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**IN2P3**

Institut national de **physique nucléaire**  
et de **physique des particules**

**Elba round table**  
**26/05/2015**

# IN2P3, an institute in CNRS



## CNRS :

– Under the authority of the ministry for higher education and research

• **33 000** researchers, engineers, technicians

• **3.3 billion euros per year** (total budget)

– 1 200 laboratories

– 10 thematic institutes, including 3 national institutes : IN2P3 and INSU, INSMI. Covering all scientific domains from human and social sciences to universe science

## IN2P3 :

• **3 206** researchers(1/3), engineers and technicians(2/3)

– 2 400 CNRS staff, researchers, engineers and technicians;  
600 university and other staff

• **71 M€** Annual budget(excluding salaries in 2015) + TGIR

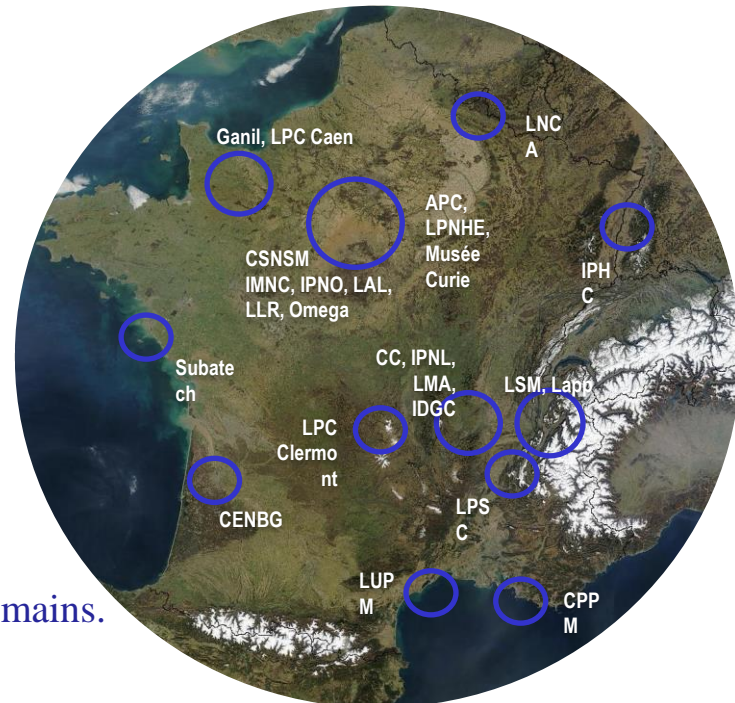
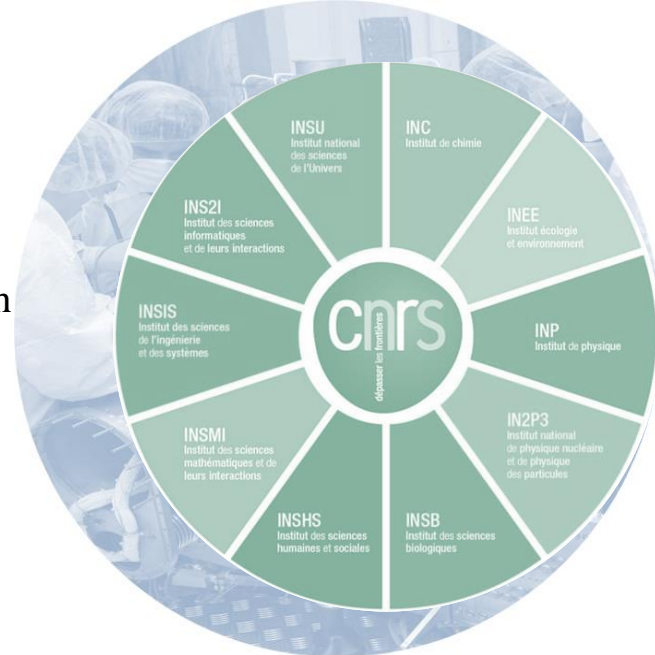
– 25 laboratories and platforms

– 40 large international projects

• Similar (but independent) organization for **CEA** and **CEA/IRFU**

( 814 FTE @Saclay, 84 M€ of budget including 12 M€ TGI).

Sharing with In2p3 the national strategy responsibility in our Science domains.



# IN2P3: MISSIONS



*TO PROMOTE AND COORDINATE RESEARCH ACTIVITIES  
IN THE FIELD OF SUBATOMIC PHYSICS*

## COORDINATION

*Programmes on  
behalf of the CNRS  
and universities*

**CEA partnership**

NUCLEAR PHYSICS, PARTICLE AND ASTROPARTICLE PHYSICS

## EXPLORATION

*The infinities,  
from particles  
to the Cosmos*

## PROVIDING

*Skills,  
expertise*

Interdisciplinary research,  
training, innovation

LINKS WITH SOCIETY

**Stay open, tradition of sharing :**

**Bring its competences**

- to other scientific domains
- to contribute solving societal problems

**Help the companies benefit from its expertise : 130 collaborative R&D contracts signed with industrial partner/year**

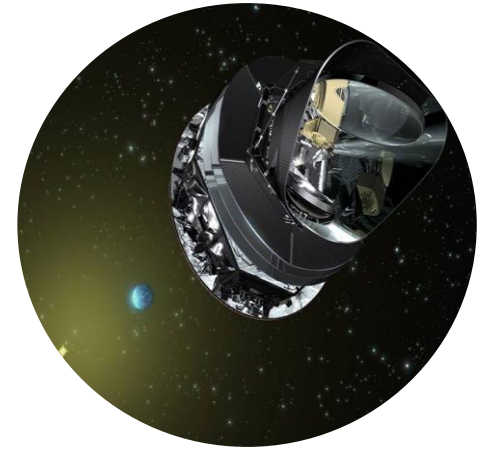
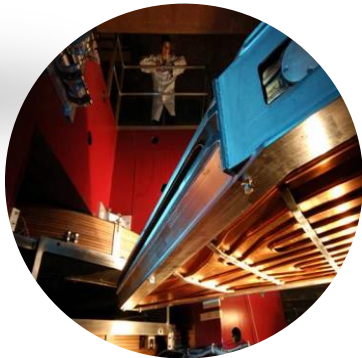
**Participate to the formation of students (University, grandes écoles) 350 PHD /year in our labs**

# SCIENTIFIC THEMES



**Particle physics**  
**Nuclear and hadronic physics**

Matter: most elementary constituents  
and fundamental interactions  
Structure of nuclear matter



**Theory**  
**Instrumentation**  
**Computing grids**  
**Accelerator R&D**  
**Back-end of the nuclear  
fuel cycle and nuclear  
energy**  
**Medical applications**

**Astroparticle physics and neutrinos**  
Universe: composition and behaviour



# R&D networks

- **Supporting Instrumentation R&D**
  - **730 Engineers & Technicians distributed in 25 labs spread all over France**
- **Need of a national coordination** sharing and optimizing the resources and competences of the Institute
- **Instrumentation Network setup in 2012**
  - To promote exchanges between experts, coordinate common actions , minimize duplication
  - Contribute to innovation
  - Keep the knowlegde to the State of the Art
  - Identify and promote common conception tools and standards

*Above all : give technical answers and assistance to physics challenges*

*Data rate, data storage, data processing, time resolution, spatial resolution, high granularity, radiation hardness, cryogenic, single photon, low noise...*

*so much to face*

# 9 instrumental networks

- **5 dedicated to detector families**
  - Photodetectors (PM, SiPM, MCCP, scintillators....)
  - Gaseous detectors (RPCs,  $\mu$ egas, TPCs...)
  - Semi-conductors detectors (MAPS, Ge, Si, C...)
  - Cryogenics (KID, TES, cryogenic electronics...)
  - Radiodetection (MHz, GHz...)
- **4 other corresponding to R&D topics transverse to detector networks**
  - Microelectronique (inc. 3D, CMOS, SiGe, 65 nm...)
  - DATA acquisition (NARVAL, FASTER, xTCA, ...)
  - Mechanics R&D (cooling, low budget material, FEM simulations...)
  - Instrument control-command (softwares, servitudes and automations)

**Internal to IN2P3 at first level, but Cea-Irfu is actively participating to all of them,  
Some of these networks already in close interactions with international similar networks  
( CERN RD collaborations as RD51, RD53,..), within R&D EU program ( AIDA H2020,...)**

# IN2P3 top 10 priorities

## Science

- **PARTICLE PHYSICS** : LHC@13 TeV and upgrades, Neutrino Long Baseline
- **NUCLEAR PHYSICS** : Ganil-Spiral2, LHC-Alice, Jlab
- **ASTROPARTICLE PHYSICS AND NEUTRINOS** : Virgo, LSST, HESS, Neutrinos
- **NUCLEAR PHYSICS AND ENERGY** :
  - Transmutation of present nuclear waste by ADS
  - Innovating nuclear systems with low wastes (thorium)
  - Radiochemistry involved in the storage of nuclear wastes

## Technical developments

- **COMPUTING GRIDS** : CC-IN2P3 contributions to Astroparticles, High energy physics and biomedical applications
- **ACCELERATORS** :
  - Superconducting accelerator cavities and cryotechnology
  - Ion and electron sources, Target/source for radioactive beams, Beam dynamics
  - **Laser acceleration**
- **INSTRUMENTATION AND DETECTORS** : Pluri/multi-disciplinarity :
  - face detectors challenges *time resolution, spatial resolution, high granularity, radiation hardness, transparency, cryogeny, single photon, low noise*
- **HEALTH** : New diagnostic and therapeutical tools
- **LINK WITH INDUSTRY**: Health, Space industry, Environment (measurement of weak radioactivity),  
Electronics

# 40 Major International Projects

