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## A New European Laboratory

LABORATOIRE  
DE PHYSIQUE DES 2 INFINIS  
IRÈNE JOLIOT-CURIE

Laboratoire de Physique  
des 2 Infinis



Laboratoire de Physique des 2 Infinis Irène Joliot-Curie



*Achille Stocchi IJCLab/Université Paris-Saclay/CNRS/IN2P3*



Giornata italiana della ricerca nel mondo - Parigi, 14/04/2023



# IJCLab : Genesis

**Successful project: merging 5 laboratories\* to create a large European laboratory (~700 people) in the field of the **2 Infinite Physics** and its applications**

- 5 "historical" laboratories (~60 years old) at the origin of the creation of the Orsay Campus, today the Campus of the Université Paris-Saclay
- A project that took 4 years to be defined and that led to the creation of IJCLab (Irène Joliot Curie) in January 2020

\*

- Laboratories sharing the same history, the same way of working (CNRS/University)
- Unique opportunity: thematic coherence and geographical proximity (ellipse of 600m, 300m)
- All the themes of "the physics of the two infinities"
- All technical and support forces unified in IJCLab



Extension Virtual Data  
bâtiment 206



Salle blanche bâtiment 200



# IJCLab : the site

IJCLab occupies a large part of the renovated Orsay Campus (~50000m<sup>2</sup>) with large research infrastructures



Entrée du laboratoire – Bâtiment 100



Cafeteria – Bât.102



Ateliers bâtiment 100



Extension bâtiment 108



Ateliers bâtiment 200



Restructuration du Hall D1-D2, de l'IGLOO, bat 201



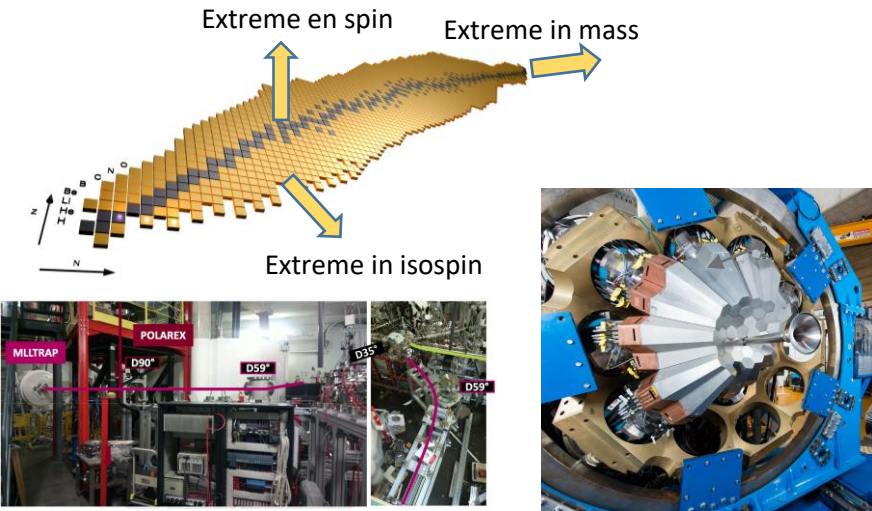
Hall D3-D4 Bâtiments 201



# IJCLab : The Science

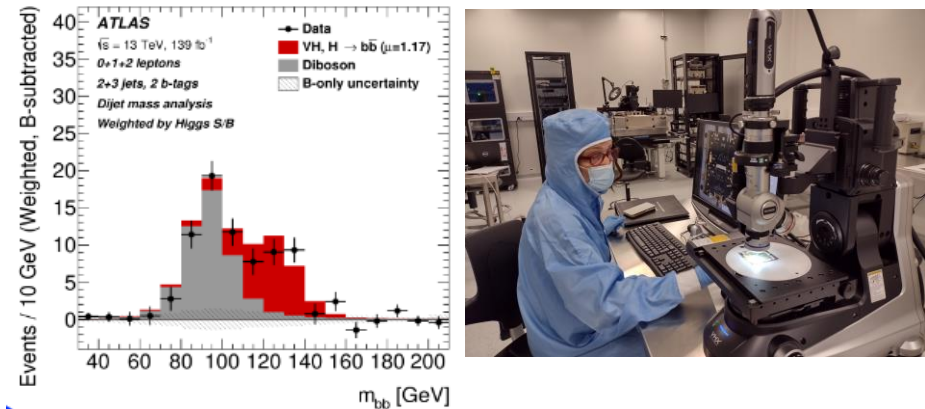
Probing matter at small distances/high energy  $E=hc/\lambda$ , Discovery of new particles  $E=mc^2$

emergent properties of an effective interaction



**Nuclear Physics**

The Standard Model and the discovery of the Higgs boson! The missing piece of the Standard Model



**Particle Physics**

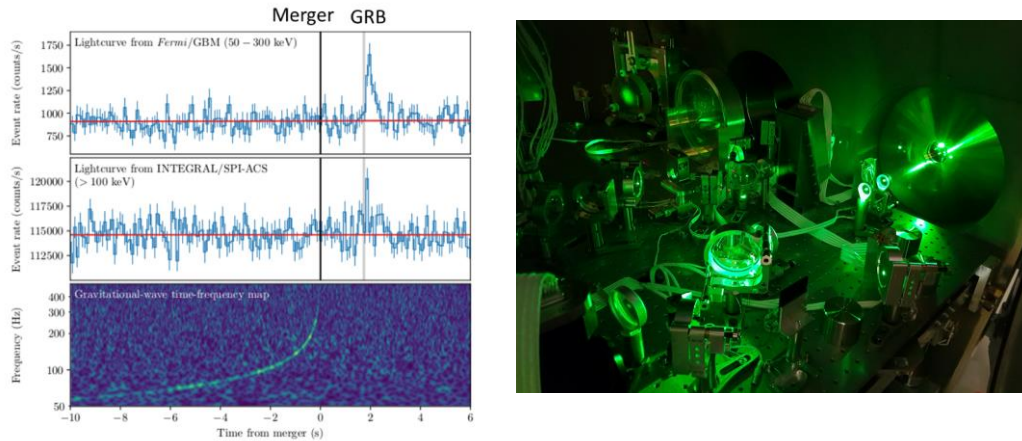
Understand the constituent elements of matter, their interactions and how the properties of matter are derived from them



# IJCLab : the Science

Understand the evolution of the Universe and study the violent phenomena that occur in it, in connection with high energy physics

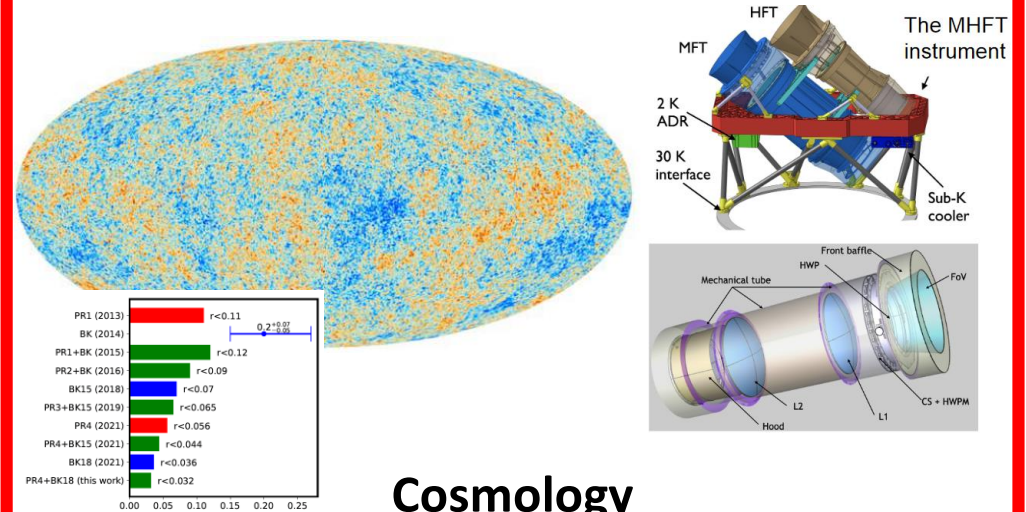
**The LIGO/VIRGO gravitational wave observation**  
Space-time waves, direct observation of black holes/other compact objects



## ASTROPARTICLE

Astrophysical events (high energy cosmic rays, black hole mergers, general relativity...)

**The early universe seen by the CMB!**  
The first photo of the universe



## Cosmology

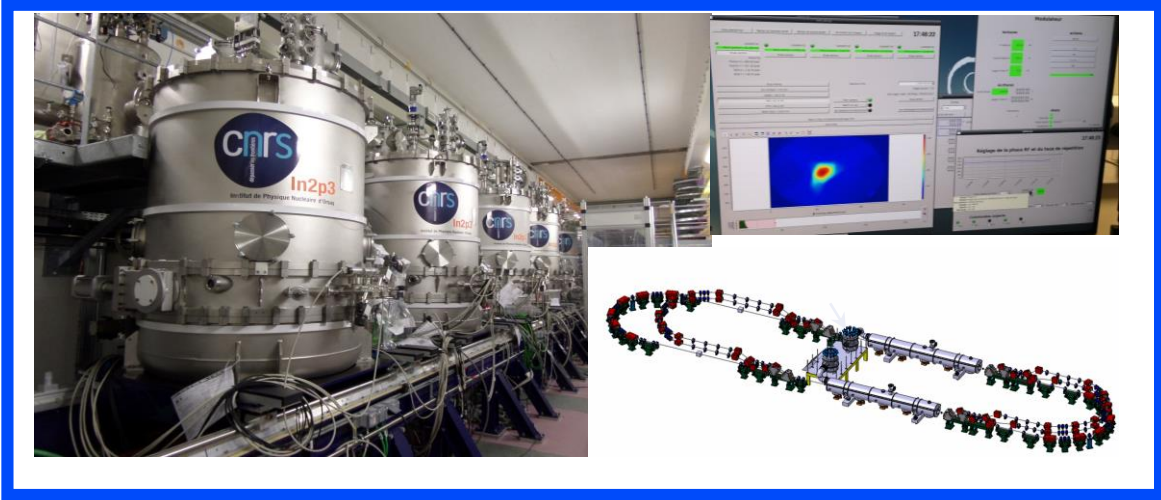
(evolution of the Universe, inflation, large structures, dark matter and energy)

Link with the



# IJCLab : The SCIENCE

Design, Develop, Build tools to carry out these researches

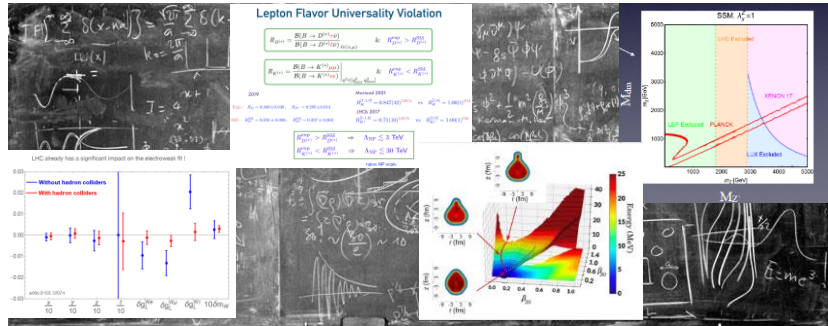


Accelerators



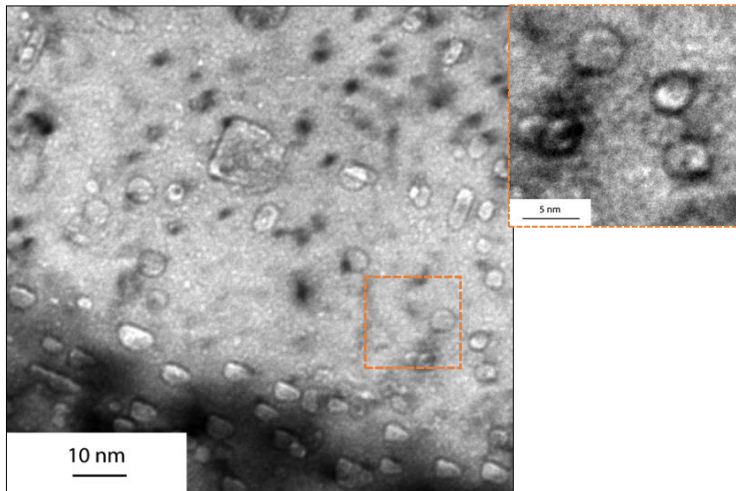
Detectors/Instrumentation

## Theory

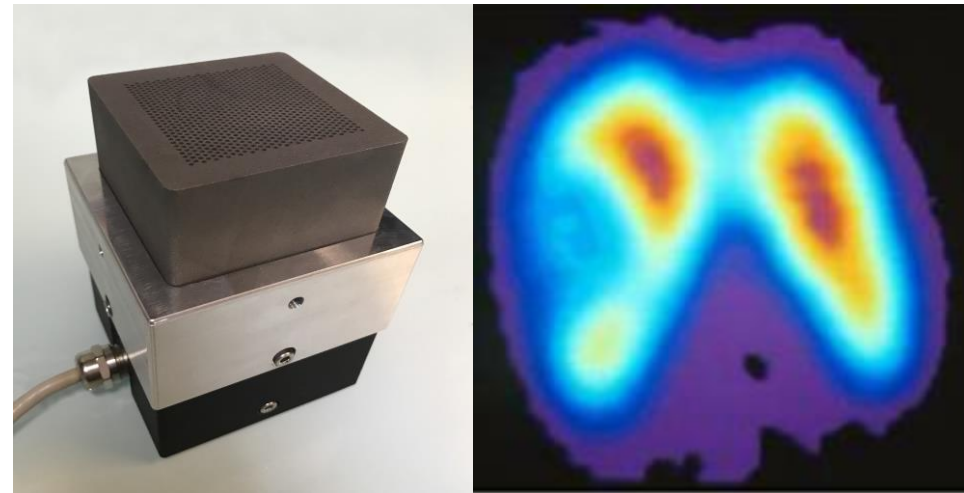


# IJCLab : the Science

Tools and concepts applied in areas that have an impact on society



Energy and environment: nuclear energy, radiochemistry and materials



Health physics : imaging, radiation therapy, modelling of the living



**1 Pôle Ingénierie 4 Départements**



**~180 permanents**

4 Départements :

**Electronics / Computing/  
Instrumentation / Mechanics**

with 10 Services

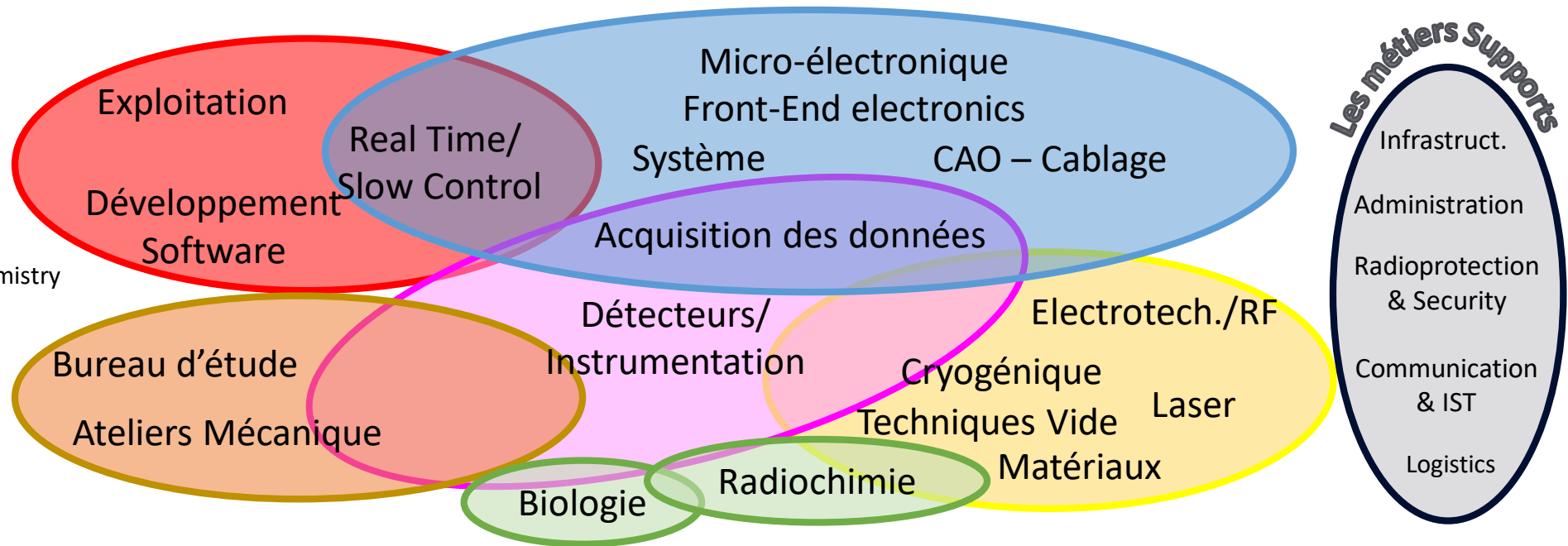
## IJCLab : the technical skills

- Cryogenics
  - RF
- ~30 permanents**

**Technical staff with technical skills / expertise. Is the mainstay of the laboratory for designing, drawing and building instruments..**

- Technical services are driven by research issues (R&D and projects)
- The proximity of technical and research teams (integrated teams)
- The ability to combine and make coexist versatility and specialization

- Mecanics
- Electronics
- Computing
- Biology/Radiochemistry
- Detectors
- Accelerators





## 7 Research Poles

31 research teams and 2 services

### 1 engineering pôle

4 Departements with 10 Services

### 1 Administration pole

3 Divisions + 1 Service

### 6 Support Services

### 5 Plateformes

(with external users)

+ several technical platforms

...et voilà IJClab



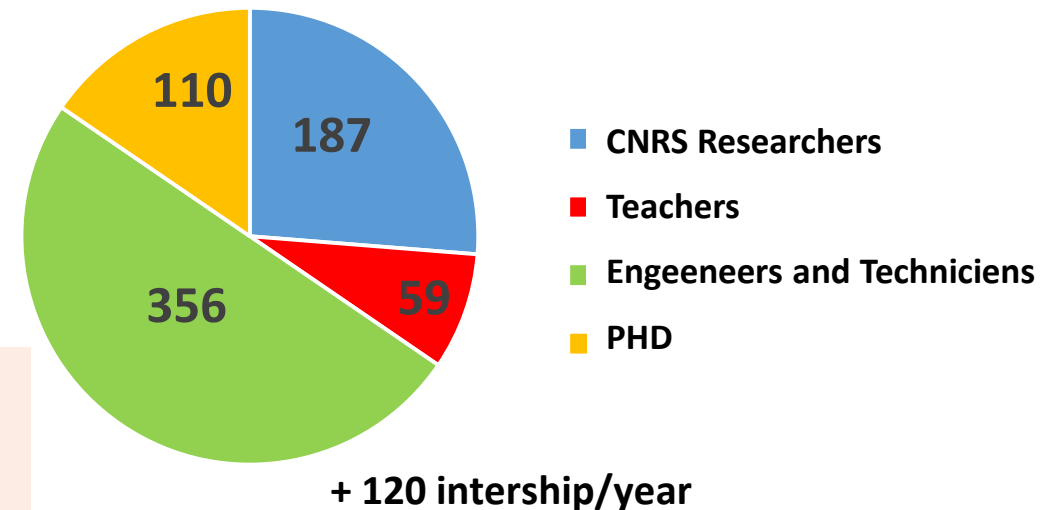
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**712 membrs (530 permanents)**

- One of the largest laboratories of the CNRS/Paris-Saclay
- In the network of 8 major European laboratories

**Year Budget ~ 18M€ + 45M€ salary**



**a society in a society**

researchers, teachers, engineers, technical staff and many skills

**in an international environment**





# IJCLab in the international framework

Beside the links with many French labs

## Europe

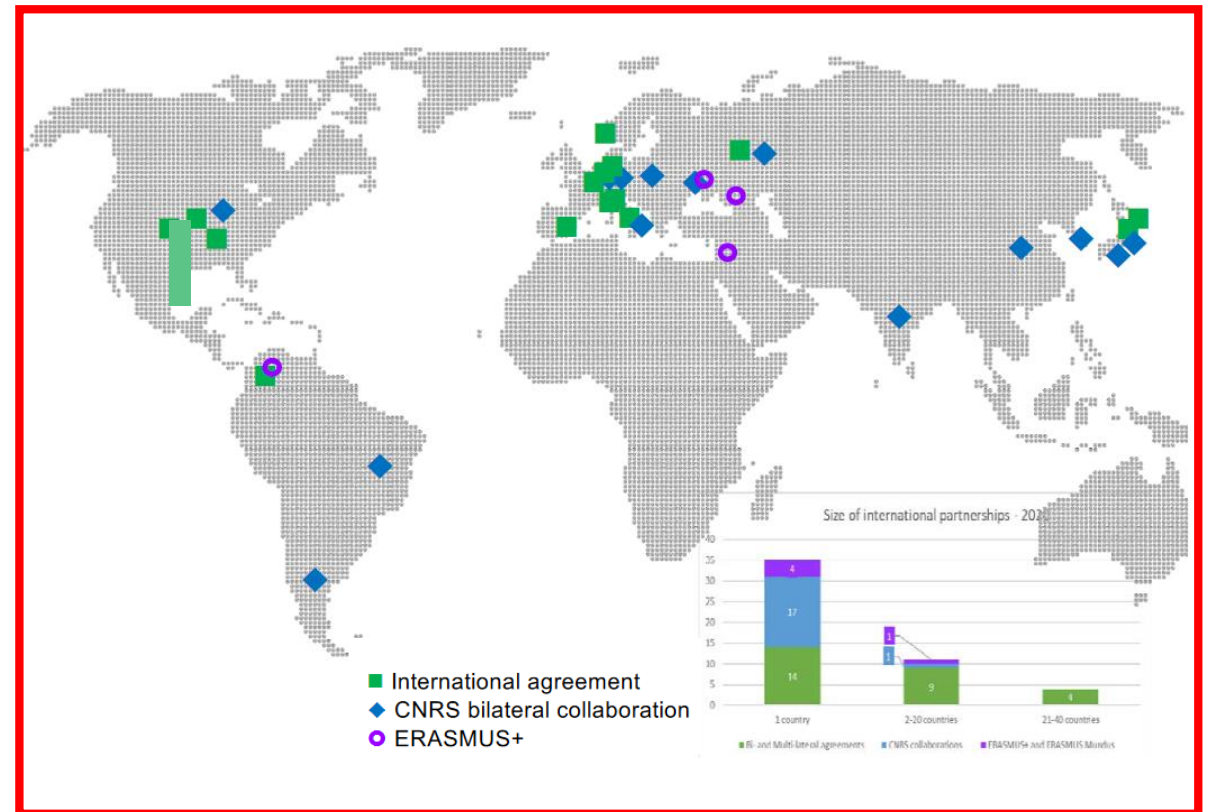
SCK-CEN-Belgium  
CERN  
CTA-Spain  
DESY-Germany  
Dubna-Russia  
EGO/VIRGO-Italy  
ESS-Sweden  
GSI-Germany  
Jyväskylä -Finland  
LNGS-Italy  
LNL-Italy  
LNF-Italy  
LSM-France  
NIKHEF-Amsterdam  
HZB (Berlin)  
PSI-Zurich  
STFC-Daresbury

## World

Auger-Argentina  
LBNL/SLAC-US  
Fermilab-US  
JLab-US  
Argonne-US  
KEK-Japan  
LSST-Chili  
Riken-Japan  
Triumph-Canada

Each year, several bilateral international collaborations are signed with research centers and universities.

Recent example given below



## IJCLab : an European laboratory

**IJCLab DNA is international due to its composition, openness in research and teaching, and for the participation and leadership in running the projects worldwide**

### Aiming to

- **Contribute to and lead projects in high energy physics, nuclear physics, astroparticles and cosmology and playing a major role** in the conception, design and construction of current and future **accelerators**.
- **Promote the development of new technologies** for science for the benefit of society and thus support national and European industrial competitiveness.
- **Form/Teach/Trains students through and for research**