transmitted, exchanged and compared. It is expected that the new service will create a virtuous circle of increased collaboration between theorists and experimentalists, leading to innovative experiments and facilitating their interpretation.

EURO-LABS has funded and provided the appropriate framework and dedicated personnel to create this virtual access service. Open to users since February 1st 2024, Theo4Exp is composed of three installations: one for reaction calculations, Reaction4Exp, and two dedicated to structure calculations

EURO-LABS project, either by providing their institution credentials (if they belong to eduGAIN network) or thier ORCID identification.

MeanField4Exp

The MeanField4Exp installation is based on the numerical applications [1-3] of the realistic phenomenological mean field approach, developed by J. Dudek and collaborators at the University of Strasbourg. The functioning of the MeanField4Exp service benefits from the integration of advanced methods of nuclear structure theory and quantum mechanics with advanced mathematical tools. These include inverse problem theory and Monte Carlo simulations for parameter optimization, group and group representation theories to handle symmetry issues, and graph theory for studying shape transitions, such as nuclear fission. The service provides access to advanced codes as well as to a comprehensive database containing pre-calculated results. The codes have been implemented by Irene Dedes and Abdelghafar Gaamouci at the Institute of Nuclear Physics (IFJ) of the Polish Academy of Sciences in Krakow.



Further services in preparation

SERVICE IMPROVEMENTS

Highlights from 2 service improvements tasks were presented yesterday:

FLESH by Warisara Charuchinda (GSI)

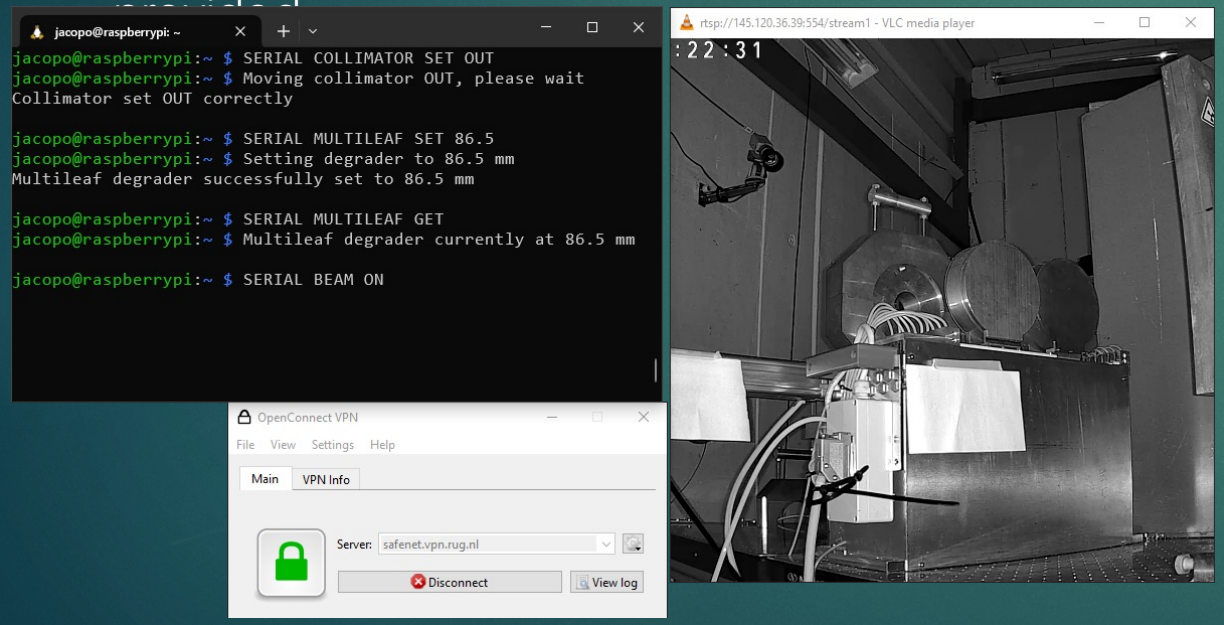
ERIBS by Paul Greenlees (JYFL)

WP.2.5.C1 Streamlined and Remote Access

Collaborators: GSI, INFN Milano, UMCG, IFIN-HH, TU Dresden

Remote irradiation control

- Provide access to the irradiation control system without compromising security
- Users are given access to a client device connected to eduroam, accessible via VPN (picture below)
- A serial connection (minimal attack surface) carries textual command to the irradiation control system
- Video feedback from the irradiation room is also



Remote access toolkit

- Development of web-based database (fully-open access) containing descriptions and documentation of remote-access tools. The goal is to have:

  i) comprehensive information about existing tools,

  ii) example use cases,

  iii) easily-accessible documentation and user manuals,

  iv) contact information for experts in the respective topics.

- **Milestone M12 reached in 02.24** – completed database containing remote access toolkit
- Database is available via **https://eurolabs-remote.gsi.de/**
- So far, information from a sub-set of EURO-LABS facilities included
- **Input from other facilities needed!**
- **Workshop on remote-access tools planned** for 04.02.2025 at the Bormio Workshop on Modern Aspects

ct us:

WP 2.5.1 Streamlined access

Interactive Web-page:
application forms.

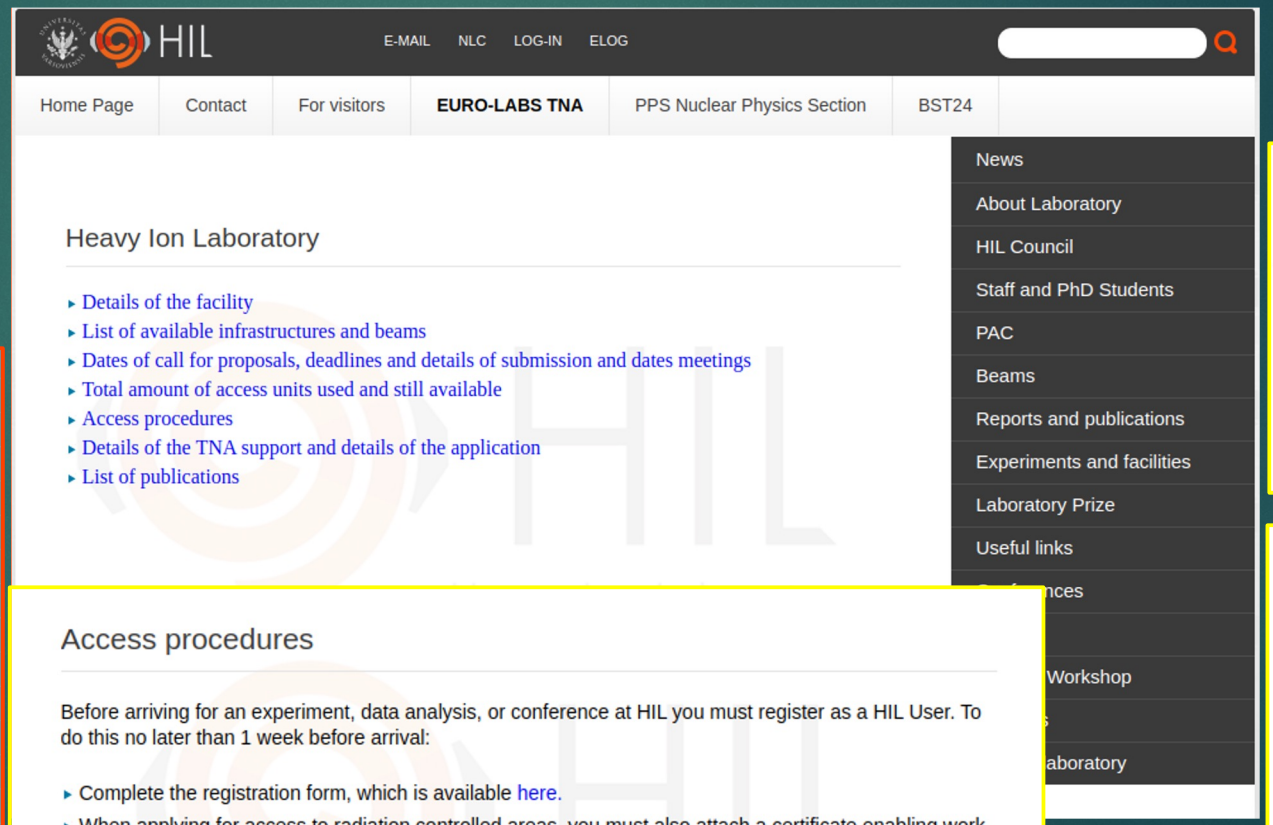
Example:
Utilization of the "Participants Database" plugin to create an interactive form for:
"HIL user registration form."

This plugin will also be used to create other forms that will facilitate various users' applications.

Prototype of facility portrait
for
database and webpage of relevant information on the participating RI


Rejestracja użytkownika HIL/HIL user registration

Imię/Name*
Nazwisko/Surname*
(As in Passport, Latin alphabet)
Numer telefonu/Phone number*
E-MAIL*
Płeć/Gender* ○ Kobieta/Female ○ Mężczyzna/Male
Data urodzenia/Birth Date*
Date format mm/dd/yyyy
Obywatelstwo/Nationality*
Rodzaj i numer dokumentu tożsamości/Passport/ID card series and number*
Tytuł lub stopień naukowy/Academic title or degree*
Instytucja macierzysta, adres/Home Institution's name, address*
Cel współpracy/Reason for collaboration* ○ Eksperyment/Experiment ○ Analiza danych/Data analysis ○ Spotkanie/Meeting ○ inny/other:


HIL
E-MAIL NLC LOG-IN ELOG
Home Page | Contact | For visitors | EURO-LABS TNA | PPS Nuclear Physics Section | BST24

Heavy Ion Laboratory

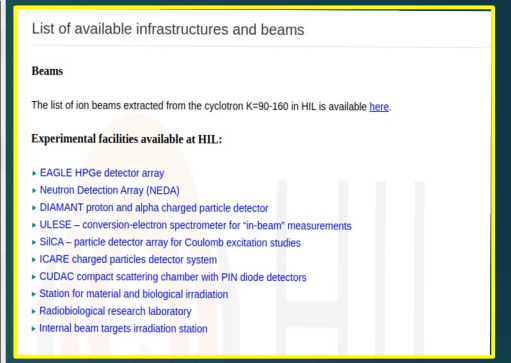
- Details of the facility
- List of available infrastructures and beams
- Dates of call for proposals, deadlines and details of submission and dates meetings
- Total amount of access units used and still available
- Access procedures
- Details of the TNA support and details of the application
- List of publications

News
About Laboratory
HIL Council
Staff and PhD Students
PAC
Beams
Reports and publications
Experiments and facilities
Laboratory Prize
Useful links

Access procedures

Before arriving for an experiment, data analysis, or conference at HIL you must register as a HIL User. To do this no later than 1 week before arrival:

- Complete the registration form, which is available here.
- When applying for access to radiation controlled areas, you must also attach a certificate enabling work with ionization radiation and pass a test of knowledge of radiation protection. Certificate, test and helpful resources are available here.

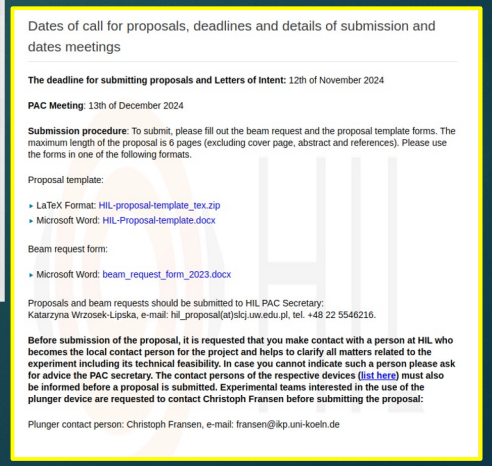

List of available infrastructures and beams

Beams

The list of ion beams extracted from the cyclotron K=90-160 in HIL is available here.

Experimental facilities available at HIL:

- EAGLE HPGe detector array
- Neutron Detection Array (NEDA)
- DIAMANT proton and alpha charged particle detector
- ULESE – conversion-electron spectrometer for "in-beam" measurements
- SilCA – particle detector array for Coulomb excitation studies
- ICARE charged particles detector system
- CUDAC compact scattering chamber with PIN diode detectors
- Station for material and biological irradiation
- Radiobiological research laboratory
- Internal beam targets irradiation station


Dates of call for proposals, deadlines and details of submission and dates meetings

The deadline for submitting proposals and Letters of Intent: 12th of November 2024

PAC Meeting: 13th of December 2024

Submission procedure: To submit, please fill out the beam request and the proposal template forms. The maximum length of the proposal is 6 pages (excluding cover page, abstract and references). Please use the forms in one of the following formats.

Proposal template:

- LaTeX Format: HIL-proposal-template_tex.zip
- Microsoft Word: HIL-Proposal-template.docx

Beam request form:

- Microsoft Word: beam_request_form_2023.docx

Proposals and beam requests should be submitted to HIL PAC Secretary: Katarzyna Wrzosek-Lipska, e-mail: hil_proposal(at)slcj.uw.edu.pl, tel. +48 22 5546216.

Before submission of the proposal, it is requested that you make contact with a person at HIL who becomes the local contact person for the project and helps to clarify all matters related to the experiment including its technical feasibility. In case you cannot indicate such a person please ask for advice the PAC secretary. The contact persons of the respective devices (list here) must also be informed before a proposal is submitted. Experimental teams interested in the use of the plunger device are requested to contact Christoph Fransen before submitting the proposal:

Plunger contact person: Christoph Fransen, e-mail: fransen@ikp.uni-koeln.de

Targets

The main Goal

Gather the community of European "nuclear target makers" having expertise in target manufacturing and characterization, both for nuclear and applied physics purposes

Fostering the connection between different nuclear physics institutions with the aim to create and maintain a distributed infrastructure for target development, production, and characterization.

Feedback and exchange of information among researchers involved in:

- Target developments
- Target fabrication
- Target characterization
- Final use

Milestone

Month 3 Production of a report to define the state of the art in the field and collect the requests from the com

Fulfilled

Deliverable

Creation of a database (DB) containing the information about the preparation and the characteristics of available targets in vari
lab

DB ready, working on the publication (EURO-LABS website?)

Two post-docs hired with EURO-LABS funds:
Vasilis SOUKERAS (INFN)
Radia RAHALI (GANIL)

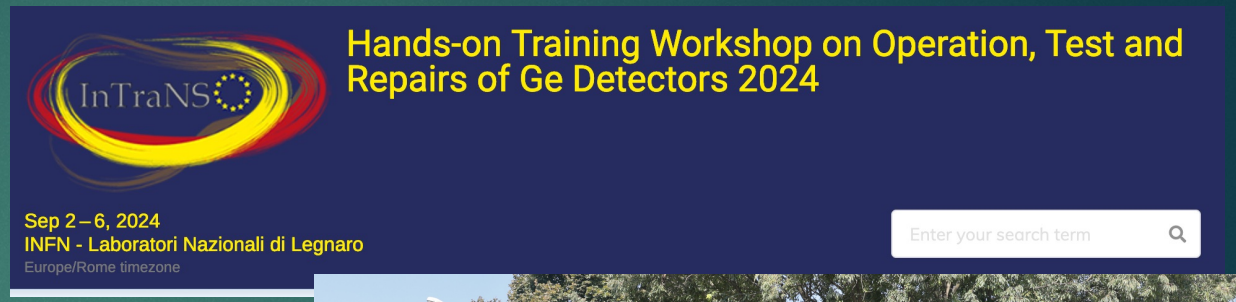
See poster session

InTraNs

Instrumentation and Training for accelerator based Nuclear Spectroscopy and Reaction

https://web.infn.it/EURO-LABS/intrans/

2024 events:



86 participants. Great success !

→ the INTRANS SC has decided to host another workshop before the end of EURO-LABS contract

30 participants, 9 lecturers, 10 hands-on laboratories

2025 events sponsored/organized by INTRANS:

-Training Workshop on Coulomb Excitation (27-30 January 2025, Florence, Italy)

-AGATA Data Analysis School (13-17 January 2025, Lyon, France)

-INTRANS Ge Detector School (7-11 April 2025, Liverpool, UK)

2026 events:

2nd INTRANS workshop (LNL)

Conclusions and outlook

- The work in WP2 progresses very well.
- Many interesting scientific highlihts in differrent TA facilities were obtained.
- Many facilities exceeded the AUs planned for whole duration of the project, other will exceed this limit soon. This demonstrated that access to nuclear physics facilities are in high demand. Questions were raised how to finance the AUs after exceeding the planned limit.
- There are small issues in few laboratories in spending the T&S budget – measures to improve this will be taken.
- Theo4Exp VA facility, opened to users only since 9 month, demonstrated large interest of the users. Further actions to adverise it are planned.
- Service improvements provided very interesting developments
- All planned milestone were eached on time. The work on remaining milestones and delivarables is in very good progress

Thanks to all FC and task leaders for providing the inforrmation