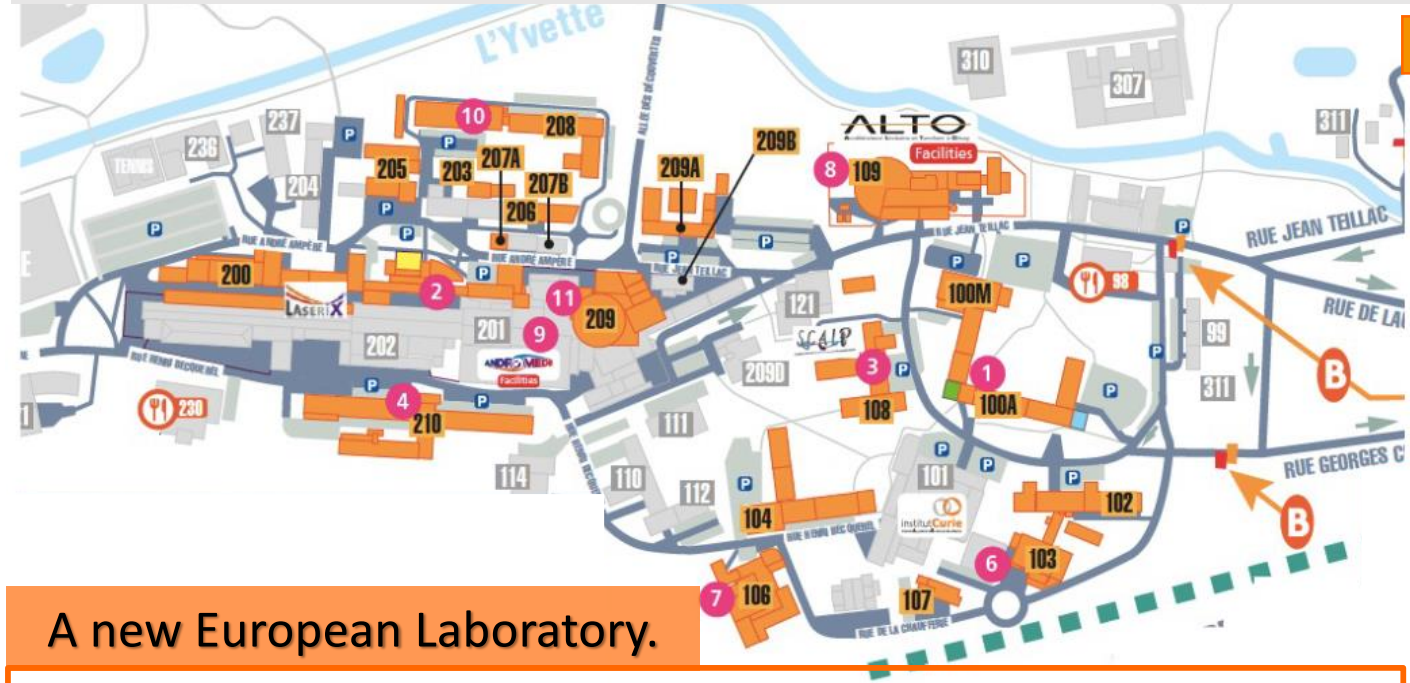
Welcome for the

The International workshop on CLAS12 physics and future perspectives at JLab

IJCLab : Located in Orsay Campus, 30 Km South-Paris, Campus Paris-Saclay

IJCLab is occupying a large part of the Orsay Campus (~50000m²)



A new European Laboratory.

Formed on 2020 by the merging of 5 Laboratories in Orsay-France

CSNSM	*Centre de Sciences Nucléaires et de Sciences de la Matière*
IPN	*Institut de Physique Nucléaire*
IMNC	*Imagerie et Modélisation en Neurobiologie et Cancérologie*
LAL	*Laboratoire de l'Accélérateur Linéaire*
LPT	*Laboratoire de Physique Théorique*

IJClab in a nutshell - I

~720 membres (530 permanents)
One of the biggest laboratory in
CNRS / Paris-Saclay / Université de Paris
In the network of major European laboratories (LDG)

IJCLab
Irène Joliot-Curie
Laboratoire de Physique des 2 Infinis

Direction du laboratoire

- Chargés de mission
- CeMaP

Plateformes de Recherche
ALTO | ANDROMEDE | JANNuS/SCALP | SUPRATech | LaseriX

Services support
- Documentation
- Communication & Événementiel
- Enseignement
- Infrastructures
- Prévention des risques
- Qualité
- STIRI

Pôles de Recherche

PHYSIQUE DES HAUTES ÉNERGIES
- ALICE
- ATLAS
- B Factories
- DeLLight
- HADES
- ILC
- JLab/EIC
- LHCb
- Neutrinos

PHYSIQUE DES ACCÉLÉRATEURS
- ALEA
- MAVERICS
- BIMP
- Cryogénie
- Technologie RF
- Plateforme /PANAMA

PHYSIQUE SANTÉ
- Modélisation et vivant
- Radiation et vivant
- Instrumentation Multimodale et Imagerie Tissulaire
- Cellule de Biologie experimentale

PHYSIQUE THÉORIQUE

PHYSIQUE NUCLÉAIRE
- Noyaux aux extrêmes
- Noyaux exotiques structures astrophysique réactions
- Noyaux ions matière
- Physique nucléaire théorique
- Spectroscopie décroissanses et fission
- Faisceau ISOL, ions radioactifs et structure

ASTROPARTICULES, ASTROPHYSIQUE ET COSMOLOGIE
- Astrophysique & cosmochimie
- Astro-particules de haute énergie
- CMB
- GREEN
- Ondes gravitationnelles
- Astroparticles Solid State detectors

ENERGIE ET ENVIRONNEMENT
- CHIMèNE
- RAPHYNEE

Pôle Ingénierie

ELECTRONIQUE
- Systèmes numériques et acquisition
- Développements analogiques et microélectronique
- CAO prototypage et réalisation

INFORMATIQUE
- Développement
- Exploitation
- On-Line

DÉTECTEURS ET INSTRUMENTATION
- Détecteurs de particules & instrumentation associée
- Détecteurs cryogéniques de particules & instrumentation associée

MÉCANIQUE
- Bureau d'études
- Réalisations et montages mécaniques

Administration
- Division accueil et ressources humaines
- Division achats et logistique
  Service logistique
- Division financière
  Service contrats
- Service des marchés

cnrs | université PARIS-SACLAY | Université de Paris

https://www.ijclab.in2p3.fr

7 Research Poles
31 research teams et 2 services

1 Engineering Pole
4 Departments with 11 Services

1 Administration Pole
3 Divisions + 1 Service

8 Support Services

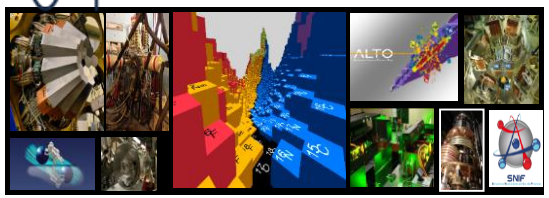
5 Platforms (with external users)
+ several technical platforms

IJClab in a nutshell - II

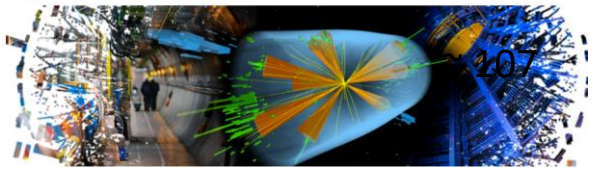
7 Pôle Scientifiques

The ensemble of all the themes of "the physics of the two infinities" with the presence of strong historical/existing poles, of emerging poles and of activities at the interfaces

PHYSIQUE NUCLÉAIRE
NUCLEAR PHYSICS

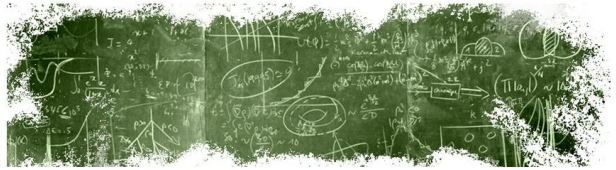


PHE Physique des Hautes Energies
High Energy Physics



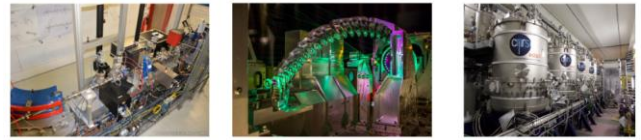
A2C Astroparticles, Astrophysics & Cosmology

Théorie



Santé

Accelerator Physics



Including RF and cryogenic services

Energie et Environnement

116 PHD student

@october 2022

IJClab in a nutshell – III : Technical Skills

1 Pôle Ingénierie **4 Départements**

~180 staff members

4 Departments :

Electronics / Computing
Instrumentation / Mechanics

with 10 Services

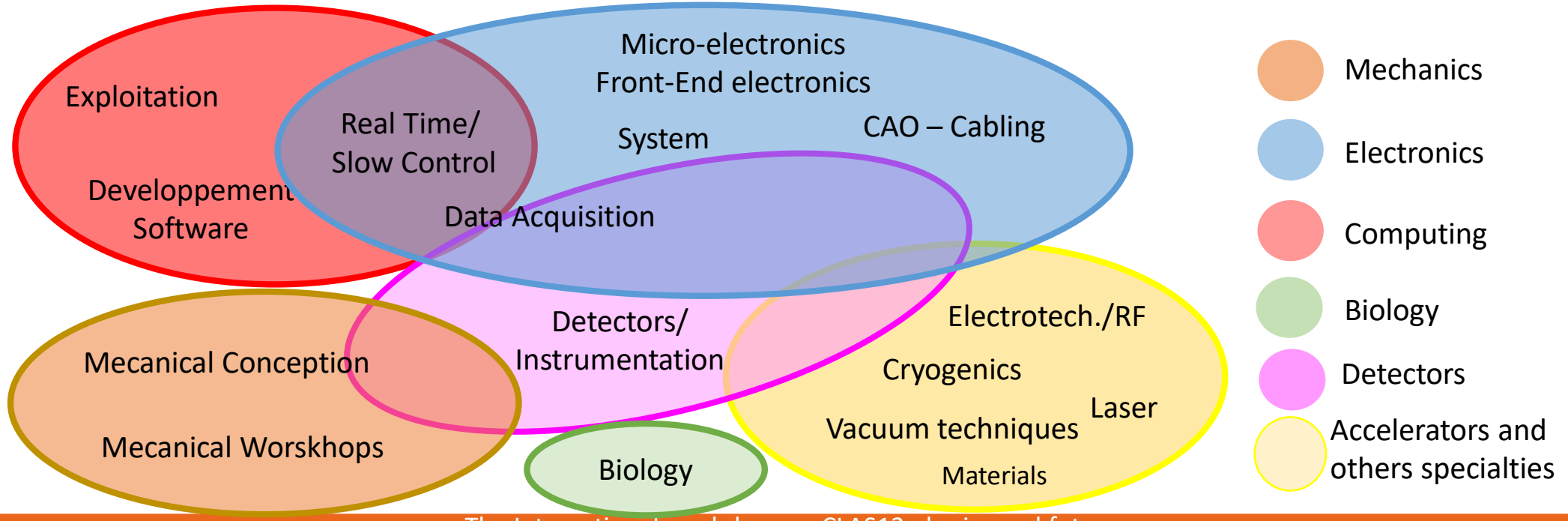
Services in accelerator Pole

- **RF**
- **Cryogenics**

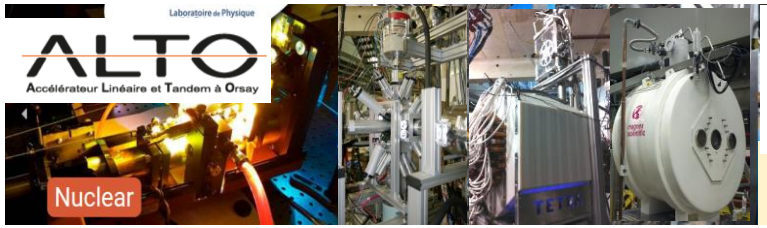
~30 staff members

Technical staff with technical skills/expertise
essential pillars for the laboratory to design, draw and build instruments.

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



IJClab in a nutshell – IV : The Platforms



- **15 MV Tandem** (from proton to aggregates)
- **electron linac** -> radioactive beams by photofission

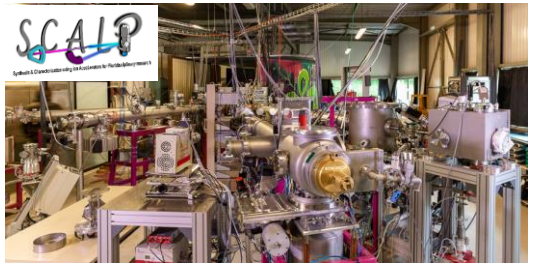
Nuclear, Health physics, Irradiation

Opened to external users

Several MeV protons, multicharged atomic ions, gold molecules and nanoparticles

Nuclear/A2C, Health physics, Irradiation

Opened to external users



Ion irradiation / implantation and *in situ* characterization techniques (TEM, IBA)

Energy, nuclear materials, Health physics, Irradiation physics and chemistry

Opened to external users

IJClab in a nutshell – V : The Platforms

Semiconductor Platform :
Silicon Detector Characterisation/Production

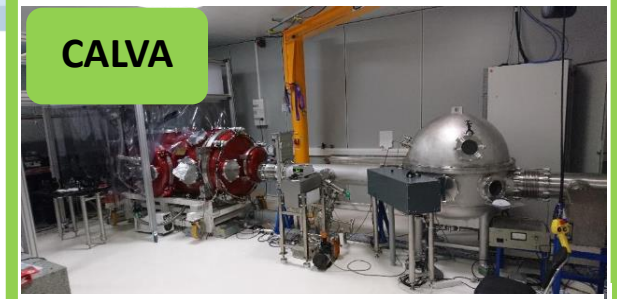
VIRTUAL DATA
Advanced computing resources infrastructure
Grid / Cloud

Health research themes

PIMPA
Plateforme d'imagerie Multiphotonique du Petit Animal
non linear optical biphotonique imaging

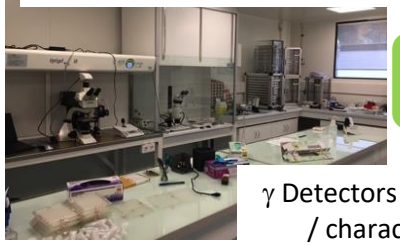
A2C Research themes

CALVA



Cavity locking/Squeezing for VIRGO and ET

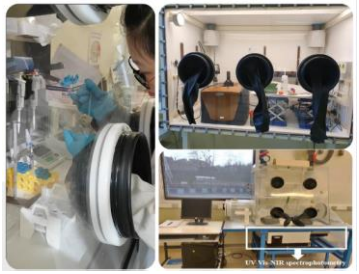
Micrometeorite Preparation/analysis



Myrtho

γ Detectors development / characterization

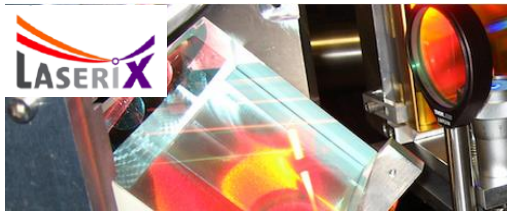
Radiochemistry laboratory
Actinides - Bat 107



Accelerators research themes/technologies

Opening to Materials, atomic physics, detectors

SUPRATECH
R&D on the superconducting cavities (prepare, package, assemble & testof the superconducting RF cavities).



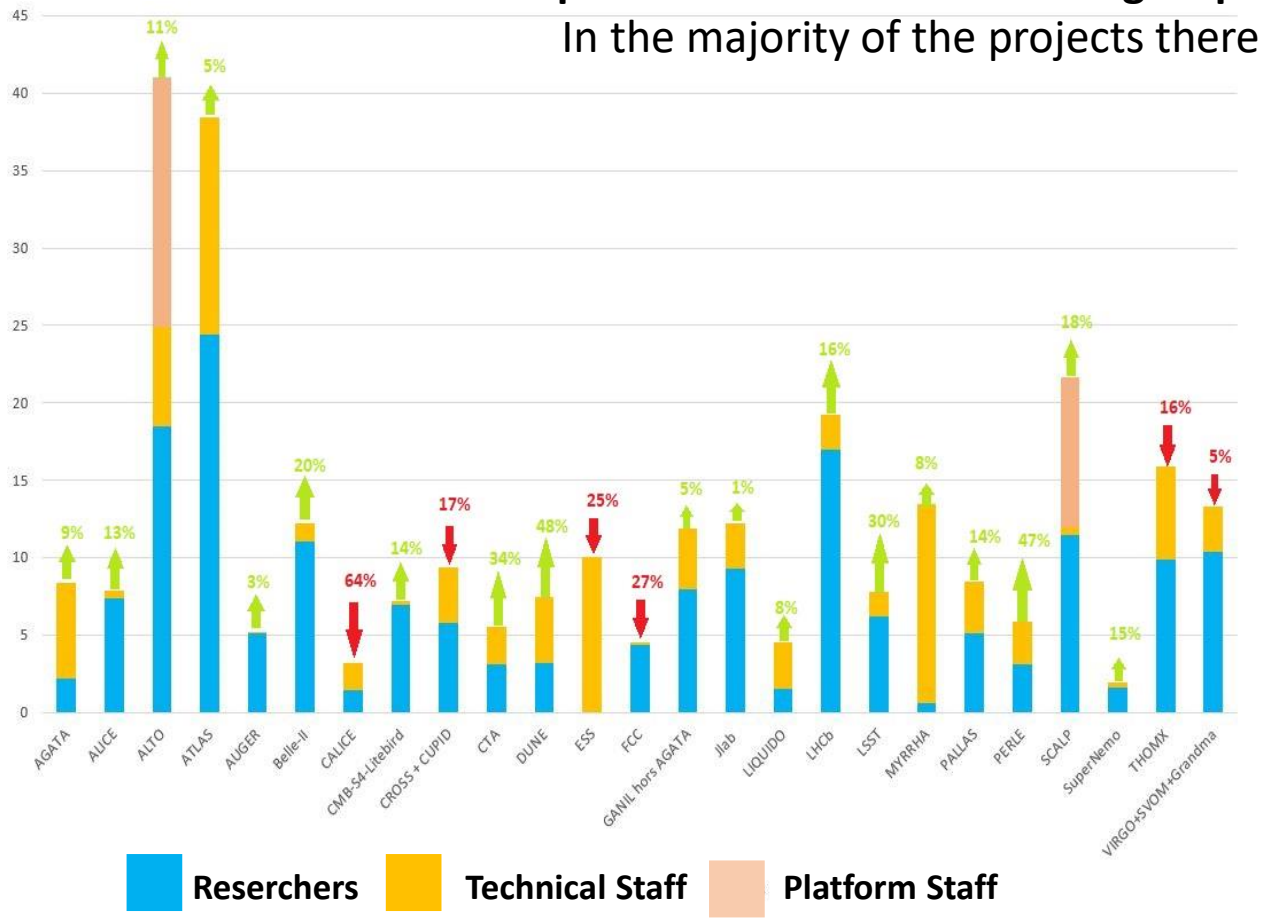
LaseriX
coherent, intense, brief (50fs to 10 ps) **sources in near-infrared** (800nm) **and EUV** (30 to 90 eV)

Vide et Surfaces
In construction

Large Project at IJCLab on PHE, Nuclear, A2C, Accelerator Physics

Implications of IJCLab in the largest projects (most with increasing forces)

In the majority of the projects there is a strong technical implications



	Some comments/example
ATLAS	-National Scientific Leader
AGATA	-National Technical Leader
ALTO	-National Platforms/leaders most exp.
Belle II	-Spokesperson
CALICE	-Spokeperson
DUNE	-National Technical Leader
ESS	-National responsibility with IRFU
JLab	-CLAS12 Spokesperson
LiquidO	-Spokesperson
LHCb	-Physics Coordinator, Deputy spokeperson
MyRRHA	-National responsibility with IRFU
PERLE	-International Technical coordination
AstroGam	-CoPI M7 Call
EUROLABS	- Responsable National
NEWGAIN	- Coordinateur National
LiteBIRD	- Coordinateur National

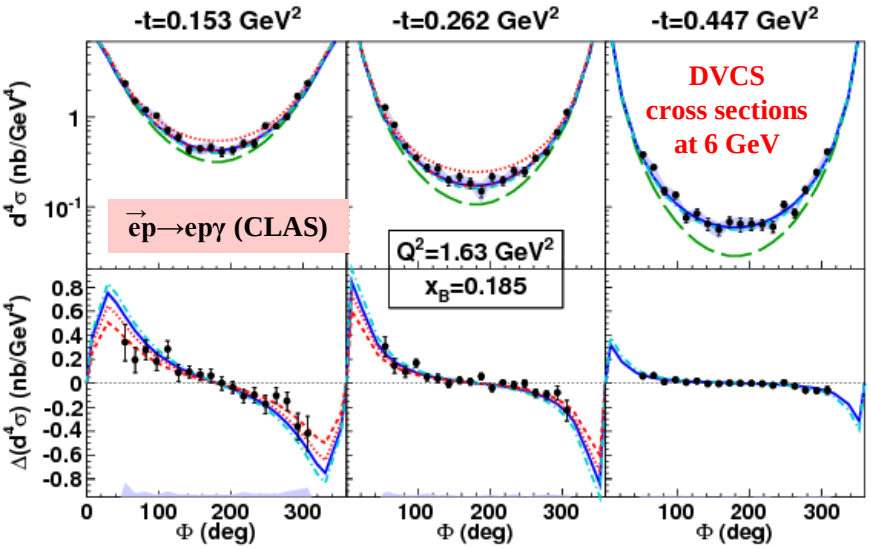
IJCLab has been created for :

- **Contributing to projects at all stages**: proposal, design, construction, operation, data analysis, theory
- **Playing a major role in the conception, design and construction of current and future accelerators**.
- **Developing and operating research infrastructures and technological platforms** supporting these research areas as well as original research in health physics and energy
- **Promoting the development of new technologies for science for the benefit of society** and thus supporting national and European industrial competitiveness
- **Welcoming students that the laboratory trains through and for research** in the heart of a world-class academic environment.

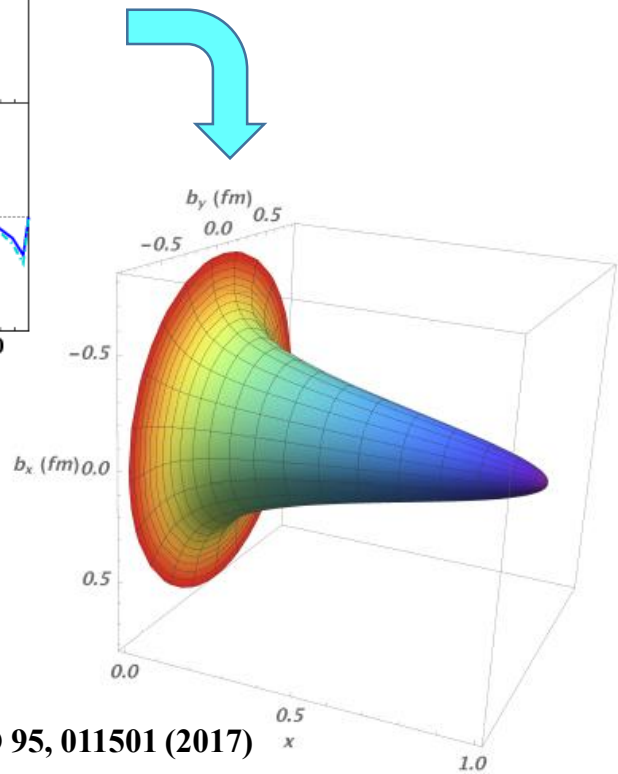
CLAS/CLAS12 at IJCLab: physics highlights

Study of nucleon structure, mainly via **Generalized Parton Distributions (GPDs):**

Correlations between position, momentum, and spin of partons in the nucleon → **nucleon tomography, quarks' angular momentum**,…



H.S. Jo et al., PRL 115, 212003 (2015)

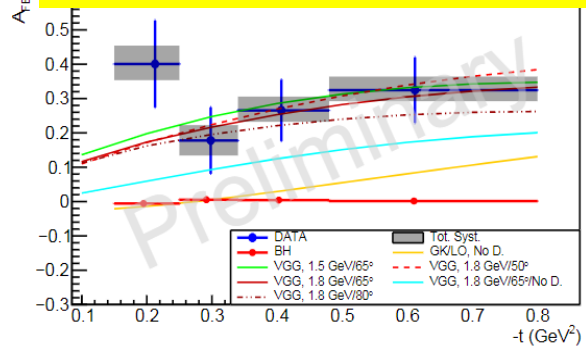


Measurements of several DVCS observables
→ Extraction of GPDs
→ **proton tomography**
(valence quarks are at the proton's core, sea quarks are at its periphery

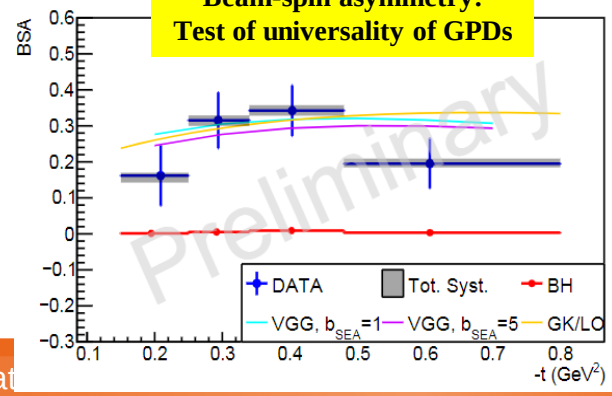
R. Dupré, M. Guidal, M. Vanderhaegen, Phys. Rev. D 95, 011501 (2017)

CLAS12@11 GeV: First measurement of **Timelike Compton Scattering,** P. Chatagnon et al. PRL 127, 262501 (2021)

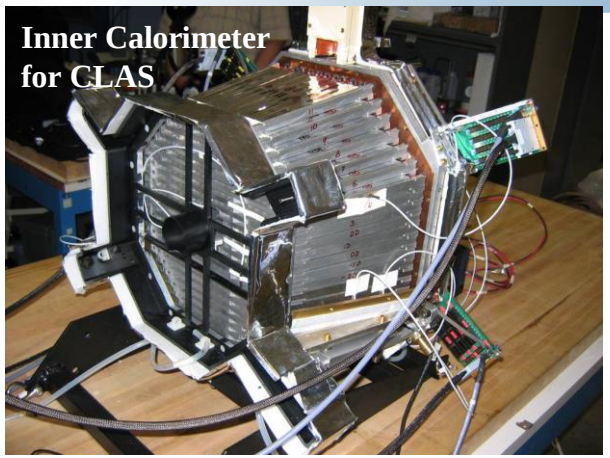
Forward-backward asymmetry:
Access to mechanical properties of the proton



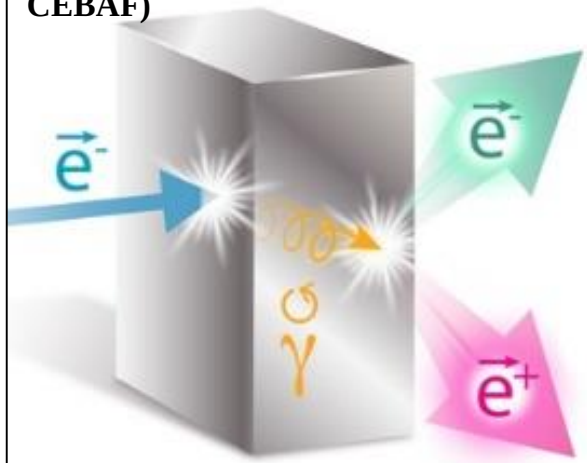
Beam-spin asymmetry:
Test of universality of GPDs

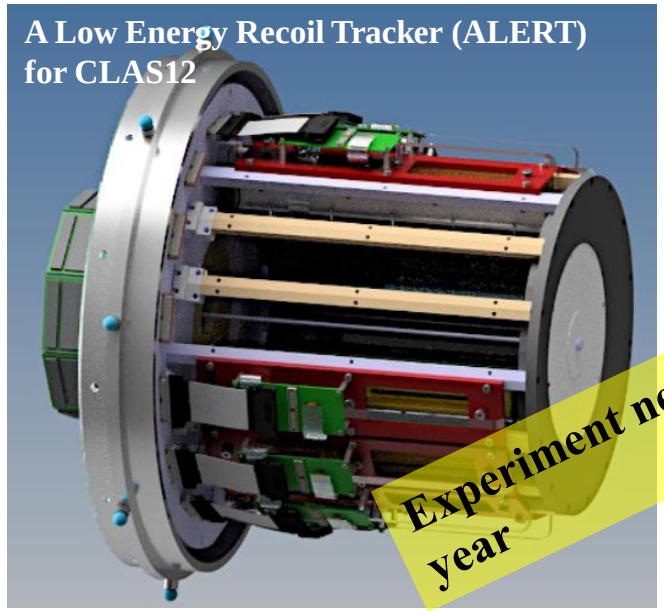


Recent and ongoing technical contributions of IJCLab to JLab



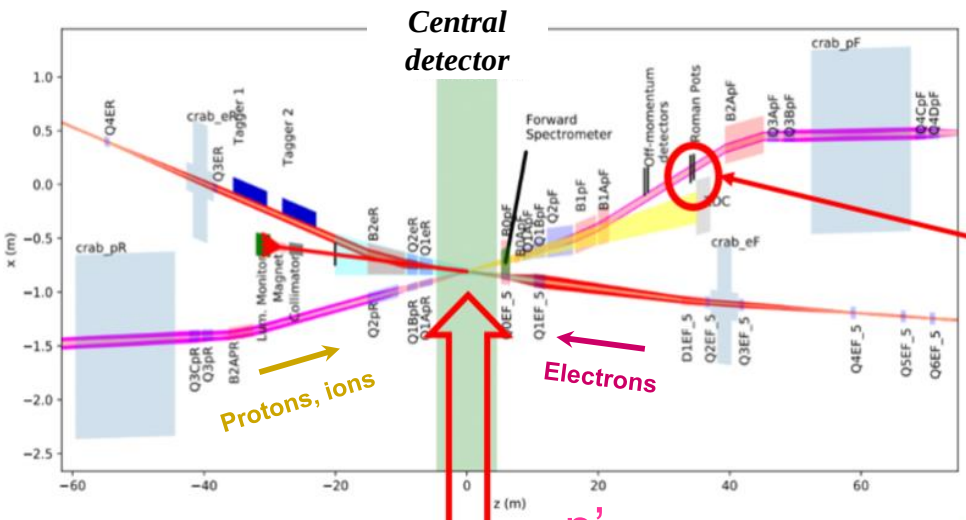
PePPo (polarized positron beam for CEBAF)

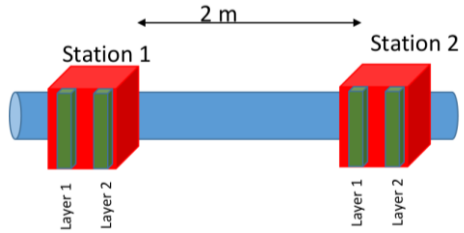




IJCLab interests at EIC: EMCal, Roman Pots

[Far-forward detectors]





Roman Pots

protons / ions

Momentum & Timing

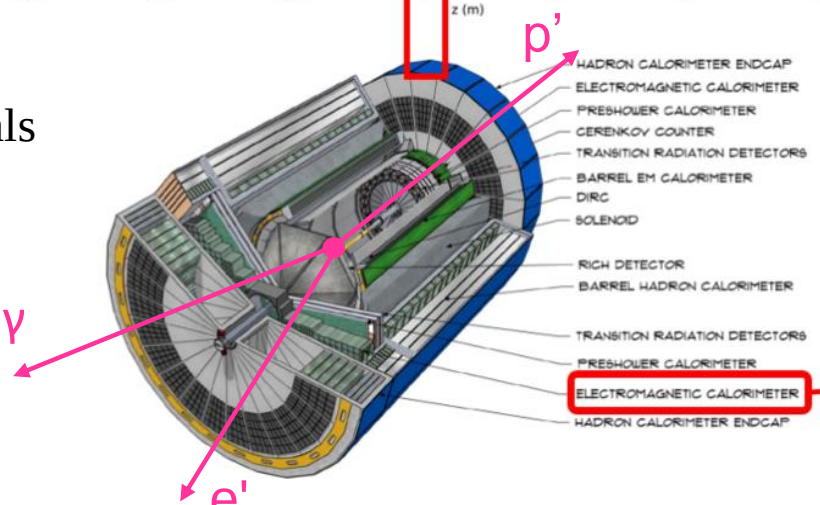
(25 – 30 m from IP)

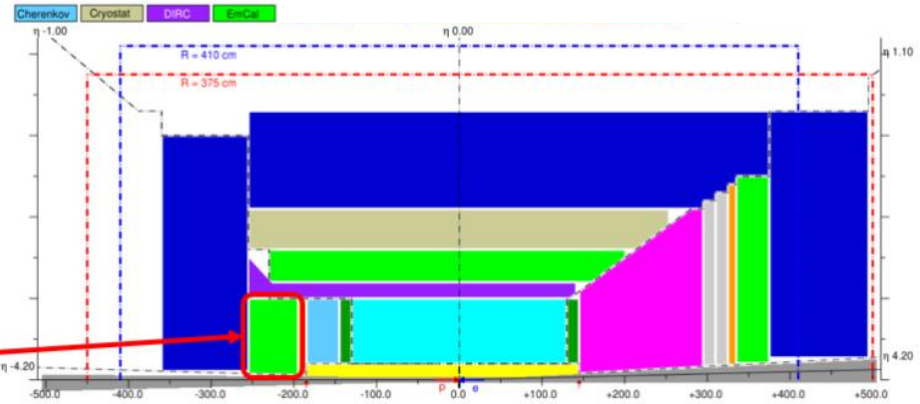
Technology :

- Ultra-fast silicon detectors (AC-LGADs)
- Synergy with the ATLAS group@IJCLab

Technology :

- PbWO4 crystals
- SiPM readout (or APDs)
- R&D ongoing





Calo. EM, e-End-Cap

Welcome to France

for this worskhop
that I hope will be
productive
and fruitfull