LINAC & BTF

L. Foggetta on the behalf of

LINAC/BTF Group

Researchers:
B. Buonomo, F. Cardelli,
D. Di Giovenale, C. Di Giulio,
L. G. Foggetta

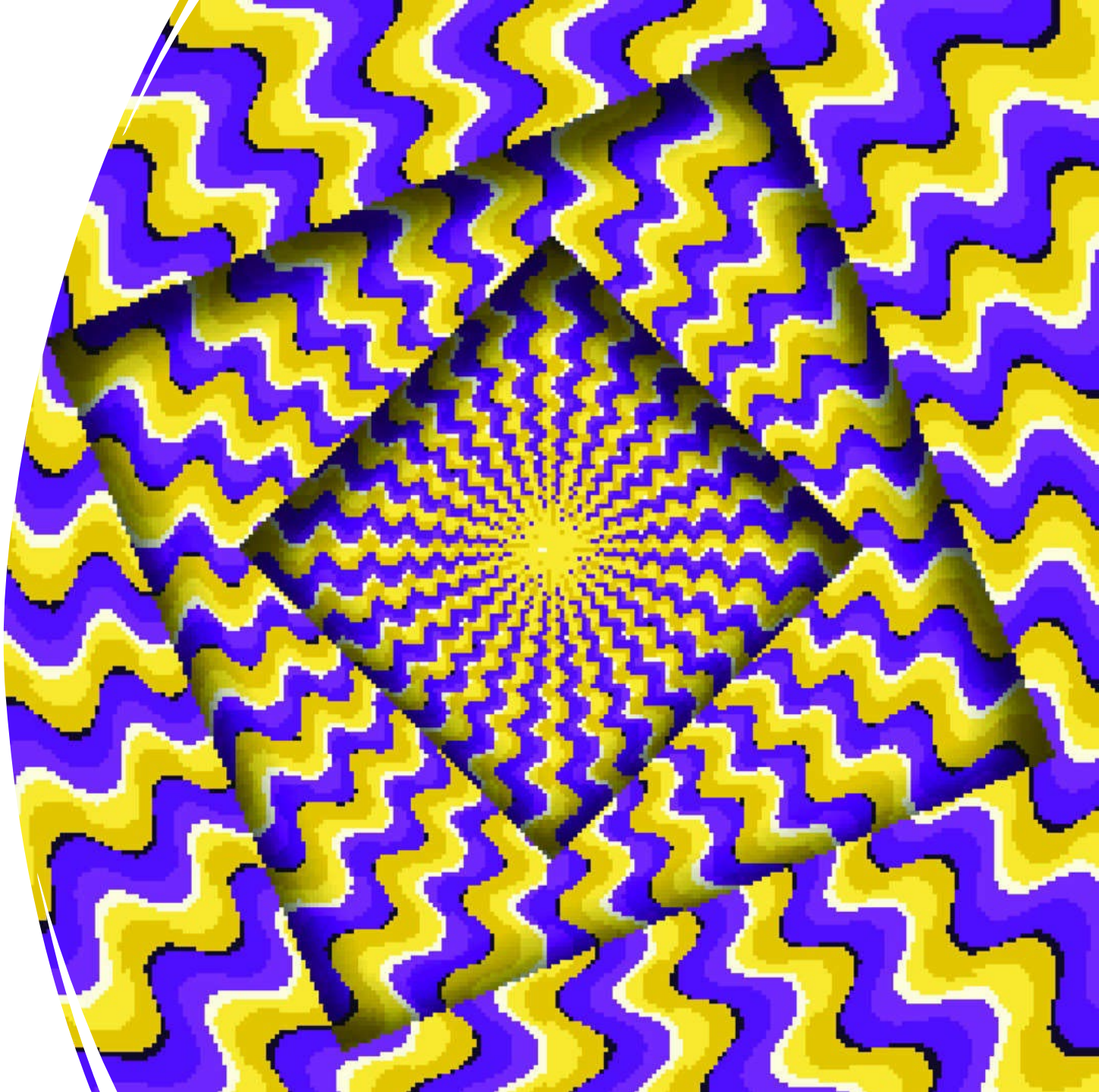
Welcome to our new researchers

E. Diociaiuti

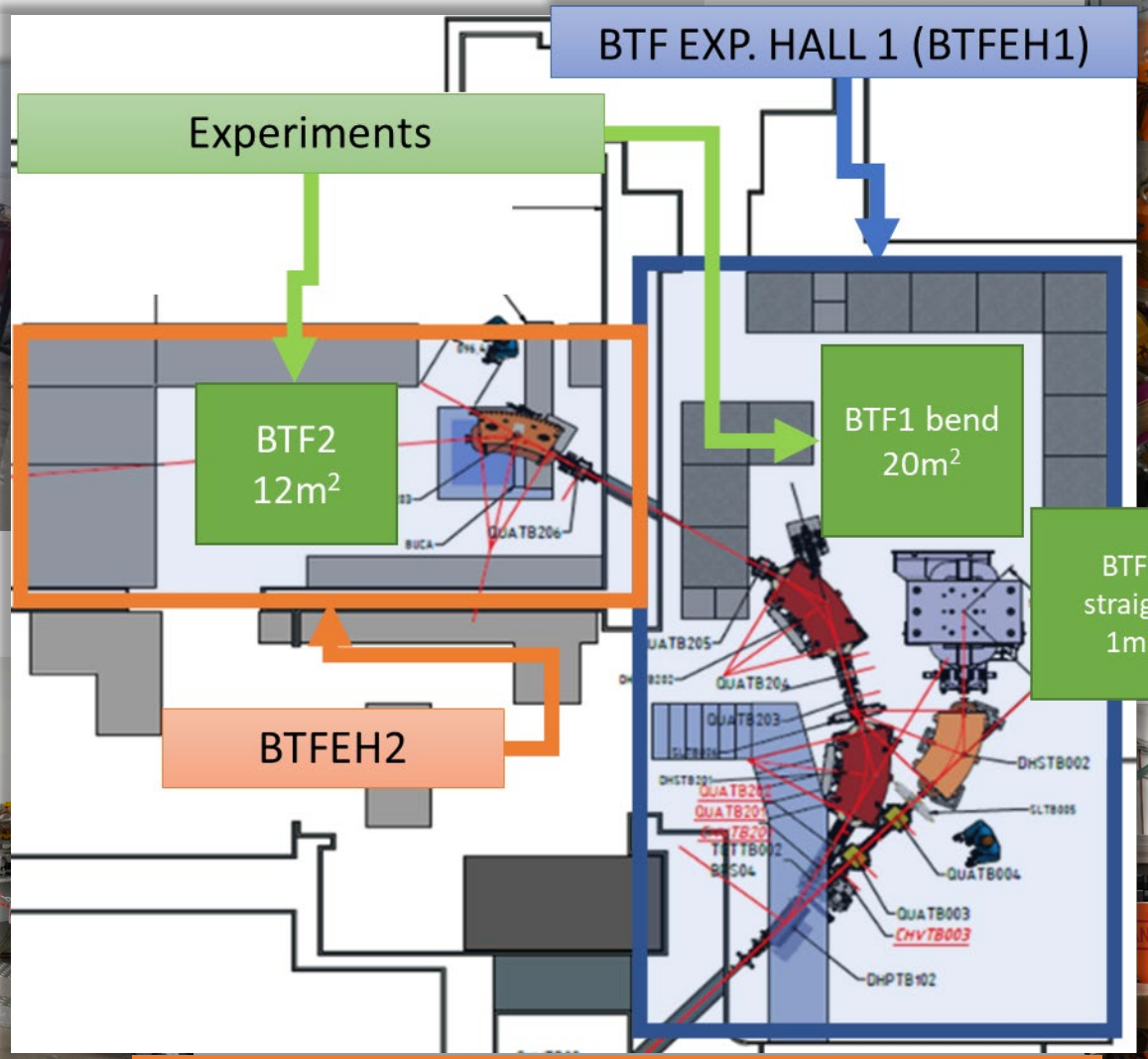
C. Taruggi

Technicians:
R. Ceccarelli, A. Cecchinelli,
M. Ceccarelli, G. Piermarini,
A.L. Rossi, S. Strabioli, R. Zarlenga
***Retired**: M. Belli, R. Clementi*

BTF STATUS



OVERVIEW – 1Y OF ACTIVITY



GOOD NEWS:
STILL SURVIVING over 150 users

LNF – BTF THREE LINES STATUS

BTFEH1 – BTF1 (2 lines)

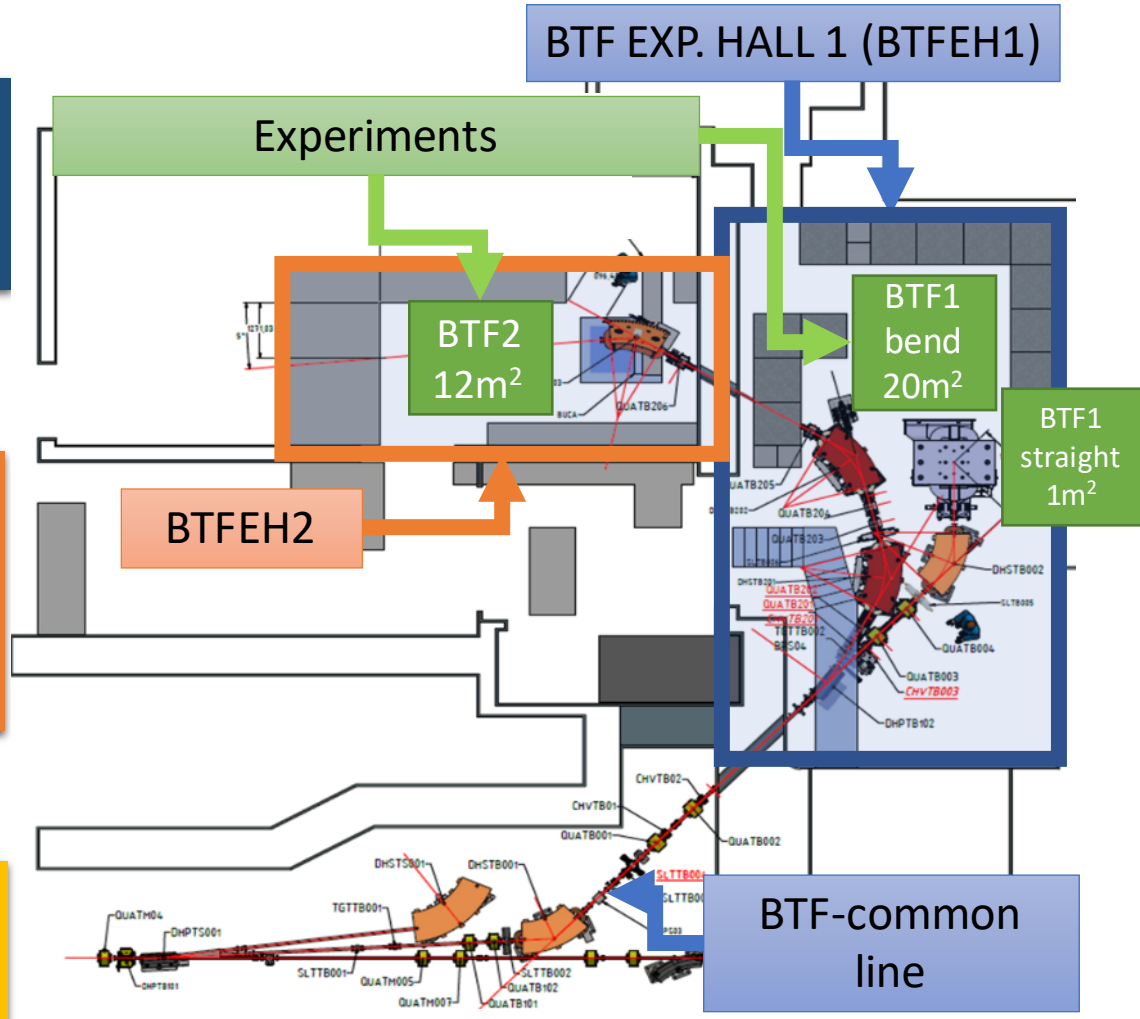
- Hall Operative but in mostly in standby
- Internal LNF test runs
- Improved triggered camera readout and triggering

BTFEH2 – BTF2 (1 line)

- Hall operative, BTF2 line to external users
  - external users run foreseen now up to December ends
- Only secondary beam
- Still beam performances upgrade respect to first runs (transverse param.)
- Involved in EUROLABS Project, started on Autumn 2022

BTFs

- **DHPTB101 PS is a TRUE pending problem, single point of failure**
  - **1 month downtime (2022/23)**
- **Software for automated call and user management operative**
- **DAϕNE on, BTF run in spare pulse mode**



LNF – BEAM TEST FACILITY

Parameters	BTF1 Time sharing		BTF1 Dedicated		BTF2 Time sharing	BTF2 Dedicated
	With Cu target	Without Cu target	With Cu target	Without Cu target	With Cu target	With Cu target
Particle	e^+ / e^- (User)	e^+ / e^- (DAΦNE status)	e^+ / e^- (User)		e^+ / e^- (User)	
Energy (MeV)	25–500	510	25–700 (e^-/e^+)	167–700 (e^-) 250–550 (e^+)	25–500	25–700
Best Energy Resolution at the experiment	0.5% at 500 MeV	0.5%/1%	0.5%(Energy/mult dependent)		1% at 500 MeV(Energy/mult dependent)	
Repetition rate (Hz)	Variable from 1 to 49 (DAΦNE status)		1–49 (User)		Variable from 1 to 49 (DAΦNE status)	1–49 (User)
Pulse length (ns)	10		1.5–320 (User)		10	10
Intensity (particle/bunch)	$1–10^5$ (Energy dependent)	10^3 to $1.5x10^{10}$	$1–10^5$ (Energy dependent)	1 to $3x10^{10}$	$1–10^4$ (Energy dependent)	
Max int flux	$3x10^{10}$ part./s				$1x10^6$ part./s	
Exit Beam waist size (m1, mm)	0.5–55 X / 0.35–25 Y (vacuum window dependent)				0.4x0.4(Energy/mult dependent)	
Divergence (mrad)	Down to 0.5				Down to 0.5	

- Pulsed **electron** and **positron** beams (up to 49 pulses/second)
- Wide range: from 10^10 down to single particle per bunch, continuous energy selection
- Different ranges of parameters in the **two running modes**:
  - Dedicated: only when DAΦNE collider in shutdown, exclusive BTF users
  - Time sharing:
    - DAΦNE spare pulse injections mode via DHPTB101 pulsed magnet
    - Beam top parameters defined by DAΦNE injections

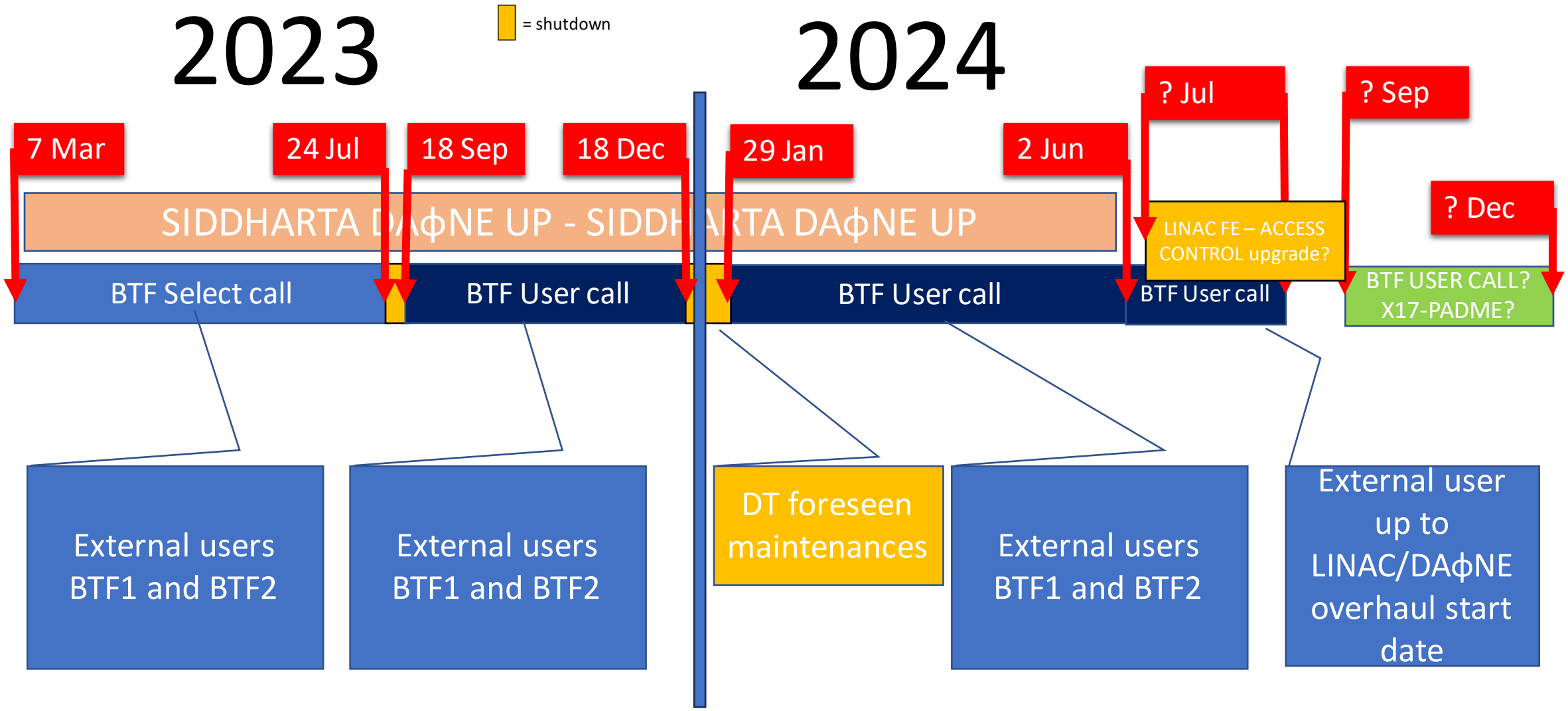
2023 ACTIVITIES

Recommendations LINAC-BTF previous meeting

- From past experience, machine availability during summer and in case of high temperatures might be lower. Optmization of the running period with an early restart in September might impact favourably machine availability.

- 2023 user beam-days planning **almost acquired**
  - **1 shift totally lost but rebooked**
- 2023 Calls closed and acquired
  - **March to June, June to July, Sept to Dec (ongoing)**
- 2024 H1 call opened, submission ends on 15 Jan 2024
  - 2024 call is open beam-days planning expectations **ongoing smoothly**
- LINAC/BTF team mainly involved in 2023 for DAΦNE and BTF operations, TEX, SPARCLAB, Rome Technopole
- EUROLABS (1w payed for 2023)
- INFaN established = network of INFN Charged Irradiation Facilities
- ASIF-2 project in discussion
- Collaboration with UK university and Labs for different projects

NEXT DUMMY CALENDAR



DISSEMINATION

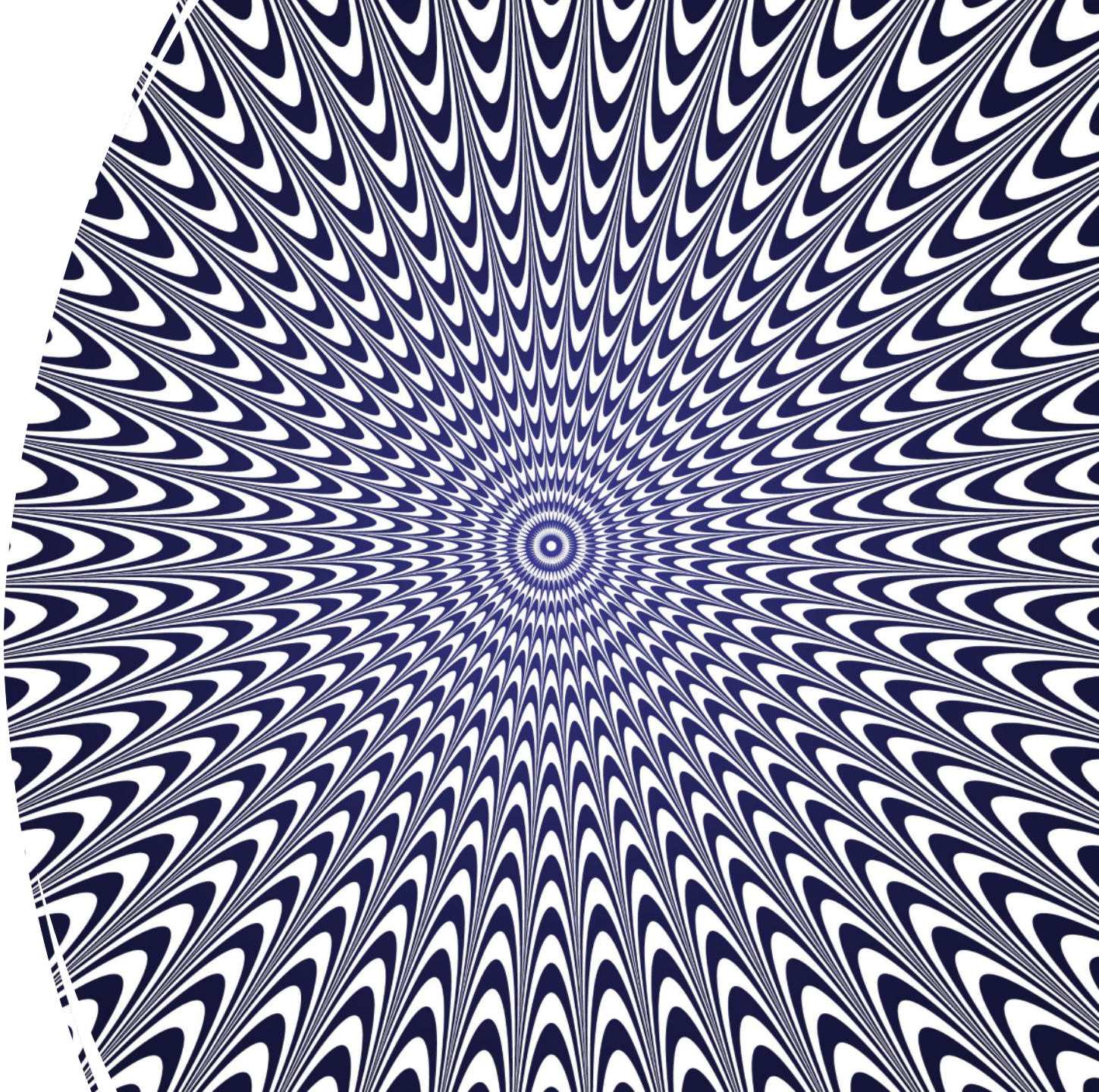
BTF Team in 2023 (up to Now) has been involved as tutor, visit guide, and presenter for:

Event Type	Target	Year	Number of students/people involved
Accelerators PhD LABS	PhD Students	2023	7 students/ 3 sessions
BTF Tutoring	university student users	2023	10
LNF visit guide	university and high school	2023	660
PCTO (work-school join)	high school students	2023	12 student for 9 days
LNF Lessons on Accelerators Researcher@School 2023	high school students General communication	2023	+1600 views up to October
Childhood/Teenager tutoring	Primary Secondary school	2023	53
Undergraduate tutoring	University	2023	25

BTF is the right place for young people and ideas
(more than four groups develops thesis work in BTF in 2023 last calls)

- **We present two projects for master class "LASCALA"**

BTF USERS

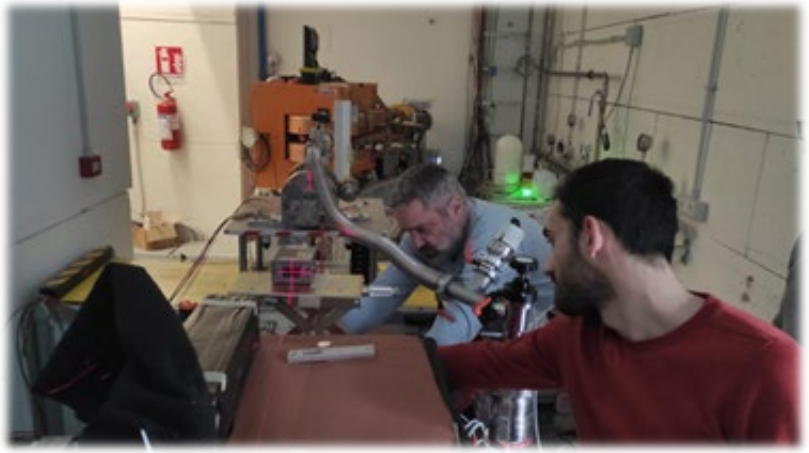


2023 CALLS FOR BEAMTIME

- **Difficult call restart** due previous challenging periods:
  - COVID
  - New hall and its new operative rules and limitations
  - New users-side rules
  - User typical attitude has changed

  But now, the machinery has successfully completed a consolidation period.

- **No gas**, led to the exclusion of a significant portion of the HEP community
  - Two gas pipeline already design with safety system, 20kEur, waiting funding



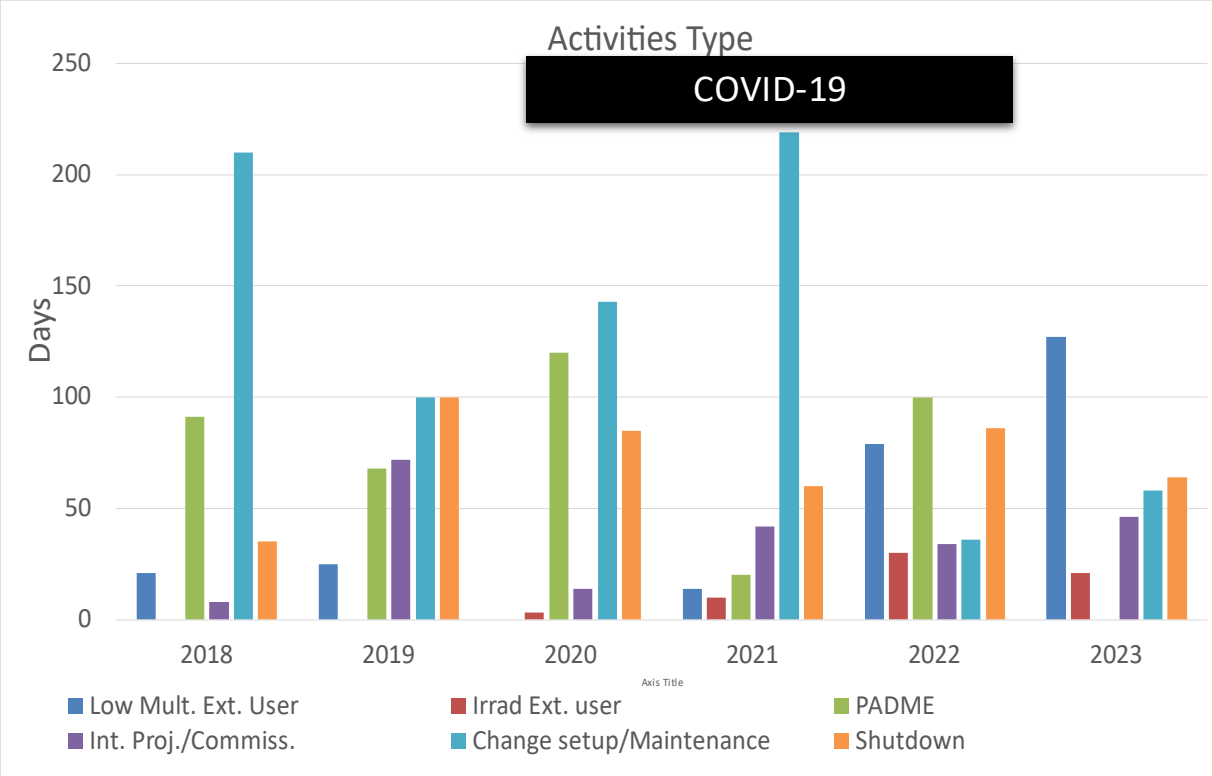
- We got **full occupancy** for the weeks on the shelf (apart no-show)
  - Few last-minute withdrawals (2)
  - Due to shipments, collaboration
  - Old queue of users has been zeroed

- **Failures** affecting BTF availability

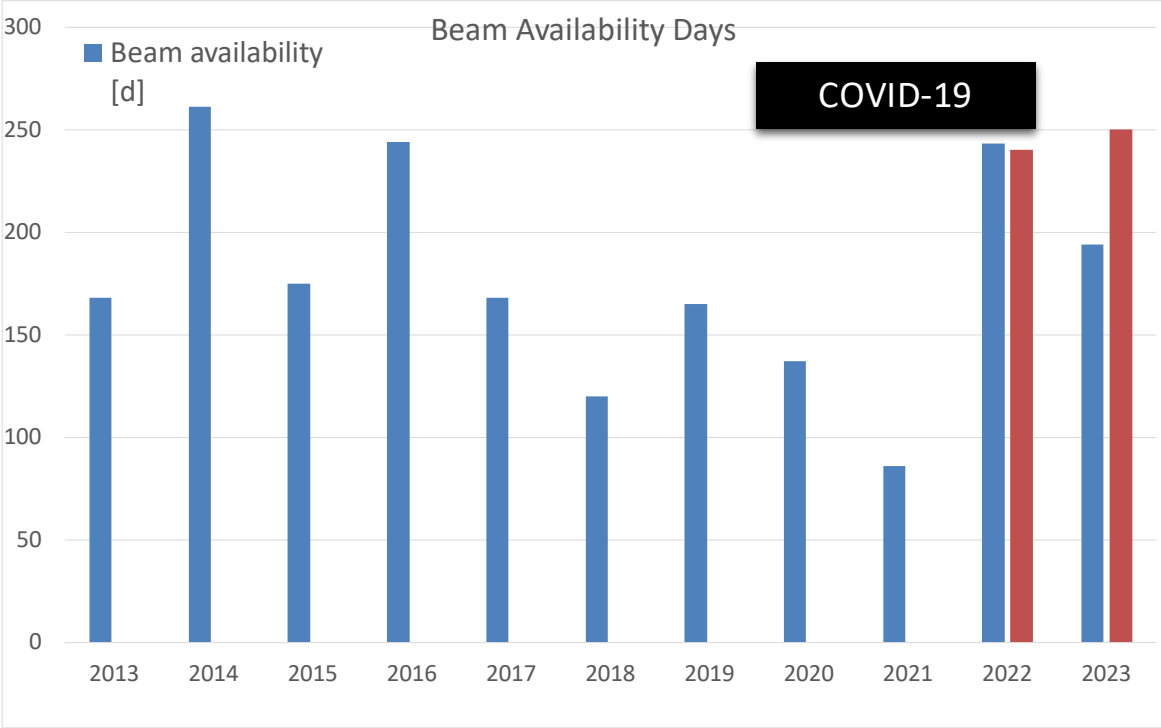
  4 bookable weeks lost, fortunately in the between of planned maintenance stops and users cancellations reduced to 1 shift lost (and recovered): 1w LINAC cool. tower shaft, 2w DHPTB101, 1w LINAC water leaks (on KLYA solenoid, chicane)

LNF – BTF NUMBERS

2018-2023 Activities



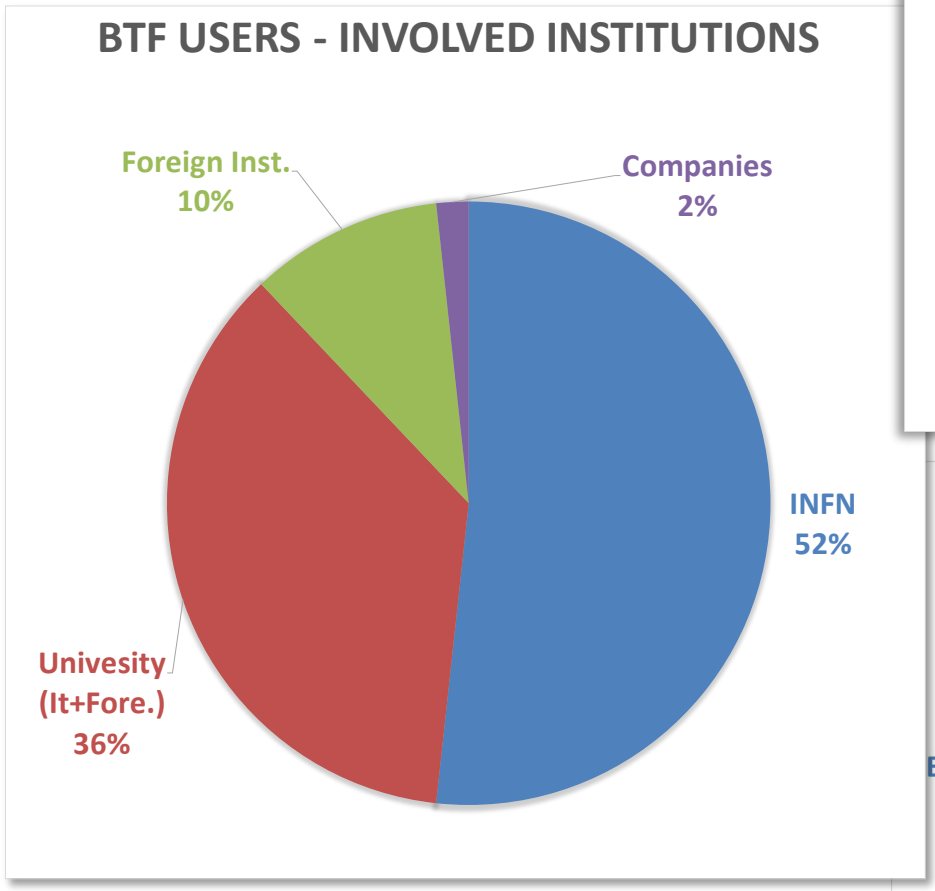
Beam Availability Days (up to Oct 2023)

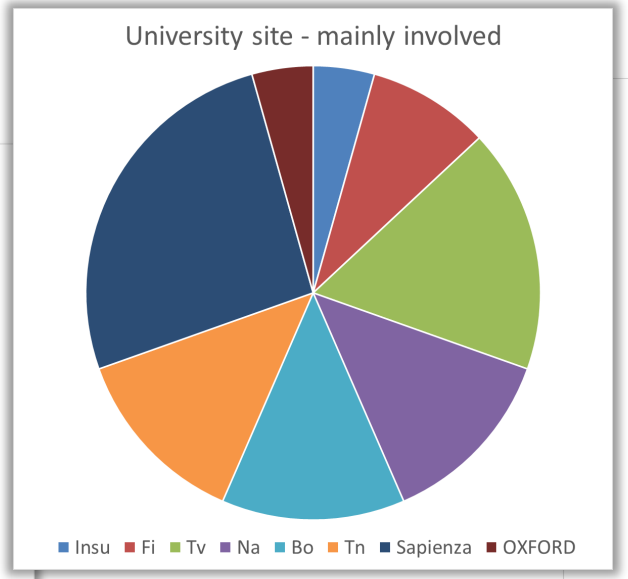


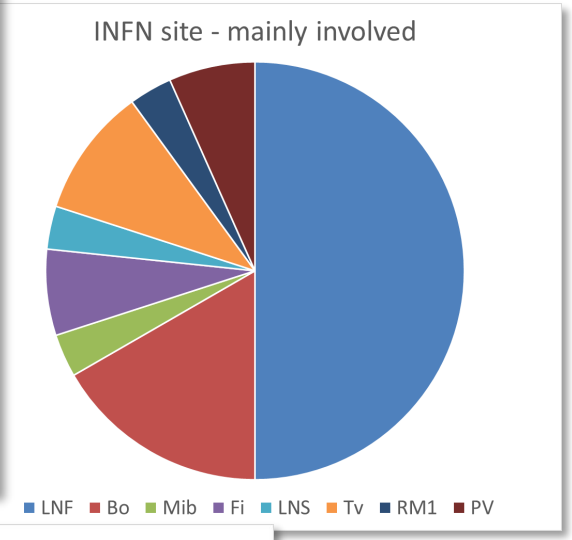
Shutdown (but not losed) time mainly due to DHPTB101 issue(3w) - LINAC (3w)
Converted in hall activities: camera setup, instruction, maint., BTF Corrector installation…

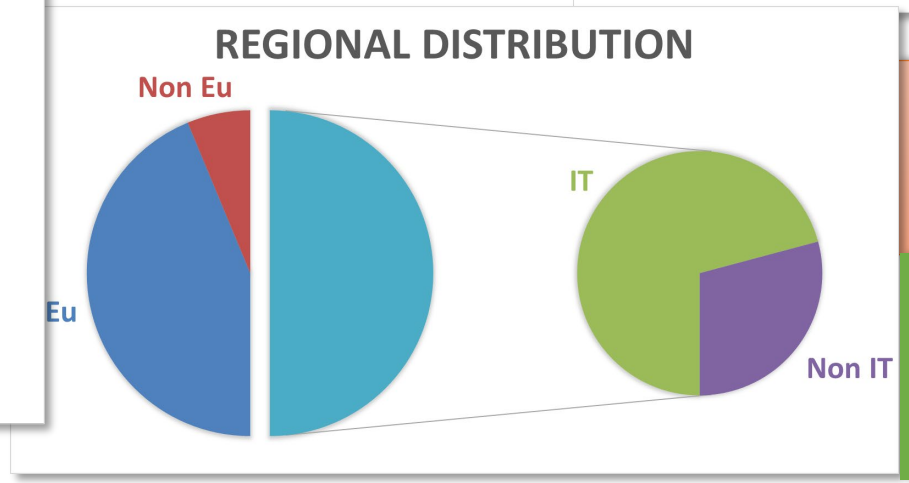
LNF – BTF NUMBERS

2022-2023 Involved Institutions









Beam availability days = ~200d/y
Shift average time = 7d
Average team member number = 8

2023 BTF mostly used for:

- New Solid-state detector developing
- Space detectors test and calibration
- HEP detector developing

CITING BTF

Around 15 paper citing BTF (Jan. 2023, Nov. 2023), more from PADME collaboration.
Increase is expected in the next year due to a bigger users team.

The PADME beam line Monte Carlo simulation
F. Bossi (Frascati), P. Branchini (INFN, Rome3), B. Buonomo (Frascati), V. Capirossi (Polytech. Turin), A.P. Caricato (INFN, Lecce and Salento U.) et al.

F. Bossi *et al.* "Cross-section measurement of two-photon in-flight annihilation of positrons at $\sqrt{s}$=20 MeV with the PADME detector". Phys. Rev. D **107**, 012008, (2023)

Dimitrova et al., Using Artificial Intelligence in the Reconstruction of Signals from the PADME Electromagnetic Calorimeter, Instruments 2022, 6(4), (2023)

Long, Elizabeth, Mauro Raggi, and Dott Tommaso Spadaro. "Measurement of the Bhabha scattering cross section at the PADME Experiment." (2023). Thesis Work.

Gianotti, Paola, and PADME collaboration. "The study of the X17 anomaly with the PADME experiment." *Journal of Physics: Conference Series*. Vol. 2586. No. 1. IOP Publishing, 2023.

N. Atanov *et al*., "The Mu2e crystal and SiPM calorimeter: construction status," in *IEEE Transactions on Nuclear Science*, (2023)

S. Bartocci *et al.* (Limadou HEPD collaboration) Phys. Rev. D **105**, 022004
Deep learning based event reconstruction for the Limadou High-Energy Particle Detector, Phys. Rev. D **105**, 022004 (2023)

Annucci, Davide, et al. "The SHERPA project: Bent crystal-assisted beam extraction simulations." IL NUOVO CIMENTO 100.148 (2023): 46.

E. Diociaiuti, et al. "RD Mucol/LNF 2022 M. Boscolo, C. Cantone, F. Colao (Ass.), E. Di Meco (Laur.)."

De Donato, C. "An innovative particle detector onboard the CSES-02 satellite." (2023) (TIPP2023).

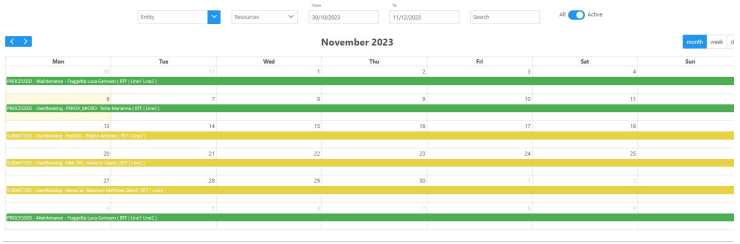
Increase our (mostly digital) presence to better dissemination of LINAC/BTF beam capabilities (and the calls for experiment)

- 6th International Conference Frontiers in Diagnostic Technologies (ICFDT6)
- Compact Light Follow up '23
- 14th International Particle Accelerator Conference (IPAC'23)
- 15th Workshop on Breakdown Science and High Gradient Technology (HG2023)
- AMICI-I.FAST Workshop on Facilities for beam test of accelerator components
- 2023 International Workshop on Future Linear Colliders (LCWS2023)
- NANOINNOVATION 2023
- 2023 Pulsed Power Conference (PPC2023)
- 109° Congresso Nazionale SIF
- LINACS Network Internal Biannual Workshop

BOOKING SW

Booking BTF: BTF booking management software based on an automated approval workflow software. Call management.

- First **operative use on March**, after few initial problem promptly resolved
- **Few bugs** in the first two months (only losing some user shifts display on UI but the automation worked well)
- Acquired some **other features** especially in the Admin section to ease calendar management in case of last-minute shift renunciation or rebooking



- Currently, specific version also for **INFN-LABEC**
  - Under INFaN – INFN-A
  - Production side = operative test
  - Similar aim (internal or users management)
  - Many lines: 5 for TANDEM facility

Hard to reach but could be a widely use new standard.
Around than 160 users has been managed (by this LNF app and staff)

Definitely simple to use, as reported by users
Up to now, **the IT infrastructure has no detectable fault**
Many thanks to our scientific groups that acted as beta-tester user!

Developed G. L. Napoleoni (LNF Computing Center, main dev.), R. Orrú, M. Tota
BTF group and LNF Secretariats (and bug-finder group):
- AD-Secretariats (M.R. Ferrazza, G. Vinicola, V. Rosicarelli)
- Personnel-Secretariats (G. Dalla Vecchia, F. Triolo, L. Occidente, A. Mininni)

SPARC-ULENS

Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Frascati

BTF run (New Diagn.): 2023 – NEW SETUP

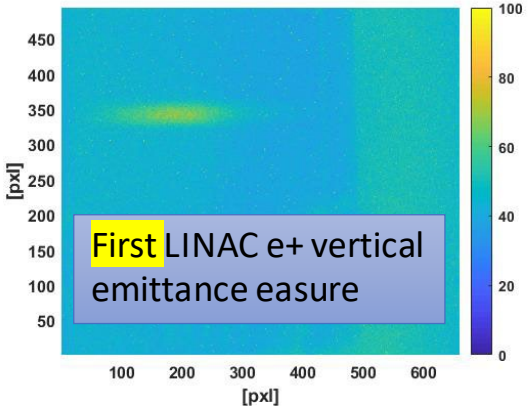
BTF beam 503 MeV, 1 Hz, ~10^7 e+/s, ~10^9 e-/s, optimized spot diameter for vertical measurement

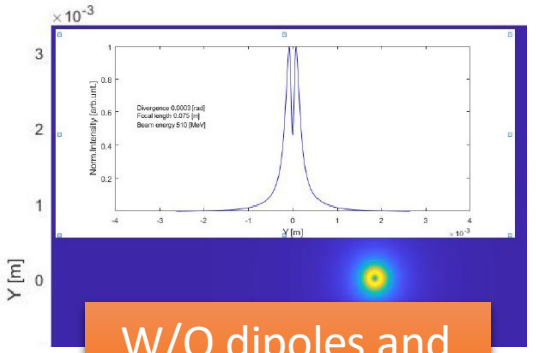
Synergistic emittance measurement system both for SPARC **Vladimir Shpakov** (leave) and BTF team.

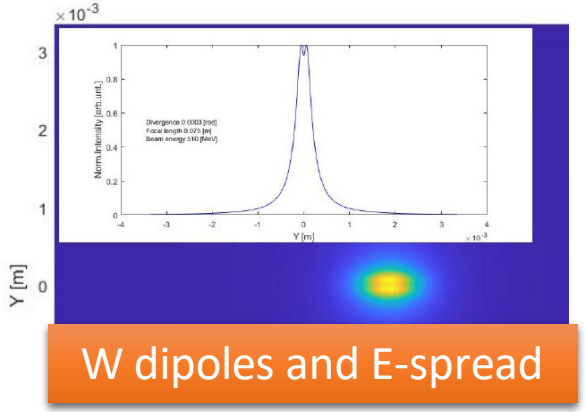
Single-shot beam emittance via a pepper-pot-like method:
-> microlens array beamlets from the beam OTR radiation produced by the OTR radiator. Single shot measurement of **beam size (OTR beam image), beam divergence (from OTR ang. distr. image), beam correlation (from microlens)**

ELECTRON Beam = 503 MeV/10ns/300pC
Vertical emittance (rms) 0,2±0,05 mm x mrad

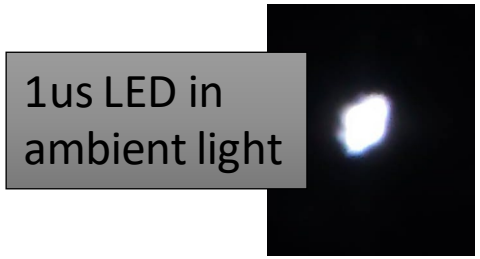
POSITRON Beam = 497 MeV/10ns/4,7pC
Vertical emittance (rms) 0,93±0,32 mm x mrad

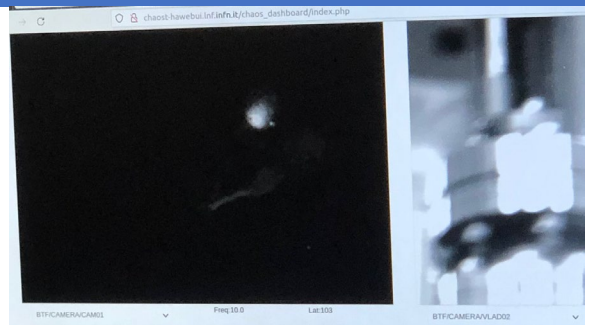


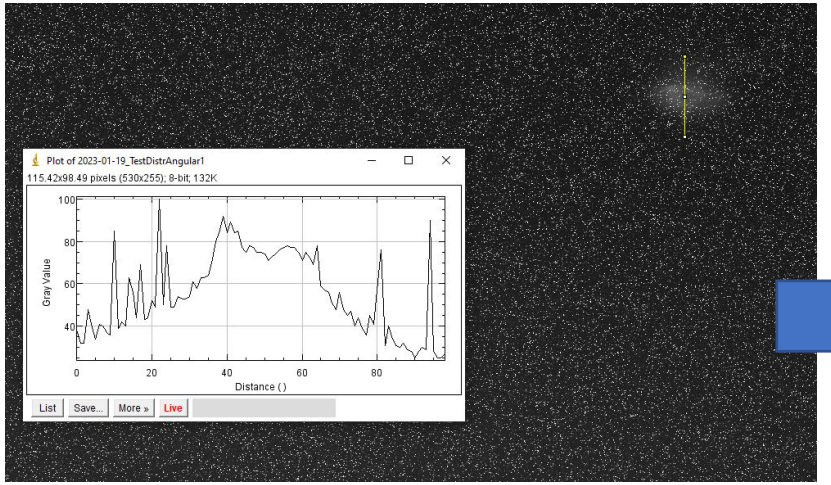




We are slowly move on in the between of runs
- develop a better signal to noise measurement with the fast triggered camera -> ready to continue
- waiting 2 weeks of beam time







U-lens array

- **BTF SCI Coll run: (New Mat. Prod. and Dosy.) Mar 2023**

BTF beam 504 MeV, 1 Hz, 10^9 e-/s, spot diameter around 2mm
Beam on a ~ thin foil Mo target

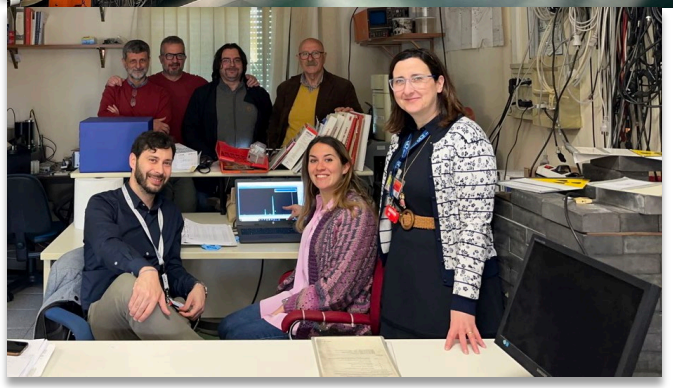
Explored an alternative approach to produce Tc-99m radiopharmaceutical, a crucial diagnostic tool in medical imaging, without relying on nuclear reactors.

Scientific collaboration with:

- Researchers from Rutherford Appleton Laboratory and (RAL, UK) and ENEA (target, idea)
- INFN-LNF (BTF, FISMEL, and SPCM teams) (target setup, testbeam and measure)
- Based on Nature | Vol 603 | 17 March 2022 | **393**
- **Two months from measure idea to install the 3D printed setup**

Run Aims:

- ^{99}Tc Production
- Tc buffer (based Mo precursor)
- assessment of the physical model used in the Monte Carlo code (cross section measurement). First measure at these energy



During these 6 months we develop:

- fixing the energy benchmark for real counts

- simulation for calculate HPGe nose efficiency for target in respect to calibration sources geometry

- exploring target optimization and mass production (ongoing)

BTF Projects

INFAN (IRRADIATION NATIONAL FACILITY NETWORK)

The proposal is initiated in INFN-A environment to establish an internal INFN network connecting IRRAD facilities that are dedicated to external users.

This proposal is founded on a shared request for abstraction and synergy among the numerous scientific, technological, and technical management experiences of irrad facilities across the national territory and under the management of INFN.

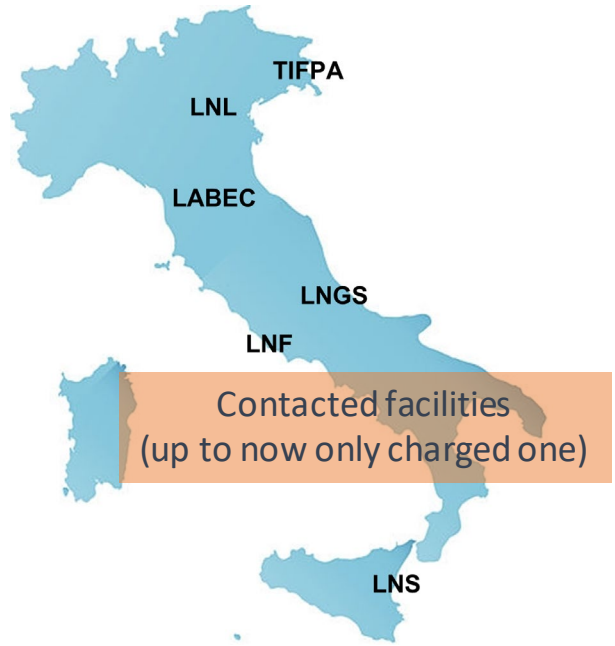
AIMS

- **INTERNAL NETWORK**: Establish an internal network within INFN for scientific, technological, technical, and infrastructure exchange between irrad facilities for mutual operational benefit.
- **GENERALIZED INFRASTRUCTURE with NATIONAL SERVICEs**: Utilize a generalized infrastructure based on national services that includes information, beam time calls, and access procedures to INFN irrad facilities for scientific and third-mission purposes, while respecting the usage norms and local customs of the facilities, which will integrate into an abstract IT infrastructure.
- **COMMON FUNDING**: the collection of funds to implement innovative and experimental operational solutions (e.g., detectors, hardware and software infrastructure) of shared ownership and common use, as well as to support and implement the network itself.

Single and independent way of working

VS

Collaborative win-win approach



INFAN (IRRADIATION NATIONAL FACILITY NETWORK)

Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Frascati

Distributed IT facility for INFAN

National Level

- INFN main site
- Light web DB facility
- Calls Newsletter (now performed by hand replies)
- Local level object linking
- Guided path to best beam needed
- Dissemination

National service

- **fully mantained**
- **more reliable**

wiki.infn.it
@lists.*.it
GODIVA
AAII
Userportal
Booking
DB
Backup
Territorial access

Local Level (Customizable)

- Facility web site template
- Wiki.infn
- Mailing list
- **Booking app**
- Own call DB
- Repository Software
- Data Logging
- User guide

BTF way of operation could explore a new paradigm of working for easy develop and integration from external project and internal collaboration

PROJECTS INCOME – 6 MONTHS AFTER

Recommendations LINAC-BTF previous meeting - 1

- Continued operation of DAΦNE will require a significant investment for consolidation of the accelerator and a long shut-down for the machine. In addition, the scope of the LINAC-BTF consolidation depends to some extent on the future of DAΦNE (e.g. DHPTB101 power converter).

ERAD funding -> fixed-term contract 2-years (adding 1 FTE in BTF)

- E. Diociaiuti started to work with us, BTF full time

PNRR - Rome Technopole funding LINAC SERVICE involved with total (cutting 1.2 FTE/YEAR) (B. Buonomo, F. Cardelli, C. Di Giulio)

- C. Taruggi involved in project that has TEX and BTF as activities base (1FTE)

ASIF – to be discussed

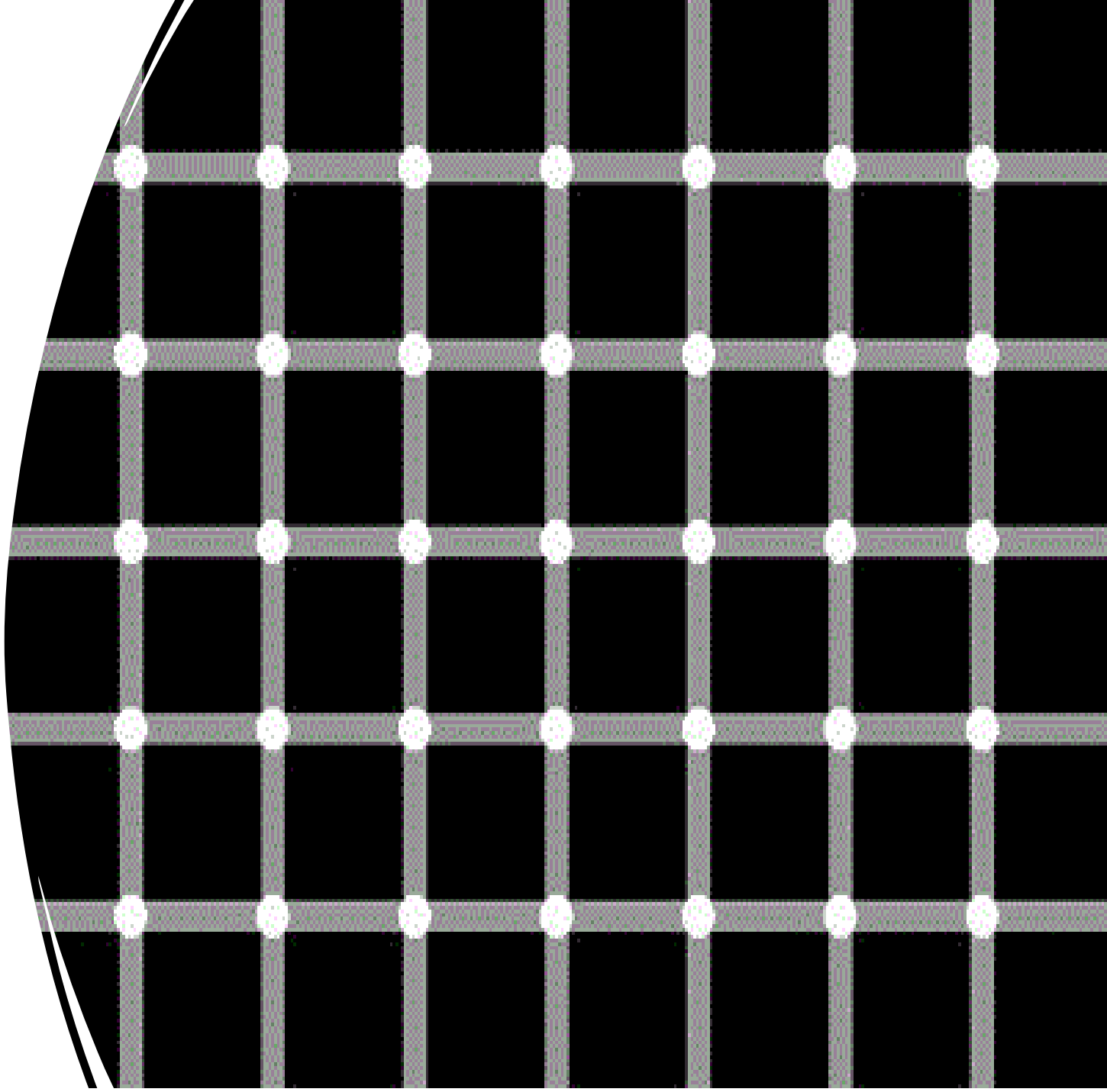
EUROLABS – just implemented

Project/users want to involve LINAC/BTF for long term collaboration

- Long term plan could help
- Funding
- People

Internal discussion on future development of BTF infrastructure already settled

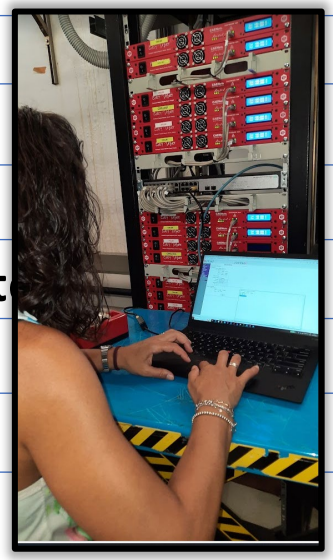
LINAC



LINAC BTF ACTIVITIES SUMMARY

What we got from last SciCom (Spring – Autumn 2023) – Internal activities

LINAC cooling tower shaft replaced	11 May -> 23 May
BTF2 2023 H1 user beamtime	16 Mar -> 17 Jul
Overtemperature @ Mod Hall. (UFS, Mod Elect….)	Second half of Jun.
Installation in Modulator Hall Air cooling system	28 Jun. -> 1 Jul.
BTF Beam Develop and Maintenance	17 Jul -> 24 Jul
LINAC+BTF Shutdown for maintenance/consolidation	24 Jul -> 11 Sep
• LINAC Steering and Tower and Sec. Water System, LINAC/SPARC/TEX Modulat	
• 64ch Signal Digitizer test (UPGRADE/MAINTENANCE	
LINAC/BTF restart for 2023 H2 call	11 Sep -> 18 Sep

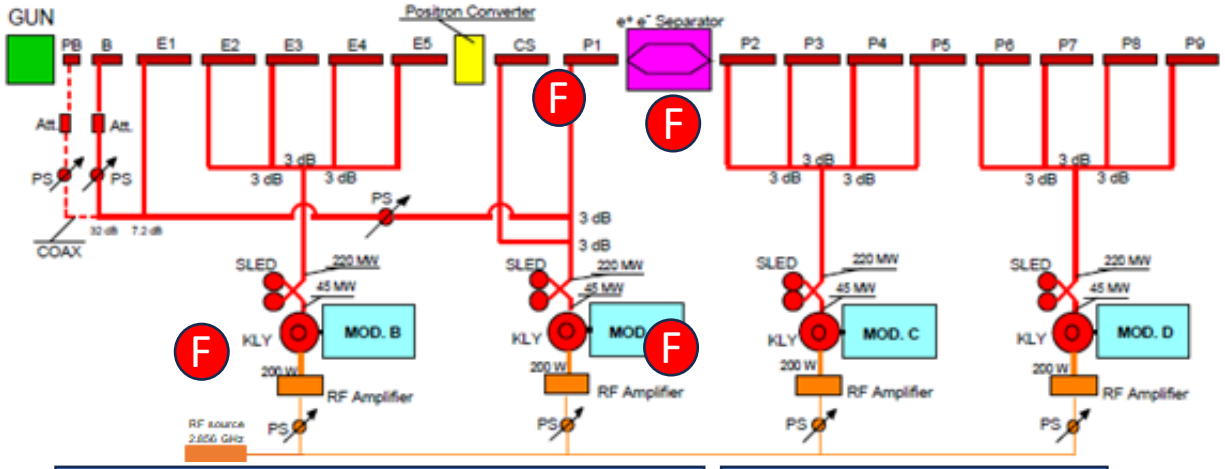


LINAC SUMMARY

INFN Istituto Nazionale di Fisica Nucleare Laboratori Nazionali di Frascati

What we got from last SciCom (Spring – Autumn 2023) – Internal activities

BTF2 2023 H2 user beamtime	**18 Sep -> 18 Dec**
DHPTB101 Main Fault	**02 Oct -> 15 Oct**
Fire in Mod B.	**02 Oct -> 04 Oct**
Water leak in e+/e- separator	**25 Oct -> 28 Oct**
Water leak on klystron A focusing (Kly extraction)	**31 Oct -> NOW**



Primary Cooling System F

Mod Hall F

LINAC BTF ACTIVITIES SUMMARY

During 2022/2023 LINAC **many faults on water related subsystems** (water properties under investigations) related to ~25 years of continuous operations ageing

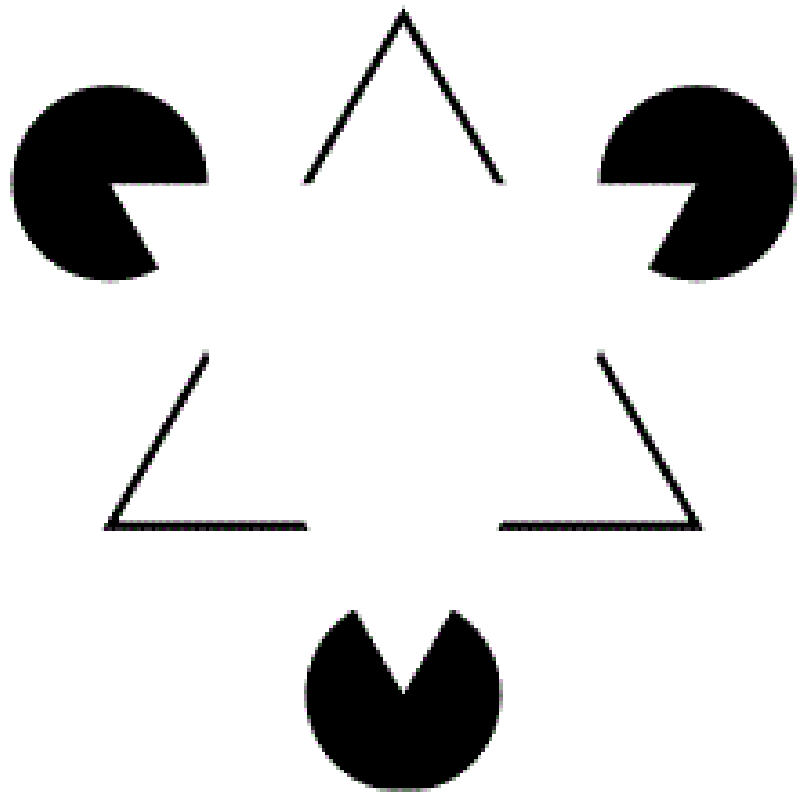
➔ **Kly C in good operation, restored 50 Hz operation**
➔ **Finished the KLYA conditioning just now, restarting today**
➔ **Spares needed** (SLED, focusing coils, magnets coils, Helmholtz coil, pipes, collectors, pumps, RF windows, valves)
➔ Scheduled high cost **replacement**: Thy 4/y, Kly's, HVPS (3o4)

➔ **Consolidation**: 4 HVPS (ModA)

➔ LINAC and DA/DT service (FLUIDS, VACUUM) technicians still consistently recover operations with a high degree of reliability and courage

Currently run at 25Hz (2Hz –e, 1Hz e+ injection) for limitation in efficiency inj in DAϕNE

Discussion



SHOWSTOPPERS

INFN
Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Frascati

Recommendations LINAC-BTF previous meeting - 2

- The committee encourages the LNF management to define a resource-loaded medium-term plan for the operation (and consolidation) of the LNF accelerator facilities.

DHPTB101 already discussed
Trials to understand the use of DHPTS001 as double B-field stage. In case of next fail, it needed a procedure to handshaking DAϕNE vs BTF duty cycle

(GAS Handling BTFEH2, is a constraint on user type)

CRANE (BTFEH1) currently out of service

LINAC uptime -> seem still high but a matter of Closed Scicom

LINAC/BTF **IT hardware** solutions:

- New Physical machine needed (offer already requested) as well as Backup space
- Renewal of CR: old service machine and infrastructure (revamped when CR has been moved years ago)

LINAC/BTF Team
In the next years other (4) retirements will occur and needs overlapping actions

- BTF STAFF Young people
- LINAC Needed urgently At least other 4 technicians

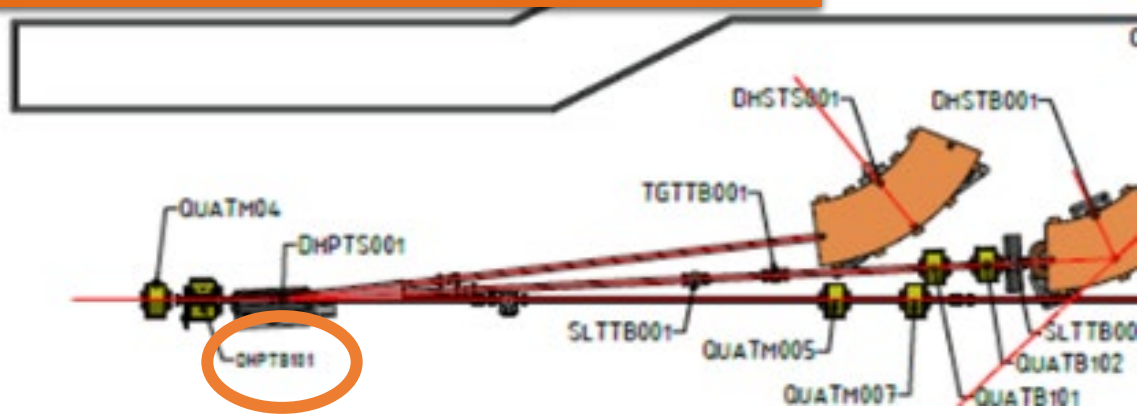
DHPTB101

Recommendations LINAC-BTF previous meeting - 3

- The specifications of the DHPTB101 power converter depend on the mode of operation of the LINAC, namely on its operation as DAΦNE injector. The scope of the consolidation of this piece of equipment should depend on the future of DAΦNE.

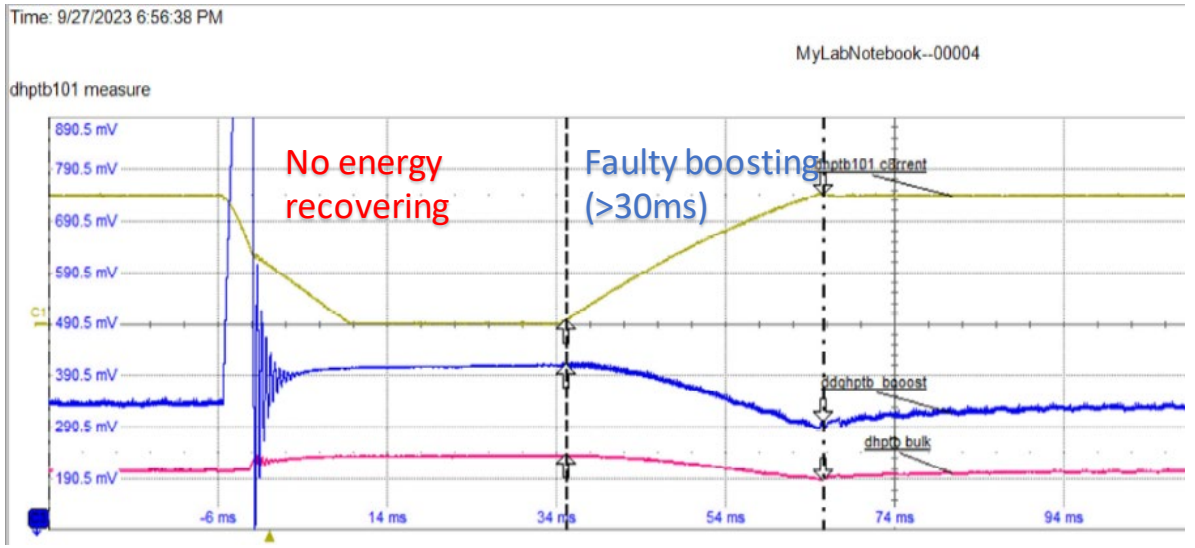
DHPTB101 is a pulsed magnet:

- **~20 years old**, LNF-CERN collaboration
- ~5ms/300A/510MeV ramp for 3deg steering, magnet not optimized
- **Crucial** for DAΦNE+BTF LINAC pulse sharing
- DOWN for all X17 run



Huge maintenance in 2022 significant maintenance effort was undertaken, during which parts of power system, communication elements, CT hardware, related electronics and calibration were replaced by magnet group (many thanks to Iungo, Vannozzi and all the group)

- Some problem arose in injection during test run before summer shutdown, few faulty shot
  - Something related to heating, faulty ramp or timing performances but some fix worked,
  - Local tests with magnet group seemed ok, but only few hour before shutdown



DHPTB101

Recommendations LINAC-BTF previous meeting - 3

- The specifications of the DHPTB101 power converter depend on the mode of operation of the LINAC, namely on its operation as DAΦNE injector. The scope of the consolidation of this piece of equipment should depend on the future of DAΦNE.

- Again strange inj faults appeared after few user run with difficulties also in DAϕNE injections
  - After dedicated test in the between of DAϕNE injection, found a slow ramp up time without timing-related issue that led the overlaps on DHPTS001 and DAϕNE inj slots.

- **Two week of overhauling** reset this power supply to operative standard:
  - Found a not compliant discharge diode on the power section
  - found some noisy element on triggering fault system
  - The power supply restoration occurred in the midst of other time-consuming tasks
  - With the effort also from electronics service,
    many thanks also to De Nardis, Franzini, Pellegrini

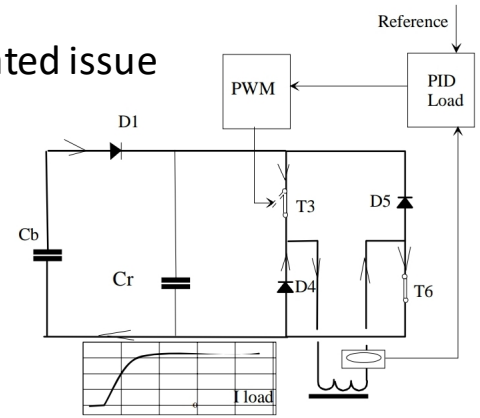
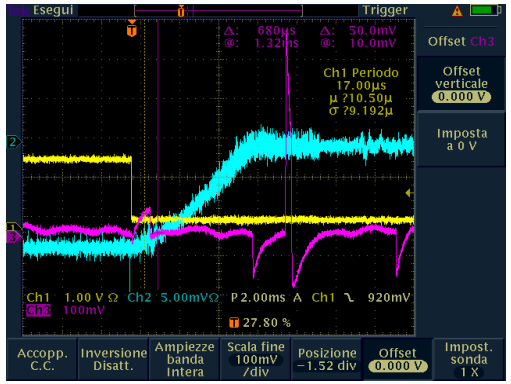


Figure 4. Flat top regulation

Now operative, restoring good performances.



- **no way to replace only DHPTB101 PS** due to internal consideration on
  - Magnet optimization -> costs
  - DAϕNE future activity

Study on the PS replacement for both DHPTB101 and DHPTS001:

➔ Intended use of only DHPTS001 magnet for both 3deg (BTF channel) and 6 deg (LINAC Hodoscope)

➔ Getting arbitrary double pulse PS,

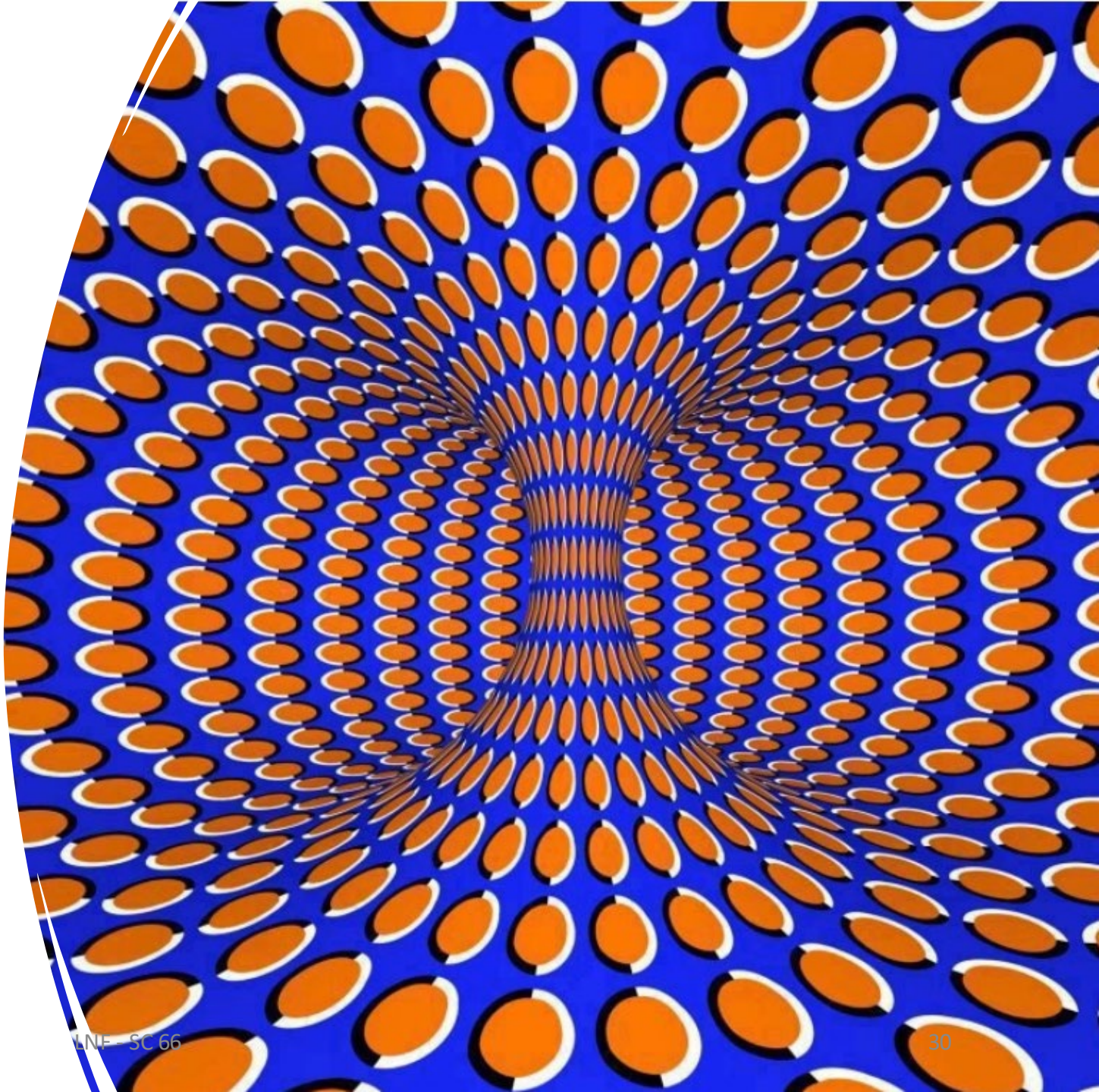
➔ **already detected** timing specs

DISCUSSIONS & CONCLUSIONS

- First four BTF calls for beam time closed successfully,
  - Beamtime ongoing
  - Just opened for 2024 H1
  - Calendar stops in June
- Ext. User call **on going**
  - Old queue of users has been zeroed
  - BTF People age still relatively high, looking forward also for students
  - EUROLABS is just involve the first group
- DHPTB101 and LINAC ageing are serious problems
  - A huge amount of overhaul has just been put in place
  - Currently investigating a solution for a double pulsed PS for using only DHPTS001
- New project born or in discussion
  - FLASHMOB
  - ASIF-2
  - EUROLABS get the first funding, after some trials in the past months

LINAC/BTF results have to be shared with all the LNF people involved
- DT and DA services, secretariats and administrations
- Especially the DAϕNE operators

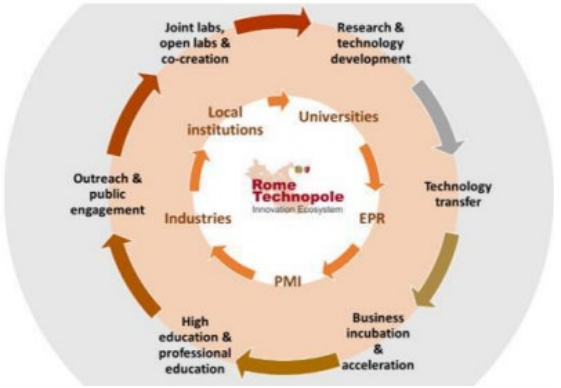
SPARE SLIDE

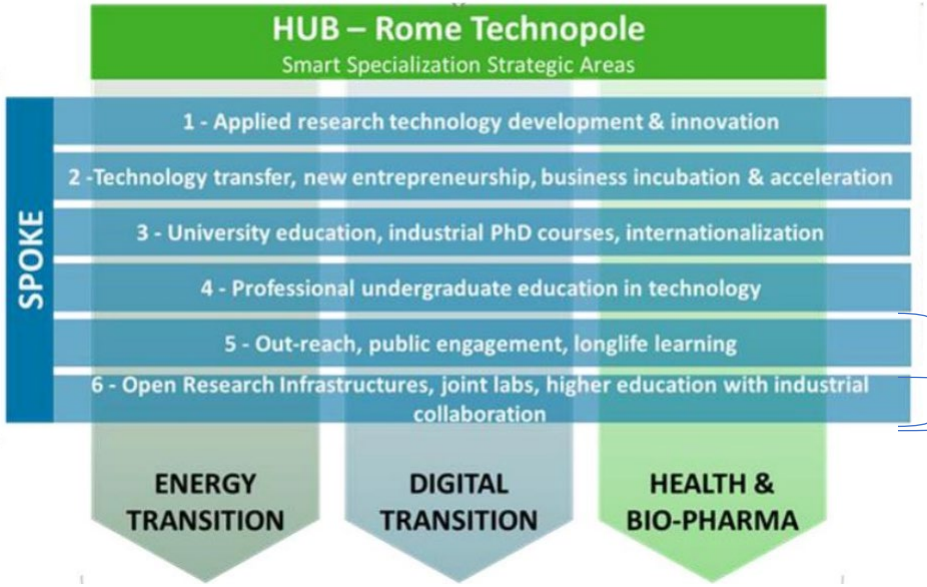


Avviso pubblico: Proposte per la creazione e il rafforzamento di "Ecosistemi dell'Innovazione»
PNRR, Missione 4 Istruzione e ricerca
Componente 2 Dalla ricerca all'impresa, Investimento 1.5

Rome Technopole
Innovation Ecosystem

AIM:
Equip the region with an open research infrastructure to provide support for competitive innovation and growth for companies and stakeholders.

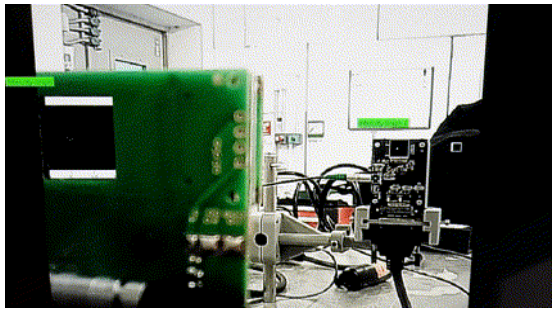




LNF

Flagship projects

LINAC SERVICE involved with total
1.2 FTE/YEAR
(B. Buonomo, F. Cardelli, C. Di Giulio)



Joint Open Labs:
o FP4 (Health & Bio-Pharma) – **F. Cardelli** (Resp. BvTech) – Measurements and RF conditioning of acc. structures for medical application
o FP6 (Digital Transition) – **C. Di Giulio** (Resp. Thales) – Development of algorithms based on Machine learning for big-data analytics, Virtual and **augmented reality** and Digital Twin.

Recommendations DAFNE-BTF SC63

Operate the LINAC at 50 Hz, provided a repair of Klystron C is successful, to reduce injection time. Optimum "stable beam" duration should be adapted accordingly considering luminosity lifetime.

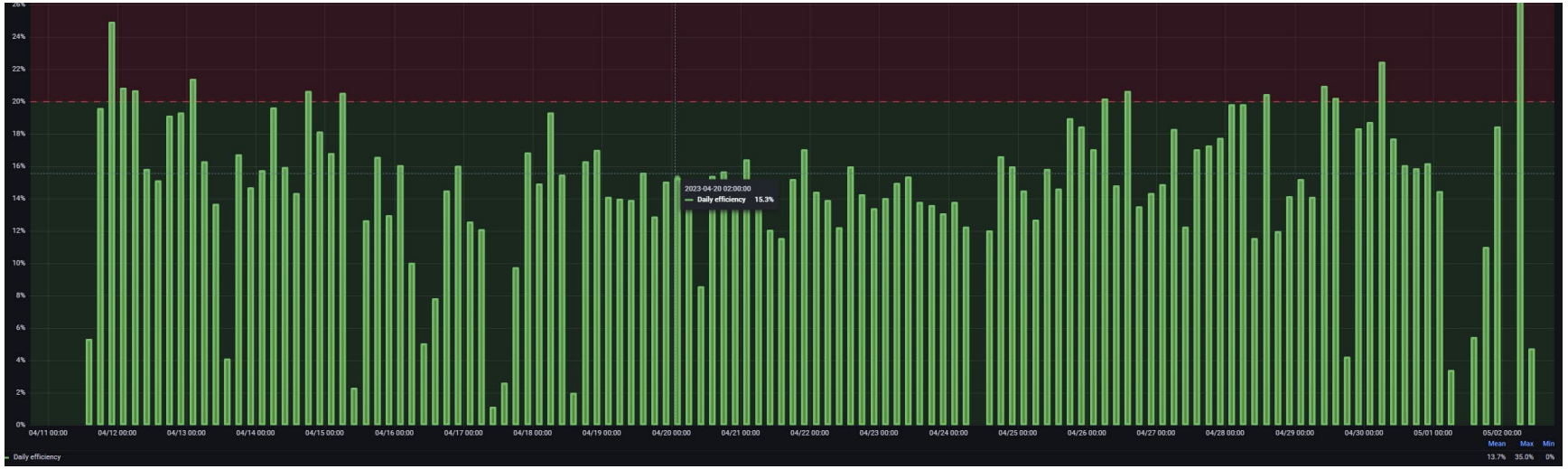
INFN Istituto Nazionale di Fisica Nucleare Laboratori Nazionali di Frascati

25Hz BEST ops (current ops)	e- inj	e+ inj	switch phase	coasting
Time [min]	3,5	4,3	5	12
BTF [pulse/s]	20	5	0	25
Pulses/sect	70	21,5	0	300
BTF D/sect	0,11	0,03	0,00	0,48
			BTF D	0,63
Time between cycle	24,8		BTF Average rate	15,79

50Hz BEST ops (my opinion)	e- inj	e+ inj	switch phase	coasting
Time [m]	2	3	5	12
BTF pulse/s	40	10	0	50
Pulses/sect	80	30	0	600
BTF D/sect	0,07	0,03	0,00	0,55
			BTF D	0,65
Time between cycle	22		BTF Average rate	32,27

Injection efficiency = time spent during injection
Last 20days = average 13% (little bit more)
LINAC switch time = ~2min
TL switch time = ~2min
50Hz ops -> take in account:

- Double rate of faults
- Less efficient for TL, DR inj (stability)
- Duty cyle for BTF now is around 50% (this month)
- Not even in BEST ops



https://dashboard.lnf.infn.it/prod/grafana/d/WeAkaME4k/long-term-trends?orgId=1&refresh=1h

EURO LABS

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

Access

To provide efficient access to the available resources at a major fraction of **EUROpean Laboratories for Accelerator Based Sciences** (**EURO-LABS**).

Infrastructure

Large and diverse community of users to choose the most appropriate state-of-the-art Research Infrastructures RI(s).
For conducting high impact research, fostering the sharing of knowledge and technologies across scientific fields.

Data Management & Service Improvements

Implementation of good practices for data management and activities relating to targeted service improvement to enhance capabilities and performance of the RIs.

RIs

Provide broad and focused joint training activities with hands-on experience at the RI's to develop diverse skills of the next generation researchers, for the optimal use of the large number of RIs potential for scientific and technological discoveries.

Community

Build a super community of sub-atomic researchers and the associated technical staff.

Physics

This proposal brings together for the first time in Europe the three communities engaged in Nuclear Physics and Accelerator/ Detector technology for High Energy Physics.

Operational Budget

	Number of hours over the 4 years	Actual cost (*)	Total value	INFN in kind contribution	Project contribution
BTF	1176 (7 weeks)	180.75 €/h	≈ 213 k€	60 %	≈ 86 k€
SPARC	1680 (10 weeks)	126.75 €/h	≈ 213 k€	60 %	≈ 86 k€

(*) includes:
electric power, personnel (2 technicians h 24, 1 staff researcher h 8), user initial training

Other budget items:
user travel support, INFN staff travels, TA management

	Modal attività	Nome attività	Durata	Inizio	Fine	Prede
1		FISMEL_calendar_2023	320 g	lun 19/09/22	ven 08/12/23	
2		BTF_calendar_2023	380,13 g	ven 08/07/22	lun 08/01/24	
3		DA_calendar_2023	0 g?	gio 15/09/22	gio 15/09/22	
4		SPP_calendar_2023	0 g?	lun 19/09/22	lun 19/09/22	
5		DT0_calendar_2023	302 g?	lun 24/10/22	mar 19/12/23	
6		Fest_calendar_2023	262 g	mer 28/09/22	gio 28/09/23	
7		DR_calendar_2023	0 g?	mar 04/10/22	mar 04/10/22	

5			DT0_calendar_2023	302 g?	lun 24/10/22	mar 19/12/23
1			Crane Maintenances	299 g?	gio 27/10/22	mar 19/12/23
8			Shieding Doors Maintenance	264 g	lun 24/10/22	gio 26/10/23
12			LINAC mowing	196 g	lun 31/10/22	lun 31/07/23
18			CR Deep cleanings	261 g	lun 19/12/22	lun 18/12/23
24			FLUIDS Maintenance	20 g	lun 23/01/23	ven 17/02/23
29			Pest control	101 g	ven 28/04/23	ven 15/09/23
34			Special DAFNE Building Maintenance	43 g	gio 01/06/23	lun 31/07/23

		Modal attività	Nome attività	Durata	Inizio	Fine	Predecessori
1			**FISMEL_calendar_2023**	**320 g**	**lun 19/09/22**	**ven 08/12/23**	
1			**Controllo periodico Sicurezze Radioprotezione**	**152 g**	**ven 02/12/22**	**lun 03/07/23**	
2			Check FISMEL LINAC+BTF	3 g	lun 09/01/23	mer 11/01/23	
3			Check Globale+DAFNE-L	3 g	ven 02/12/22	mar 06/12/22	2
4			Check FISMEL LINAC+BTF	3 g	gio 29/06/23	lun 03/07/23	2FI+6 mes
5			Check Globale+DAFNE-L	3 g	ven 02/12/22	mar 06/12/22	4
6			**Controllo Buon Funzionamento Sistema radiometrico**	**320 g**	**lun 19/09/22**	**ven 08/12/23**	
7			Controllo Buon Funzionamento Sistema radiometrico	2 g	lun 19/09/22	mar 20/09/22	
8			Controllo Buon Funzionamento Sistema radiometrico	2 g	mar 20/06/23	mer 21/06/23	7FI+6 mes;11FI+6 mes
9			Controllo Buon Funzionamento Sistema radiometrico	2 g	gio 07/12/23	ven 08/12/23	8FI+6 mes
10			**Manutenzione Sistema radiometrico**	**1 g**	**lun 02/01/23**	**lun 02/01/23**	
11			Manutenzione Sistema radiometrico	1 g	lun 02/01/23	lun 02/01/23	
12			**Monitoraggio attivazione residua aree**	**153 g**	**lun 02/01/23**	**mer 02/08/23**	
13			Monitoraggio attivazione residua aree	2 g	lun 02/01/23	mar 03/01/23	
14			Monitoraggio attivazione residua aree	2 g	mar 01/08/23	mer 02/08/23	

Minimize impact on inline check and maintenance operations

Repetitive scheduled events