Report from the LNL and LNS PAC (ENSAR meeting, Legnaro October 2013)

LNL: two PAC meetings
- 17-18 January 2013
- 15-16 July 2013

D. Ackermann	GSI
B. Back	Argonne
G. Colo'	Milano
A. Del Zoppo	LNS
S. Lunardi	Padova (Chair)
O. Sorlin	GANIL
R. Wadsworth	York

LNS: one meeting in June 2013

R. Bougault	Caen (Chair)
P. Descouvement	Bruxelles
M. J. Borge	Madrid
F. Gramegna	LNL
A. Kacperek	Clatterbridge Hospital (UK)
Thomas Aumann	(GSI) new member
R. Tribble	Texas

Legnaro accelerators

LNL

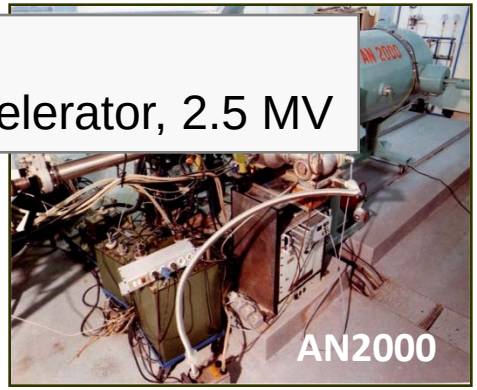
TANDEM-XTU
Elettrostatic accelerator, 15 MV

ALPI
Linear superconducting accelerator. Injection from Tandem or ECR source and PIAVE

Mainly used for fundamental heavy-ions nuclear physics experiments (discussed and approved by the Nuclear Physics PAC)

Part of the beam time also to applied physics experiments (the beam time division between nuclear and applied physics experiments is decided by the Lab. Director)

AN2000
Elettrostatic accelerator, 2.5 MV



CN
Elettrostatic accelerator, 7 MV

Mainly used for interdisciplinary research, applied physics, solid state physics, neutron physics research and advanced educational purposes.

The interdisciplinary, applied physics experiments are discussed and approved by a dedicated PAC

LNL

The PAC meeting is held usually twice a year

in 2013 the two meetings were held on

- January 17-18

- July 15-16

- next meeting will be in January 2014

- before the meeting, each proposal is assigned to two members of the PAC for a more detailed analysis

- at the meetings each proposal is presented orally (10 minutes + 5 discussion) by the spokesperson

- in the closed PAC meeting, there is an open discussion of each proposal. The proposals are not anymore ranked individually by each member but a consensus is reached after the discussion

- the criteria for ranking are strictly based on scientific merits and on the feasibility of the experiment. Attention is given also on results and publications from past experiments

LNL

17-18 January meeting
(beam time April-July 2013)

15-16 July meeting
(beam time October 2013-March 2014)

A large gamma-ray spectrometer (GASP, EUROBALL, CLARA, AGATA demonstrator) was available at Legnaro since 1992, attracting many users worldwide. The amount of beam time taken by such arrays at the Tandem-ALPI accelerator was ranging from 40% to 60%. The new project in this field, GALILEO, will be available next year

→ No proposals of nuclear structure via gamma-ray spectroscopy at these PAC meeting

All proposals were therefore mainly in the field of nuclear reaction mechanism (transfer reactions, sub-barrier fusion, hot nuclei, nuclear astrophysics, clustering in nuclei, etc..)

ALPI is in operation only for half a year

EXOTIC

LNL

Total number of proposals : 43

Number of PAC proposals (Nuclear Physics) : 23

USP proposals : 20

Total requested PAC days : 160 (67%)

USP days : 78 (33%)

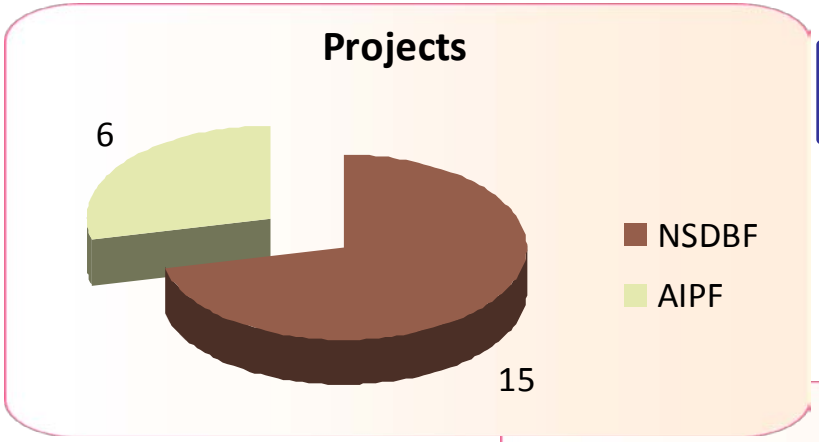
Total time available for experiments	220 days
Carry over:	38 days (17%)
Accelerator tests, etc..	24
Time allocated to new proposals (NP):	114 days (72% of the request)
Time allocated for Applied Physics (USP) :	44 days (56% of the request)

the 23 NP experiments : 11 approved for the total amount of beam time
8 approved with reduced beam time
4 not approved

Equipment of other labs.?

- AGATA detectors now at GSI
- Euroball clusters will be used in GALILEO
- GASP detectors and associated electronics at ILL Grenoble for the EXILL campaign
- $LaBr_3$ detectors from IRB Zagreb to be used with PRISMA
- New scattering chamber from IRB Zagreb for nuclear astrophysics studies

TNA03 – Activity at LNL up to July 2013

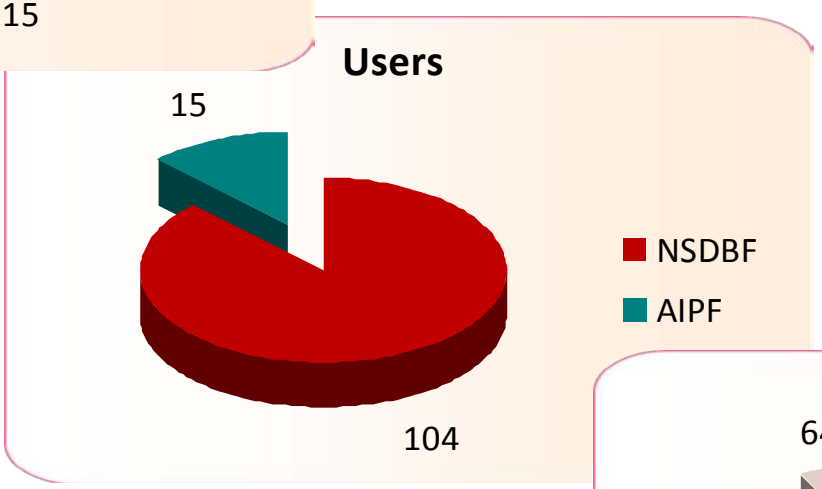


28 projects / 4y (20 @ **NSDBF**, 8 @ **AIPF**)

21 projects (15 **NSDBF**, 6 **AIPF**) → **75%**

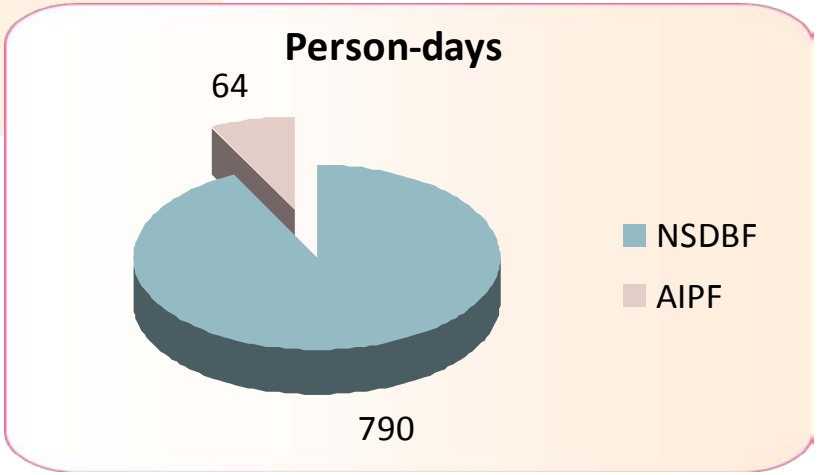
124 users / 4y

119 users → **96%**



1104 person-days / 4y

854 person-days → **77%**



TNA03 – News from the Research Infrastructures

Extraordinary maintenance of the XTU Tandem

The Tandem was opened, before running into fracture from overcome yield point of the dielectric links between the conducting elements of the belt.

(DANGER: kinetic energy of the 60 km/h velocity laddertron, right above the metal-glass accelerating tube !)

Replacement of the charging belt was planned for September-October 2013: its anticipation to July causes ~ 10 days backlog on experiments, plus … inconvenience on users, scheduled for the July shifts

All the experiments from June 29 to July 31 postponed to Fall
32 days additional backlog

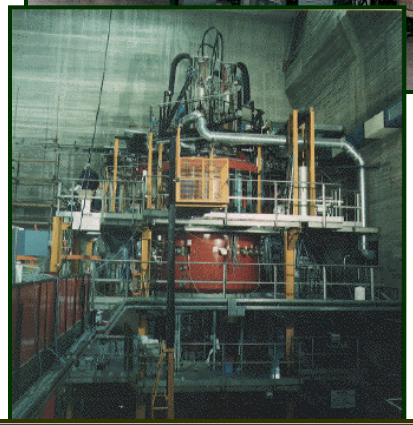
TNA03 – News from the Research Infrastructures

LNL plans for the next two semesters

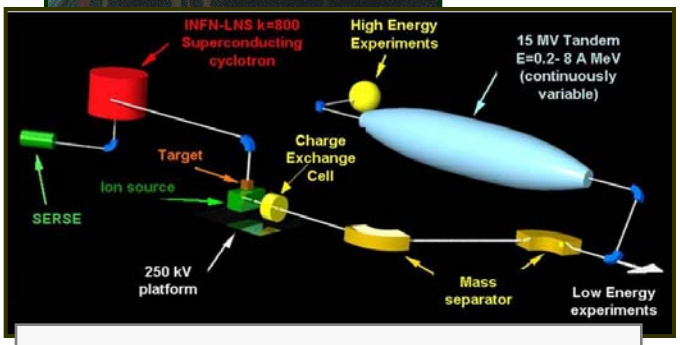
- **From Fall 2013** onwards **operation will be with Tandem only on one semester and with all accelerators in the second semester**.
- **PIAVE will be operational in the Spring 2014 semester**, due to a delay in the charge breeder construction (conflicting with PIAVE source operation): it is expected to remain off in 2015, instead.
- Due to the anticipated maintenance of the **Tandem** laddertron charging chain, **beam shift can start ~ October 7**.
- **Startup of the cryogenic plants (for both ALPI and PIAVE) will take place in February**, for SC accelerators to be ready for shifts in May, June and July.
- By the end of 2013, **the ECR source group plans completing preparation of both Ca and Pb beams**, to be made available for PIAVE-ALPI shifts in May-July 2014.
- At present Ca beam experiments are being carried out, whereas **Pb tests are scheduled for October-November**.

LNS (Catania) accelerators

TANDEM Elettrostatic accelerator, 15 MV

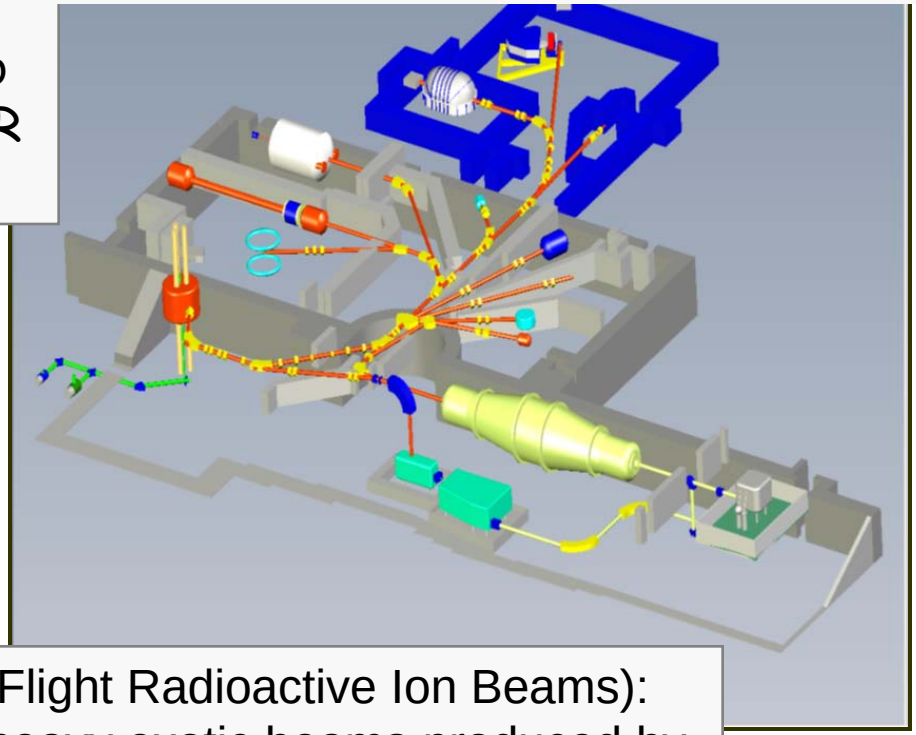


K800: superconducting cyclotron. Energy up to 80 MeV/AMU. Two ECR sources.



EXCYT light exotic beams (0.2 up to 8 MeV/AMU).

Mainly used for fundamental heavy-ions nuclear physics experiments, interdisciplinary research, solid state physics, radiobiology, applied physics and proton therapy (K800 62 MeV proton, >350 patients total – choroidal melanoma)



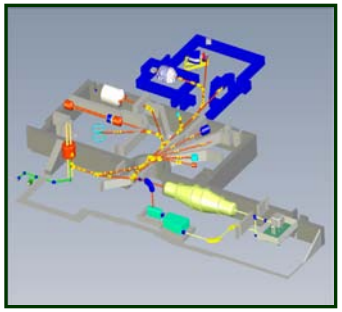
FRIBS (in Flight Radioactive Ion Beams): Light and heavy exotic beams produced by projectile fragmentation of stable beams accelerated by the LNS-Cyclotron.

LNS

One PAC for both Nuclear Physics and applied physics experiments.

Dedicated BTU for proton therapy

Dedicated BTU industrial appli. (€)



2012 activity:

Nuclear Physics 34%, Proton therapy 27%, Applications 39%.

2013 activity: **not relevant numbers because of the CS-liquefier failure.**

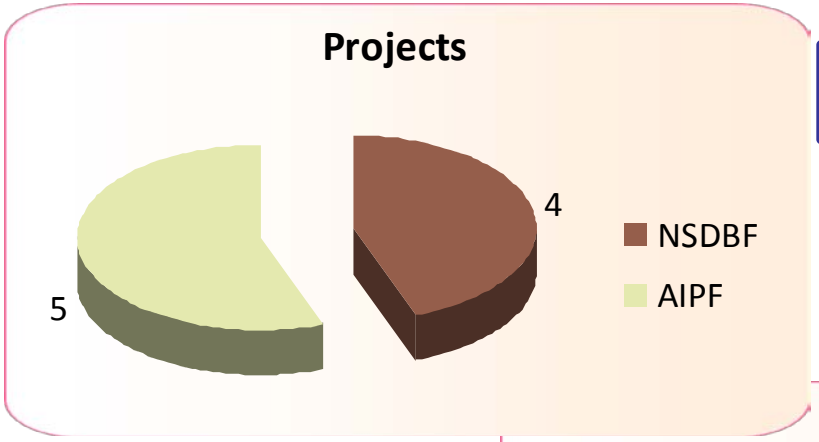
PAC meetings (1 per year)

June 2013 for 1 year period 2014/2015 (285 CS-BTU attributed, demand was 418 BTU)

"Ranked discussion" for 2013-PAC, we first discussed fundamental science proposals then the remaining time was attributed to applications, tests,…

Next PAC: end 2014

TNA03 – Activity at LNS up to July 2013

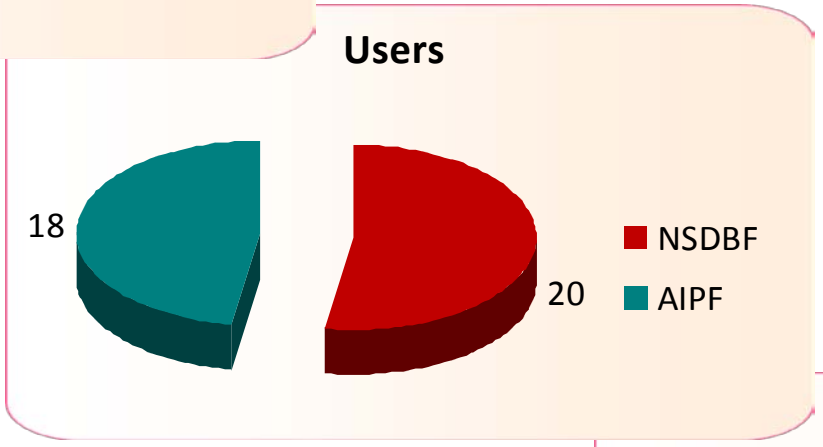


24 projects / 4y (16 @ **NSDBF**, 8 @ **AIPF**)

9 projects (4 **NSDBF**, 5 **AIPF**) → **37%**

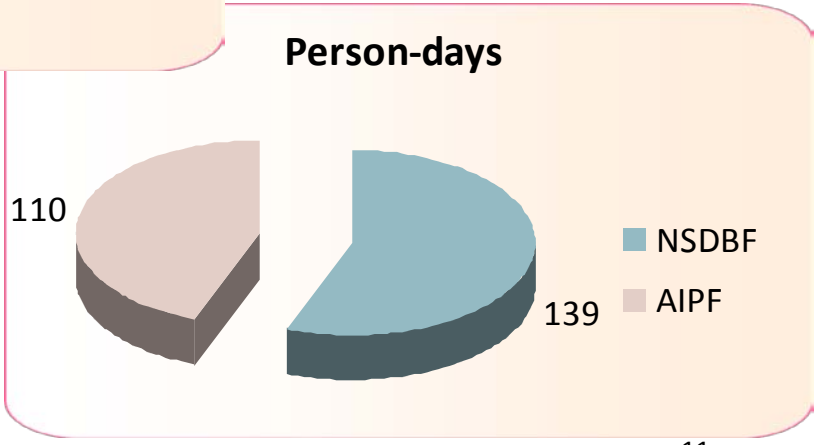
80 users / 4y

38 users → **47%**



712 person-days / 4y

249 person-days → **35%**



TNA03 – News from the Research Infrastructures

Breaking of the charging belt at the end of 2011.

The present charging system (belt) will be replaced with the NEC Pelletron in 2014 - in the meanwhile, beam delivery to the approved experiments will be depending upon the performance of the available belts.

Two experiments postponed:

LNS NICAR and LNS LIP-Magnex

The Tandem operation restarted last summer

TNA03 – News from the Research Infrastructures

January 1st 2013

Breakdown of the helium liquefier: cold turbine found broken due to impurities – restart on January 15.
Cyclotron operating on January 25.

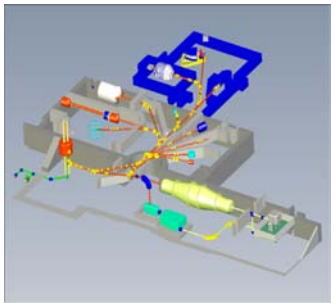
May 2nd 2013

a new failure. After Air Liquide inspection: again problems at the turbine. Consequently an extraordinary maintenance and upgrade (revamping) is needed to restore the reliability grade.


Superconducting Cyclotron

Time needed : 5-6 months from the order (middle of July)

ACCELERATOR USE



LNS Catania

ACCELATOR NEWS:

Problem with Tandem Belt: at the present the Tandem is working with an already used belt and with a terminal potential 7<V<10 MV, for those experiments already approved by the PAC that do not require higher energy.

Problem with CS: failure (May 2013) of the liquefier, the Cyclotron is stopped.

Consequences:

100 BTU backlog for the Tandem
170 BTU backlog for CS

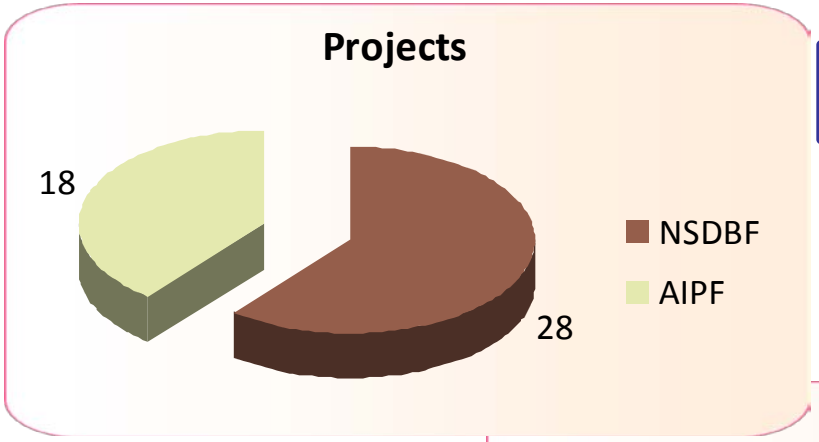
FUTURE:

Two major upgrades regarding both Tandem and Cyclotron accelerators are in progress.

The charging system of the Tandem is going to be switched from belt to pelletron system. Full operation with the new charging system is expected in the period from march to october 2014.

CS: restart of experimental activity is expected on march 2014.

TNA03 – Activity at LNL-LNS at March-July 2014

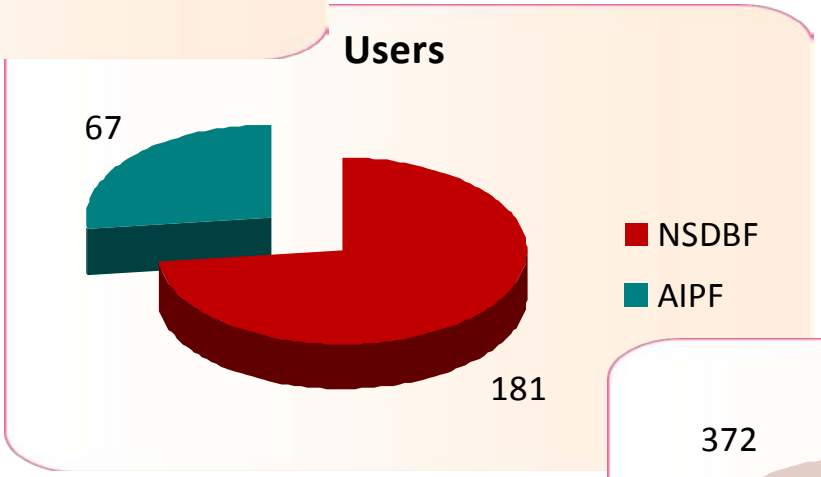


52 projects / 4y (36 @ **NSDBF**, 16 @ **AIPF**)

46 projects (28 **NSDBF**,18 **AIPF**) → **88%**

204 users / 4y

248 users



1816 person-days / 4y

1772 person-days →**97%**