

1940 FUNDAMENTO

1964 AT 17 ANOS

EX INACTIVIDADE

UM PASSADO

UM PRESENTE

UM FUTURO

MINISTÉRIO DA  
CIÊNCIA, TECNOLOGIA  
E INOVAÇÃO

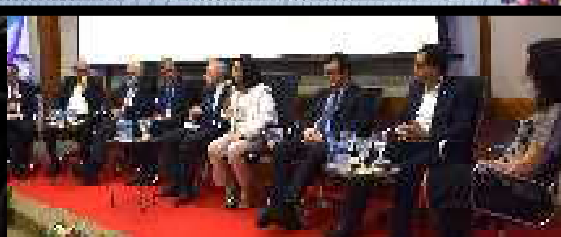
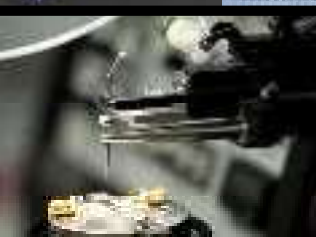
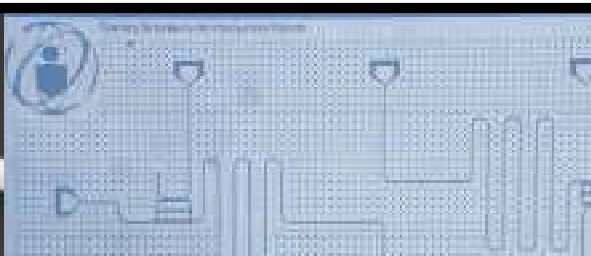


Centro  
Latino Americano  
de Física



R. L. Sommer  
[sommer@cbpf.br](mailto:sommer@cbpf.br)

Dez./25



# CBPF – 76 YEARS



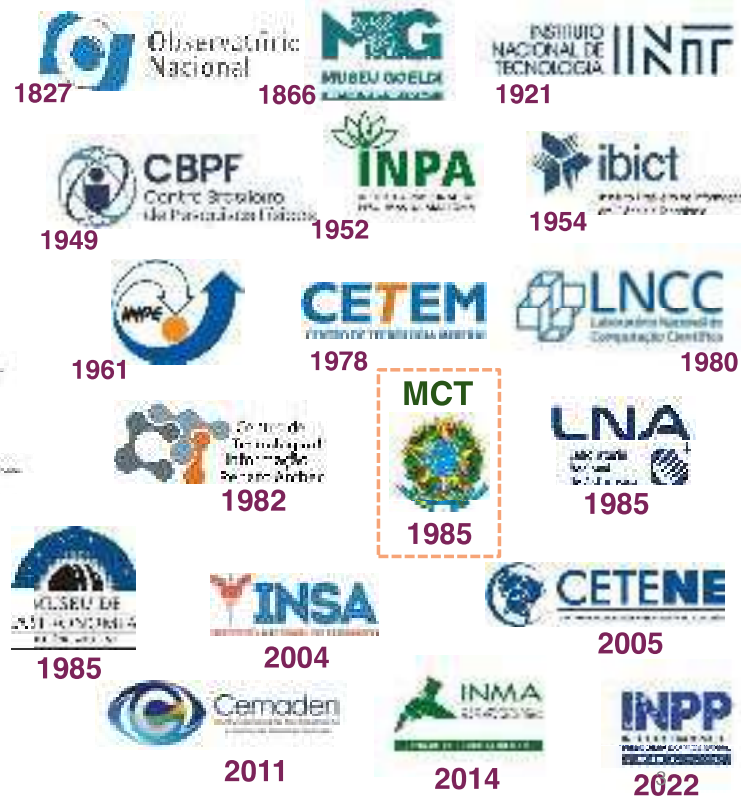
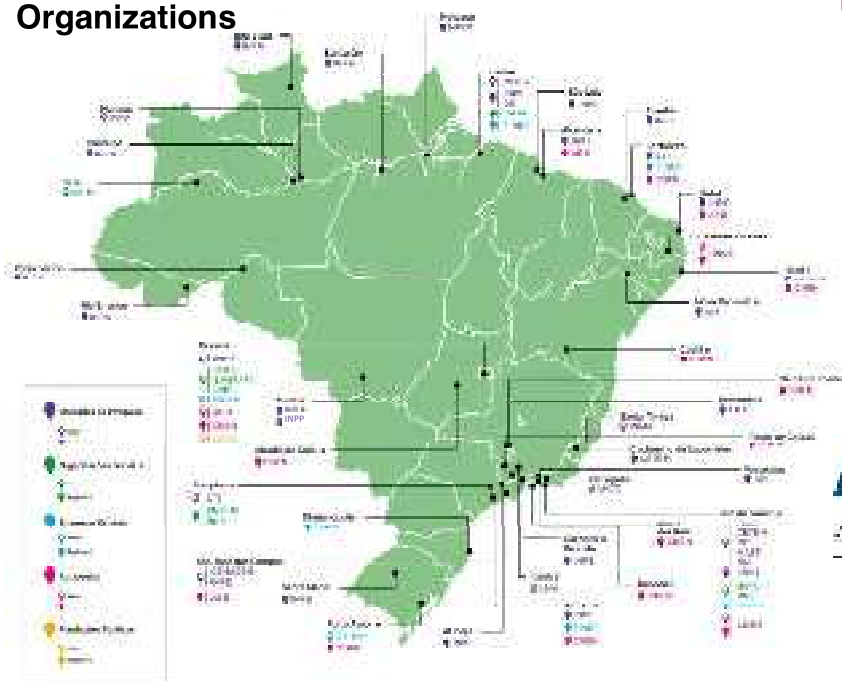
**CBPF**

Centro Brasileiro  
de Pesquisas Físicas

# Ministério da Ciência, Tecnologia e Inovação (MCTI)



Municipalities, Public Foundation, Public Companies, **Research Units** and Social Organizations





## The legacy of Cesar Lattes

Brazilian physicist Cesar Lattes, considered a national hero for his discoveries, paved the way for groundbreaking research projects in particle astrophysics across Latin America and beyond.

César Lattes, in collaboration with Giuseppe Occhialini, experimentally confirmed the existence of the pion predicted by Yukawa. The discovery was a milestone in particle physics, for which Yukawa (1949) and Powell (1950) were awarded the Nobel Prize.

One of the results of this effort was the founding of the CBPF in 1949, with Lattes as its scientific director.

1949|2024  
**CBPF** 75 ANOS

AGORA É LEI

2024

Nome de César Lattes inscrito  
no Livro dos Heróis da Pátria



LEGISLAÇÃO  
CAMARA DOS DEPUTADOS

## RESEARCH



**CBPF**  
Centro Brasileiro  
de Pesquisas Físicas

*Expanding the frontiers of knowledge*

### CBPF celebra posse de servidores(as) e reforça compromisso com a excelência científica

Publicado em 03/04/2025 16h59 | Atualizado em 03/04/2025 17h01

Compartilhe: [f](#) [x](#) [in](#) [S](#) [@](#)



## MANAGEMENT FOR S&T&I



## CBPF – P&D

### Experimental, Theoretical and Applied

- High Energy and Astroparticle Physics
- Materials and Condensed Matter
- Nanoscience and Nanotechnology
  - Biophysics and Biomaterials
  - Statistical Mechanics and Complex Systems
  - Mathematical Physics & Field Theory
  - Quantum Technologies
  - Cosmology and Gravitation
  - Artificial Intelligence Applied to Physics
  - Scientific Instrumentation



# CBPF Multi-User Laboratories

## National Research Infrastructure Platform – MCTI

PNIFE is a tool to catalog and make available information on research resources in Brazil, promoting collaboration and the shared use of laboratories and equipment.

### CBPF – 34 Laboratories



**LABNANO**  
Multiuser Laboratory of  
Nanosciences and  
Nanotechnology



**LMAG**  
Applied Magnetics  
Laboratory



**LITCOMP-IA**  
Laboratory of Computing  
and Artificial Intelligence



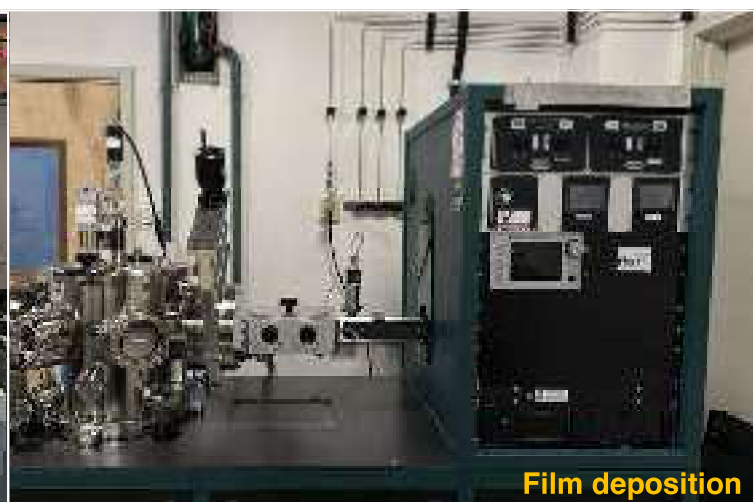
**QuantumTec**  
Quantum Technologies  
Laboratory

<https://pnipe.mcti.gov.br/search?term=CBPF>

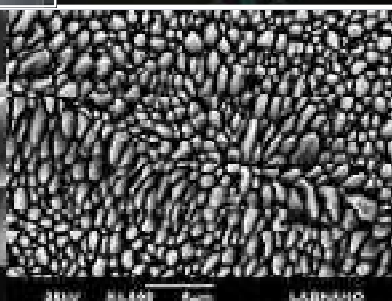
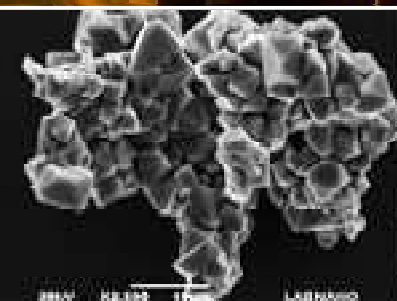




**Lithography  
Processing  
Cleanroom**



**Film deposition**



**The Brazilian initiative SisNANO  
promotes collaboration and R&D  
between Nanotechnology Laboratories.**



**Multi-User Laboratory  
of Nanoscience and Nanotechnology**

• Division of Electron Microscopy  
Micro and nanofabrication division  
Film Deposition Division

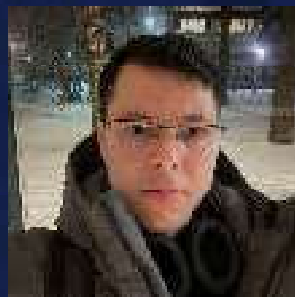




# Quantum Technologies

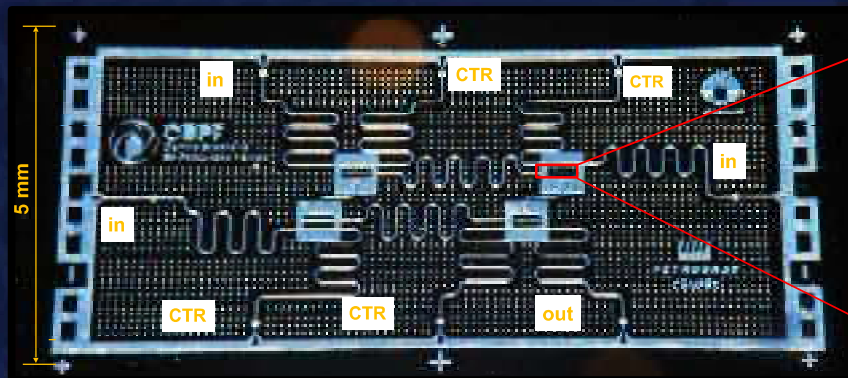


Arthur Rebello  
PhD Thesis

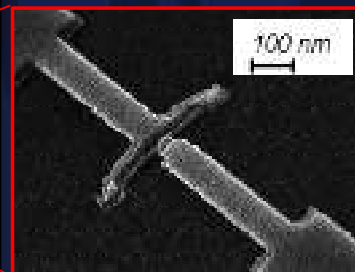


CBPF develops circuits and devices for adiabatic quantum computing and its applications – including for industry.

Quantum hardware and algorithms



Superconducting Cavities



Josephson Junctions



# Quantum Technologies Laboratory

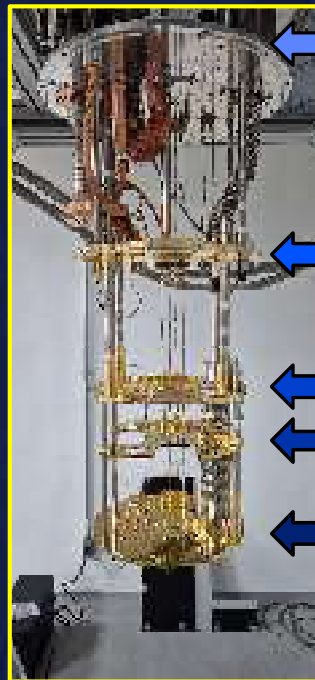
Manufacture of Qubits with Josephson junctions using deposition, ion processing and vacuum control.



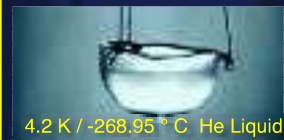
# Quantum Technologies Laboratory



## Low temperatures!



50 K / -223.15 ° C



77 K / -196.15 °C  
Liquid Nitrogen



1 K / -272.15 ° C

Free Space Temperature : 2.7 K

3000 K. 1/10 X Colder Than Environment

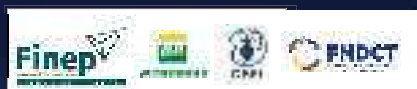
0.1 K / -273.05 ° C

7/1000 K. ~43,000 X colder than environment

0.007 K / -273.143 ° C



MultiGPU



## ARTIFICIAL INTELLIGENCE LABORATORY

AI applied to Physics: Techniques, Technologies and Research for Astrophysics, Cosmology, Proximphysics, Quantum AI, in addition to the development of its own MultiGPU computational infrastructure, with cooling systems optimized for performance



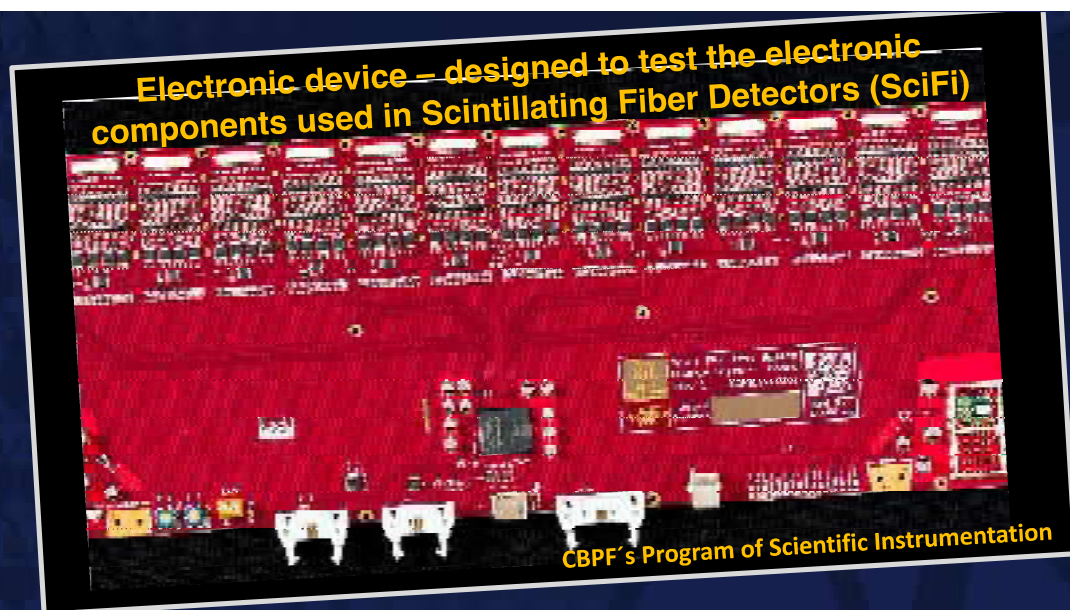
Jun./2025



<https://labia.cbpf.br>



CBPF is the headquarters of the  
National Network of High Energy  
Physics (RENAFAE)



CBPF is the headquarters of the  
National Network of High Energy  
Physics (RENAFAE)



# Primeira rede de experimentação de Comunicação Quântica no país



COMUNICAÇÃO QUÂNTICA EM RIO DE JANEIRO 2023

INSTITUTO DE FÍSICA DE RIO DE JANEIRO



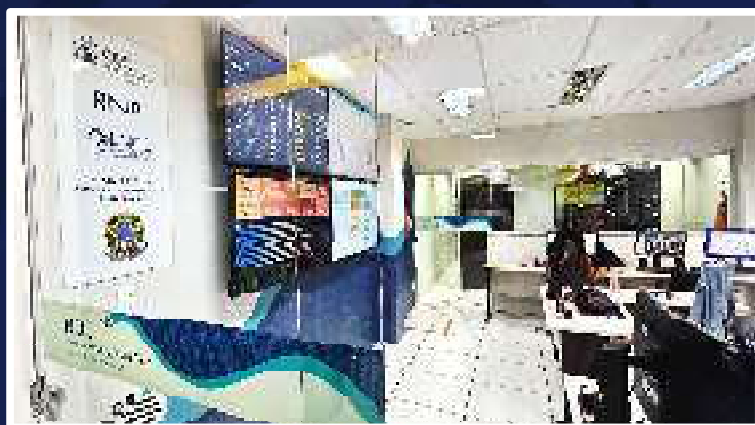
UNIVERSIDADE FEDERAL DO RIO DE JANEIRO



INSTITUTO DE FÍSICA DE RIO DE JANEIRO



# CBPF: Computação para a Ciência



CBPF firma parceria com CNPq para segurança de dados científicos



Recomendamos 24/04/2022 08:00:00 - 24/04/2022 08:00:00

Seu navegador



**Datacenter para Ciência 2025**

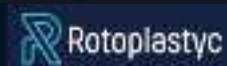
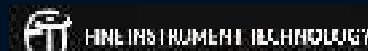
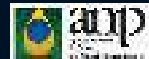


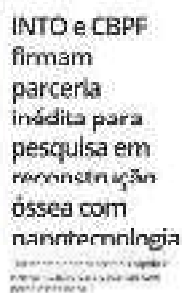


# P&D em Parceria com Empresas

## Marco Legal da CT&I

- NMR/Computação Quântica para Petrofísica
- Inteligência Artificial e Deep Learning para Petrofísica e Geofísica
- Nanotecnologia para a indústria de O&G
- Novos materiais e técnicas para implantes médicos
- Ressonância magnética em micro e nanoescala
- Novos Materiais, Nanotecnologia e Dispositivos Magnéticos
- Estrutura Mecânica do Array de Telescópios Cherenkov
- Física de Superfície para Mineração
- Tanques com Isolamento Térmico (SWGO)
- Permeâmetro Digital

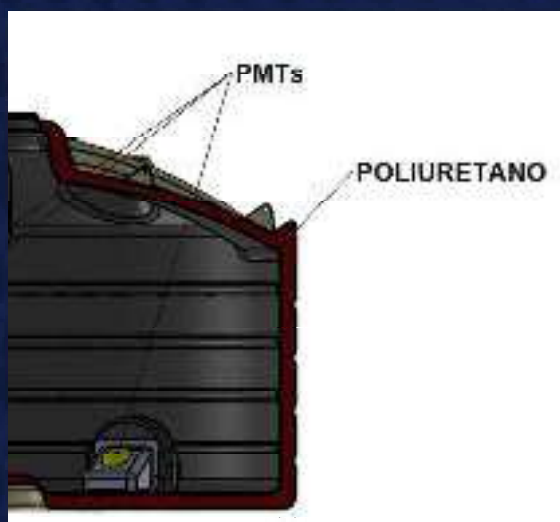


[illegible]

## RADIORUN



## R&D in Partnership with Companies Legal Framework for ST&I



*Gamma-ray observatory  
detector tanks*



*Innovation in a product for  
the agribusiness sector*

## Graduate Programs in Physics



### Master's and PhD in Physics Professional Master's Degree in Scientific Instrumentation



CBPF was the first Brazilian institution to officially grant master's and doctoral degrees in Physics in Brazil.

The CBPF graduate program completed 60 years in 2022.



We trained more than 1,000 new scientists, about 50% of whom came from other Brazilian states and Latin American countries.

Considered among the best graduate programs in the country.

# S&T for society



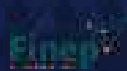
## CBPF – FUTURE EXPANSION



**CBPF**

Centro Brasileiro  
de Pesquisas Físicas

## FNDCT – MCTI - FINEP



Proposta de Criação do  
Centro Nacional de  
Memória da Física -  
Pavilhão Mário de  
Almeida



20 de Março de 2004

Proposta de  
Expansão do CBPF no  
Parque Tecnológico da  
UFRJ



**CBPF**

RESEARCH & INNOVATION CAMPUS

20 de Março de 2004



Publication of the magazine “Ciência Hoje” in April 2004

CIÊNCIAHOJE

## CBPF returns to its first headquarters under a new agreement with UFRJ

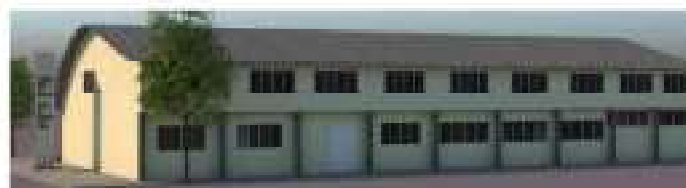
**31 October 2025** : The historic site will host the [National Center for the Memory of Physics – Cesar Lattes](#) and the [Hub of Physics](#), which will serve both as a hub for advanced discussions in physics and as a space for scientific outreach and public engagement, connecting the scientific community with society.



As the result of negotiations lasting more than two years, on Tuesday (28) the Agreement was signed between the Federal University of Rio de Janeiro (UFRJ) and CBPF for the use of the Mario de Almeida Pavilion. Built in 1951, the building was the first headquarters owned by CBPF and is considered a landmark in the development of Brazilian science.



## National Center for the Memory of Physics Cesar Lattes



External  
restoration



Internal  
restoration



The restoration of this building, under the responsibility of CBPF, is supported by resources from *Brazilian National Fund for Scientific and Technological Development* (FNDCT), under the management of FINEP (*National Innovation Agency*).



## Pesquisa & Inovação em Física

1. Nano Center: Tec. Quânticas & Saúde
2. Instrumentação Científica
3. Detectores para Física de Altas Energias
4. Inteligência Artificial para Física
5. Hub de Física & Inovação



13/06/25

# CBPF – Research & Innovation (Expansion)



## Thematic Axes / Open Platforms – Approved in the FNDCT CD

- **Nano Center**
  - **Nanotechnology and Quantum Technologies**  
R&D of new nano-scale materials and devices, quantum technologies and advanced instrumentation.
  - **NanoHealth**  
R&D and application of nanotechnology in biomedicine, diagnostics, therapies and solutions for health, articulating S&T skills with hospital networks and other ICTs.
- **Scientific Instrumentation**  
R&D of instruments and equipment, sensors and systems dedicated to research in S&T (Mechanical, Electronics, Optics, etc.), with prototyping capacity and technical support for other ICTs.
- **Detectors for High Energy Physics**  
R&D in detection technologies aimed at large international collaborations, with a structuring role in Brazil's participation in international experiments.
- **Artificial Intelligence for Physics**  
R&D in AI, including advanced infrastructures for scientific computing, machine learning and massive data processing for applications in Physics and related areas.
- **Innovation Hub for Physics**  
Articulation with companies, industries and startups, aimed at stimulating technology transfer, scientific entrepreneurship and cooperation with the economic and productive sector (articulation with the Innovation Hub of the Technology Park).



## Parque Tecnológico da UFRJ





## Parque Tecnológico da UFRJ





INSTITUTO DE FÍSICA DA UFRJ

Research & Innovation

1. Nano Center: Quantum Technologies & Health  
Scientific Instrumentation  
Detectors for High Energy Physics  
Artificial Intelligence for Physics  
Physics & Innovation Hub

MINISTÉRIO DA  
CIÊNCIA, TECNOLOGIA  
E INOVAÇÃO

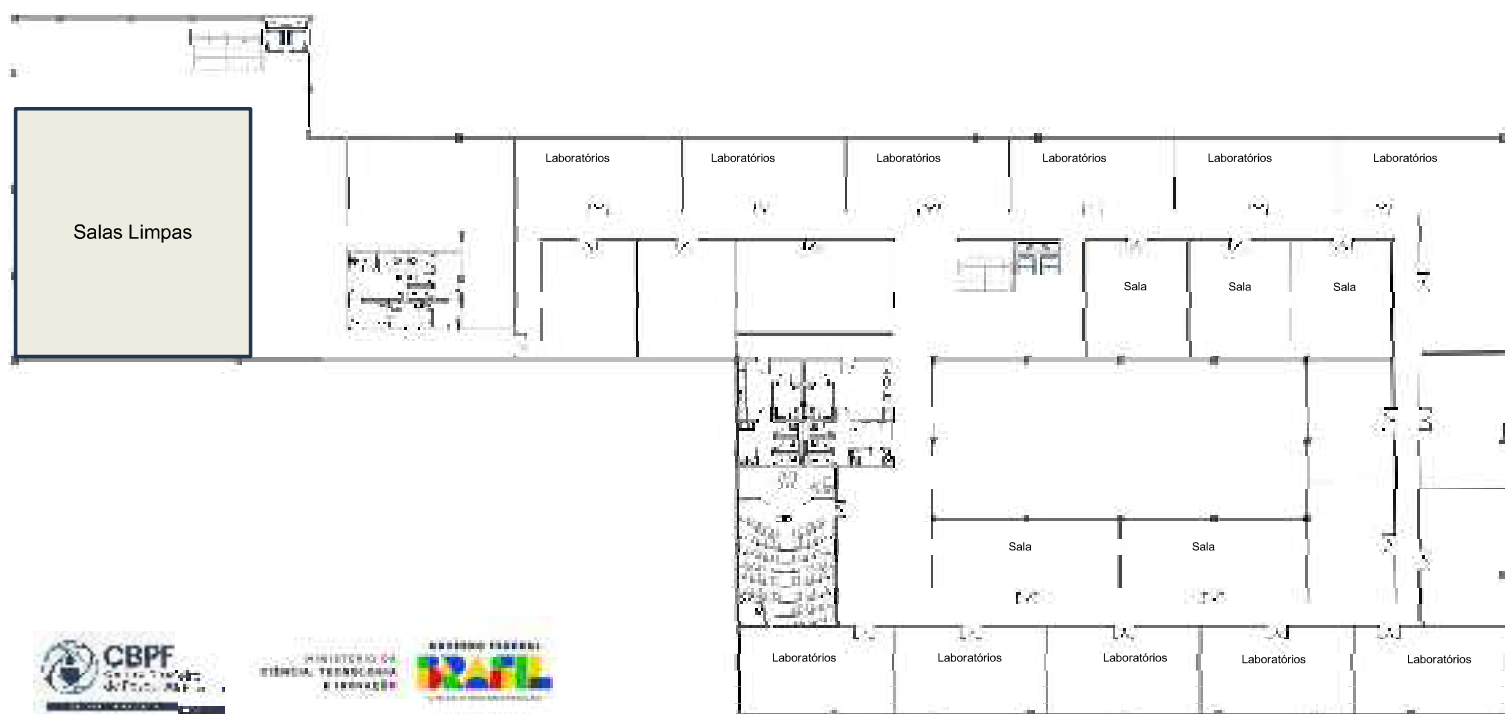




## Ground floor



# 1st Floor



TEM GARANTIA

DE QUALIDADE

TEM ATUALIDADE

DE PRESENTE

TEM SUSTENTABILIDADE

DE FUTURO

MINISTÉRIO DA  
CIÊNCIA, TECNOLOGIA  
E INOVAÇÃO



Centro  
Latino Americano  
de Física



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Dez./25

