

RADIATION PROTECTION AUTHORIZATION PROCEDURES: STATUS


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STATUS OF THE LNS RADIATION PROTECTION AUTHORIZATION

- The LNS main authorization is the inter-ministerial decree of **05.03.2007**, (following art. 28 of Legislative Decree 230/95), which authorizes the LNS activities with a “category A” practice, called “**Nulla Osta**”, in the plant configuration until 2020.
- Since 2020, due to the changes foreseen by the POTLNS, it has no longer been possible to carry out experiments with the Cyclotron and with the modified experimental rooms because the new configurations were not foreseen in the current authorization (Only the possibility of accelerating Tandem beams inside the accelerator room remained in force)
- **On 16.Dec.2021** the LNS send a request for modification of the Nulla Osta for the shielding structures, the CS modifications (stripping...), the new FRAISE and MAGNEX rooms (with beam currents unchanged compared to the previous conditions) and for the 320 kV, high power, X-ray tube for multidisciplinary and radiobiology applications.

Ministero Sviluppo Economico
Direzione Generale Energia e Risorse Minerarie
12/03/2007 - 000479





Ministero dello Sviluppo Economico
Direzione Generale per l'Energia e le Risorse Minerarie
Ufficio B6 – Energia Nucleare

Posizione: IMP/25
Allegati: 1

All'N.F.N. – Laboratori Nazionali del Sud
Via Enrico Fermi
00044 FRASCATI (ROMA)

al Ministero dell'Interno
Dipartim. V.V.F., Soccorso Pubblico e Dif. Civile
Direz. Centrale Emerg. e Soc. Tecnico – Area VI
p.zza Scilla, 2
00173 ROMA

al Ministero della Salute
Dip. Prevenzione e Comunicazione
Dir. Gen. Prevenzione Sanitaria – Uff. II
Via Sierra Nevada, 60
00144 ROMA

al Min. dell'Ambiente e della Tutela del Territorio e del Mare
D.G. per la Salvaguardia Ambientale – Div. V
via C. Colombo, 44
00147 ROMA

Al Min. Lavoro e Previdenza Sociale
D.G. Tutela Condizioni di Lavoro – Div. VII
via Fornovo, 8
00192 ROMA

all'A.P.A.T.
Dipartim. Rischio Nucleare, Tecnologico e Chimico
via Vitaliano Brancati, 48
00144 ROMA

alla Regione Sicilia
Assessorato per la Sanità – Ispettorato Sanitario
Via Mario Vaccino, 5
90145 PALERMO

al Sindaco di Catania
p.zza Duomo, 3
95100 CATANIA

al Prefetto di Catania
via Prefettura, 14
95124 CATANIA

al Comando Provinciale dei VV.FF. di Catania
via Cesare Beccaria, 31
95100 CATANIA

alla Provincia di Catania
via Prefettura, 14
95124 CATANIA

alla Presidenza del Consiglio dei Ministri
Dipartimento della Protezione Civile
via Ulignano, 111
00193 ROMA


INFN - LNS
CATANIA

= 2. APR. 2007 =

Prot. N. 1684

OGGETTO: L.N.F.N. Laboratori Nazionali del Sud (Catania) - Trasmissione di D.I. di conversione in Nulla Osta di cat. A all'impiego di sorgenti di radiazioni ionizzanti (art. 28 D.Lgs. 230/95 e s.m.i.) - Piani di intervento.

Si trasmette, in allegato, copia del D.I. 5.3.2007, concernente il Nulla Osta in oggetto, al richiedente ed alle Amministrazioni elencate all'art. 28, comma 1 del D.L.vo 230/95 e s.m.i., anche ai fini di quanto disposto dall'art. 115 ter del citato D.L.vo. Si invia altresì copia del provvedimento in questione al Dipartimento della Protezione Civile ed all'Amministrazione della Provincia di Catania, ancorché non richiamate dal citato art. 28, per quanto di competenza in materia di predisposizione di piani di intervento, ai sensi del citato art. 115 ter.

IL DIRIGENTE DELL'UFFICIO


STATUS OF THE LNS RADIATION PROTECTION AUTHORIZATION

- LNS have obtained the modification of Nulla Osta on **22 July 2024**

m_ante.MASE.REGISTRO UFFICIALE.INTERNA.0135308.22-07-2024

IMP/25/1



*Ministero dell' Ambiente
e della Sicurezza Energetica*

Art. 1

1. Ai sensi dell'articolo 51 del decreto legislativo 31 luglio 2020, n. 101, il Nulla Osta di categoria A per l'impiego di sorgenti di radiazioni ionizzanti rilasciato all'ISTITUTO NAZIONALE DI FISICA NUCLEARE - LABORATORI NAZIONALI DEL SUD, con sede legale e operativa in Via S. Sofia, 62 - 95123 Catania, C.F. 84001850589, con decreto interministeriale 05.03.2007, è modificato a decorrere dalla data del presente provvedimento, **nel rispetto delle prescrizioni impartite** dalle Amministrazioni competenti nel corso dell'istruttoria, richiamate in premessa e allegate al presente provvedimento.

The LNS authorization TODAY

TODAY, with the decree received on 22 July 2024, LNS are authorised to use:

Tandem:

- Atomic mass of the accelerated ions: all ions
- Maximum annual operating time:
 - 500 h for $A < 6$ ions
 - 4000 h for $A \geq 6$ ions

Superconductive Ciclotron (CS):

- Atomic mass of the accelerated ions: all stable ions + Uranium
- Maximum beam current

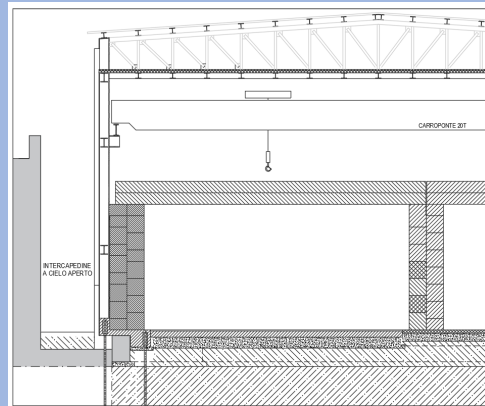
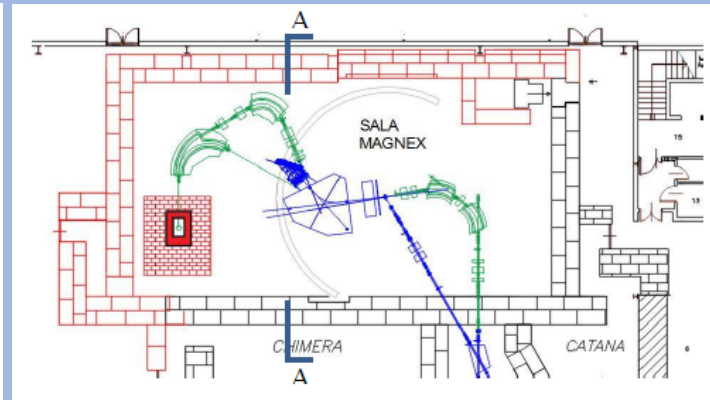
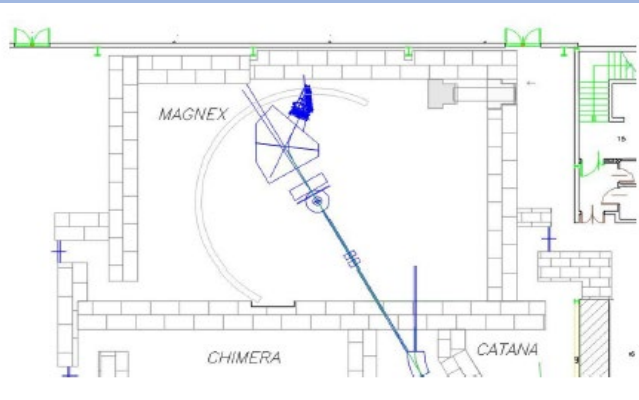
A	D.P.S
2 - 238	$5 \cdot 10^{11} - 2 \cdot 10^{10}$
- Maximum annual operating time:
 - 5000 h for all stable ions, 500 h for Uranium

- **ECR (Electron Cyclotron Resonance) ion sources:** for injection into the CS and for research and development
- **High activity sources:** two Cesium -137 sources of 74 GBq (2 Ci) each one.
- **Calibration sources:** Radioisotopes, including neutron sources (with limitations on activities).
- **CATANA:** use of protons for hadrontherapy treatments.
- **X-ray tubes:** for applications in the field of research on cultural heritage (LANDIS), with fixed and mobile radiation sources on site and off-site, throughout the national territory.
- **Labalfa:** radiochemistry laboratory authorized the construction of radioactive sources in unsealed form.

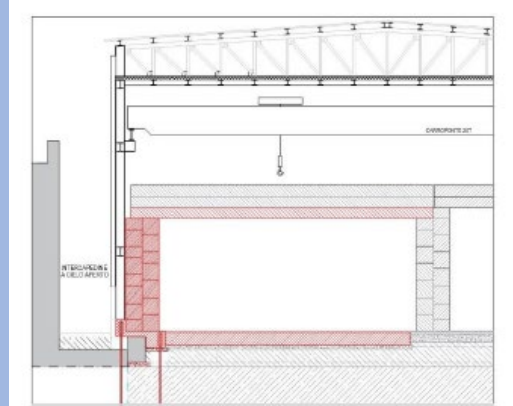
The LNS authorization TODAY

Modification of the MAGNEX and FRAISE rooms, shielding structures, beam lines, experimental equipments operating within them (with the beam currents previously mentioned) are authorized.

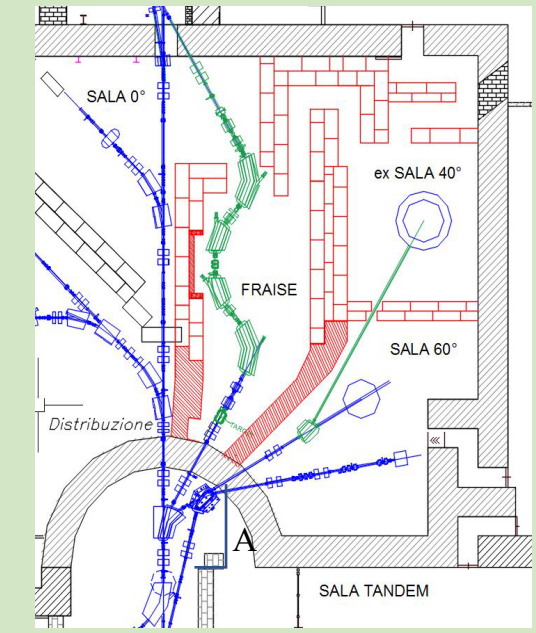
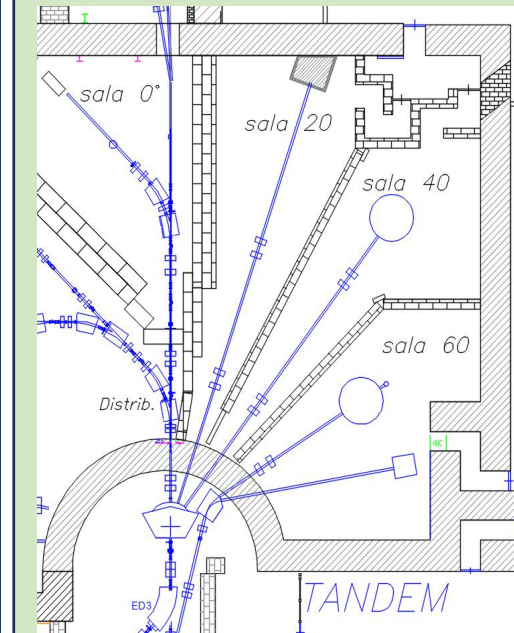
MAGNEX



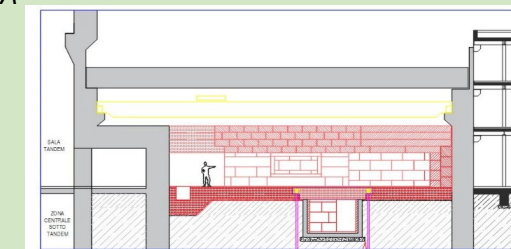
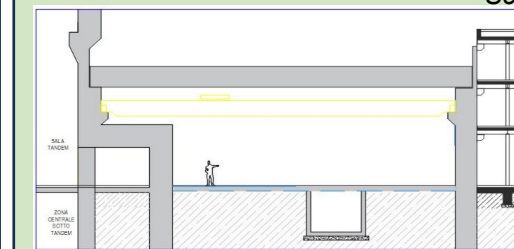
Sez. AA



FRAISE

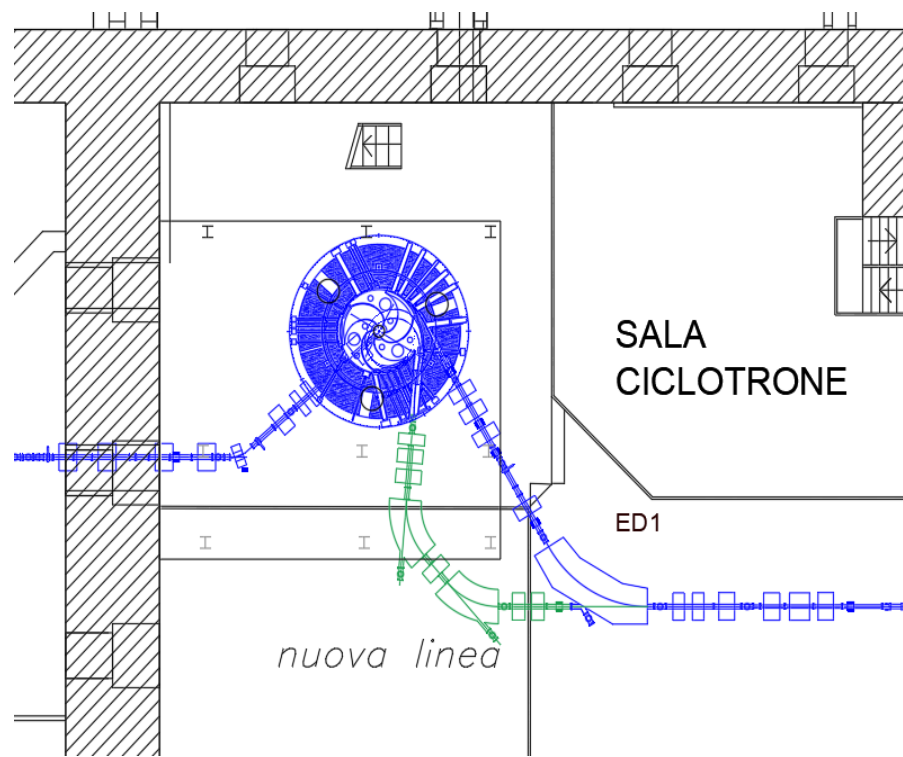


Sez. AA



The LNS authorization TODAY

The installation of a new line for extraction and transport of the Superconducting Cyclotron beam, with the **new stripping method** is allowed.



The use of an X-ray tube with an anode voltage of 320 kV and a maximum power of less than 3 kW is allowed.



PRESCRIPTIONS

IMPORTANT!! BEFORE TO START THE RADIATION ACTIVITY, LNS HAVE TO FULFILL THE

PRESCRIPTIONS AND REALIZE THE SYSTEM CONNECTED TO THE SECURITY,

DESCRIBED IN THE MODIFICATION AUTHORIZATION



**Ispettorato nazionale
per la sicurezza nucleare
e la radioprotezione**

E. Le modifiche alle planimetrie delle sale FRAISE e MAGNEX, la costruzione della nuova linea di trasporto del fascio, le strutture dell'installazione, le modalità di impiego delle sorgenti di radiazioni ionizzanti e dei relativi impianti ausiliari, i sistemi di sicurezza, segnalazione ed emergenza nonché le modalità operative **devono essere realizzati e svolgersi secondo quanto riportato nella documentazione allegata all'istanza** presentata dall'ISTITUTO NAZIONALE DI FISICA NUCLEARE-LNS, nonché nella documentazione integrativa trasmessa dal Ministero dell'Ambiente e della Sicurezza Energetica con nota del 03.01.2023, prot. n. 0000147.

PRESCRIPTIONS



Ministero dell'Interno

1. siano osservate le disposizioni di radioprotezione e sicurezza nucleare di cui al D.Lgs. n. 101/2020;
2. siano osservate le prescrizioni già previste nei precedenti decreti;
3. sia **aggiornato il piano di emergenza** interno della struttura in merito alle modifiche introdotte;
4. sia **aggiornata** da parte dell'INFN la relativa **pratica di prevenzione incendi con il Comando VF** territorialmente competente, attraverso le procedure di cui al D.P.R. n. 151/2011 ed al D.M. 7 agosto 2012.

(realize what is indicated in the fire strategy project and submit the SCIA)

RADIATION PROTECTION PRESCRIPTIONS

F. Le verifiche dei dispositivi di sicurezza, di segnalazione e di emergenza dell'installazione devono essere effettuate dall'Esperto di Radioprotezione con **frequenza minima annuale**; la verifica di buon funzionamento dei suddetti dispositivi deve essere effettuata **almeno semestralmente**.

H. Qualora durante l'esercizio dell'impianto venga superato uno qualsiasi dei seguenti **vincoli di dose efficace** per i lavoratori:

a) classificati esposti: 5 mSv/anno;

b) lavoratori considerati non esposti: 0,25 mSv/anno.

deve esserne data **comunicazione all'ISIN**, nei tempi tecnici strettamente necessari, allegando, per esame, una relazione sottoscritta dall'esperto di radioprotezione nella quale siano riportate le motivazioni che hanno determinato il superamento del vincolo di dose, le misure correttive adottate, i criteri assunti nella revisione del processo di ottimizzazione e l'eventuale nuovo vincolo di dose individuato.

RADIATION PROTECTION PRESCRIPTIONS



Ministero dell'Interno
Comando Provinciale Vigili del Fuoco
CATANIA

1) Per l'utilizzo delle sorgenti radioattive o delle macchine radiogene devono essere pianificate le procedure operative di sicurezza, che prevedano le operazioni di "messa in sicurezza" delle sorgenti radioattive in presenza di incendi o di situazioni di pericolo che possano coinvolgere i radioisotopi;

.. other requirements not related to radiation protection (continuous oxygen detection in environments where inert gases are used, obligations for the "welding" room, thermal power plant, etc. ...) must be realized too.

RADIATION PROTECTION SYSTEM

RADIATION MONITORS

- The ambient monitor system, which includes all the stations foreseen by the POTLNS, has been updated and increased. It has been delivered and tested on May 2023.
- Some stations are already installed in the rooms (INJECTORS, TANDEM, CS, CATANA) while the other ones can be installed after the end of the building works and the cables laying.



- In order to ensure compliance with the clearance levels for **radioactive gases** released into the environment, due to the interaction of secondary neutrons with air (Ar-41, N-13, C-11...), **AN AIR COLLECTION SYSTEM FROM THE ACCELERATOR AND THE EXPERIMENTAL ROOMS HAVE BEEN INSTALLED.** A **DETECTOR** INSTALLED AT THE END OF THE CHIMNEY WILL MEASURE THE CONCENTRATION OF THE EXPELLED **RADIONUCLIDES** (the detector will be the one that was installed in the Excyt chimney, with some modifications, but it will have to be installed in the new chimney).

RADIATION PROTECTION SYSTEM

ROUND AND E ACCESS CONTROL

- The stop of activities, in last years, has allowed us to gradually update the old microprocessor systems, now obsolete, replacing them with PLC (Programmable logic controller) devices (easily programmable).
- The systems for accelerator and 60° rooms are already installed and working.
- The systems for the experimental rooms: ex 40° (which will temporarily incorporate the Fraise room), CATANA, MAGNEX, 0°, distribution, have been already acquired and the delivery is scheduled for the end of 2024, while the installation will take place after the works for the shielding realization and the cables installation.
- The systems of the other rooms will be updated by 2025-2026.
- ✓ It should be underlined that the radiation protection systems are functioning with redundant equipment (two independent systems that works simultaneously) one of which will be updated with fail-safe systems.
- ✓ For the Tandem and the 60° rooms, the fail-safe systems will be installed before the start of the experimental activities but this update does not preclude the start of the experiments (as the old systems, not fail-safe, are still working).

RADIATION PROTECTION: OTHERS PROCEDURES IN PROGRESS

The word "**MODIFICATION**" of the Nulla Osta, which has been discussed, means the "variation" of the operating conditions and features of the plant that has been required by the LNS to the authorities.

The law in force since 2020 on radiation protection (Decree 101/20) has imposed a further obligation to "**UPDATE**" the Nulla Osta, which means "adaptation" to the obligations dictated by the new law ... because the old 2007 Nulla Osta, still in force at LNS, was issued with the obligations of the previous law (Decree 230/95).

On **29.Jul.2022** LNS request to update the authorization decree to the competent ministries.

At the same time, further changes have been requested regarding the use of accelerators:

- Intensity of accelerated particles: $2E12$ pps (corresponding to about 400W for Ne-20 at 60 MeV/A)
- Maximum annual operating time: Tandem (6500 hours), CS (6500 hours).
- Limits of use for radioactive calibration or irradiation sources (185 GBq).
- Clearance levels for gaseous materials (activation of air)

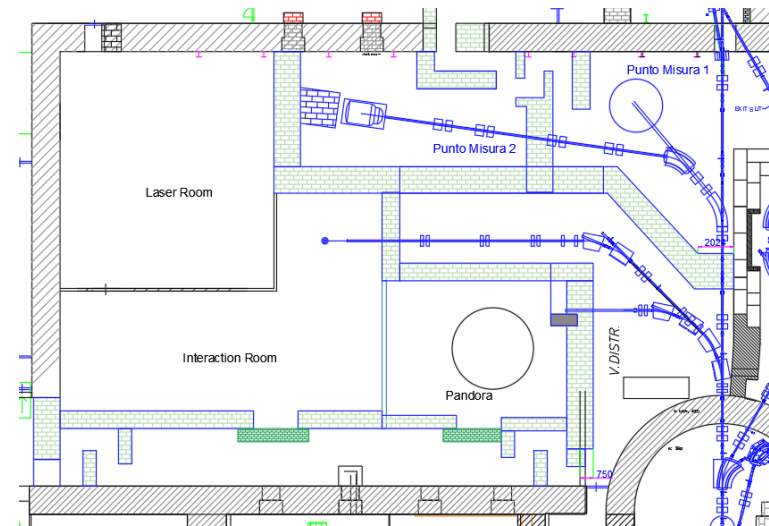
Only on **23.Jul.2024** (after the release of modification decree and two years after our request!) the procedure was started by the ministry and ISIN has already requested additional documents (the conclusion of procedure is expected by the end of 2025).

The update decree IS NOT NECESSARY FOR THE RESTART of experiments because the old authorizations still remain valid until the new one is issued.

RADIATION PROTECTION, FUTURE PROCEDURES

For future Modification of Nulla Osta, relating to all remaining new activities (not included in the previous requests) it will be mandatory (FOR PROCEDURAL REASONS) to wait for the conclusion of the previously mentioned UPDATE procedure and, **only LATER**, it will be possible to submit a new request.

- High beam intensities (2 - 10 kW)
- New layout of the experimental rooms
- LASER accelerator



The **future procedure** is expected to be concluded within 1-2 years from when the LNS will receive the update decree (**2026-2027 ?!**)

- **Guest workers**, INFN or not, have to:

- authorized by their employer;
- classified for the purpose of radiation protection and trained by radiation risks;
- for exposed workers the medical fitness dated not before then 1 year;
- ensured for accidents during activities at LNS.

- Compile one of these module:

- **NO-INFN** workers (for employees of Universities, research Institutes, external companies or other organizations) Annex RP1
- **INFN** workers (employees or associates) Annex RP2

- **AT LNS:** 15 days before the start of each experiment compile “DECLARATION FOR RADIOPROTECTION AND SAFETY OF THE EXPERIMENT”, with list of participants and the indication, for each worker, of Institution to which they belong.

- **EXTERNAL LABORATORY (NO LNS):** The experiment Spokesperson has to present the appropriate form “DECLARATION FOR MISSIONS WITH RADIATION RISK” and “AGREEMENT FOR ACTIVITIES TO BE CARRIED ON IN OTHER INSTITUTES” with the host institute, filled and provided.

<https://www.lns.infn.it/en/experiment-procedures.html>

THANKS

