

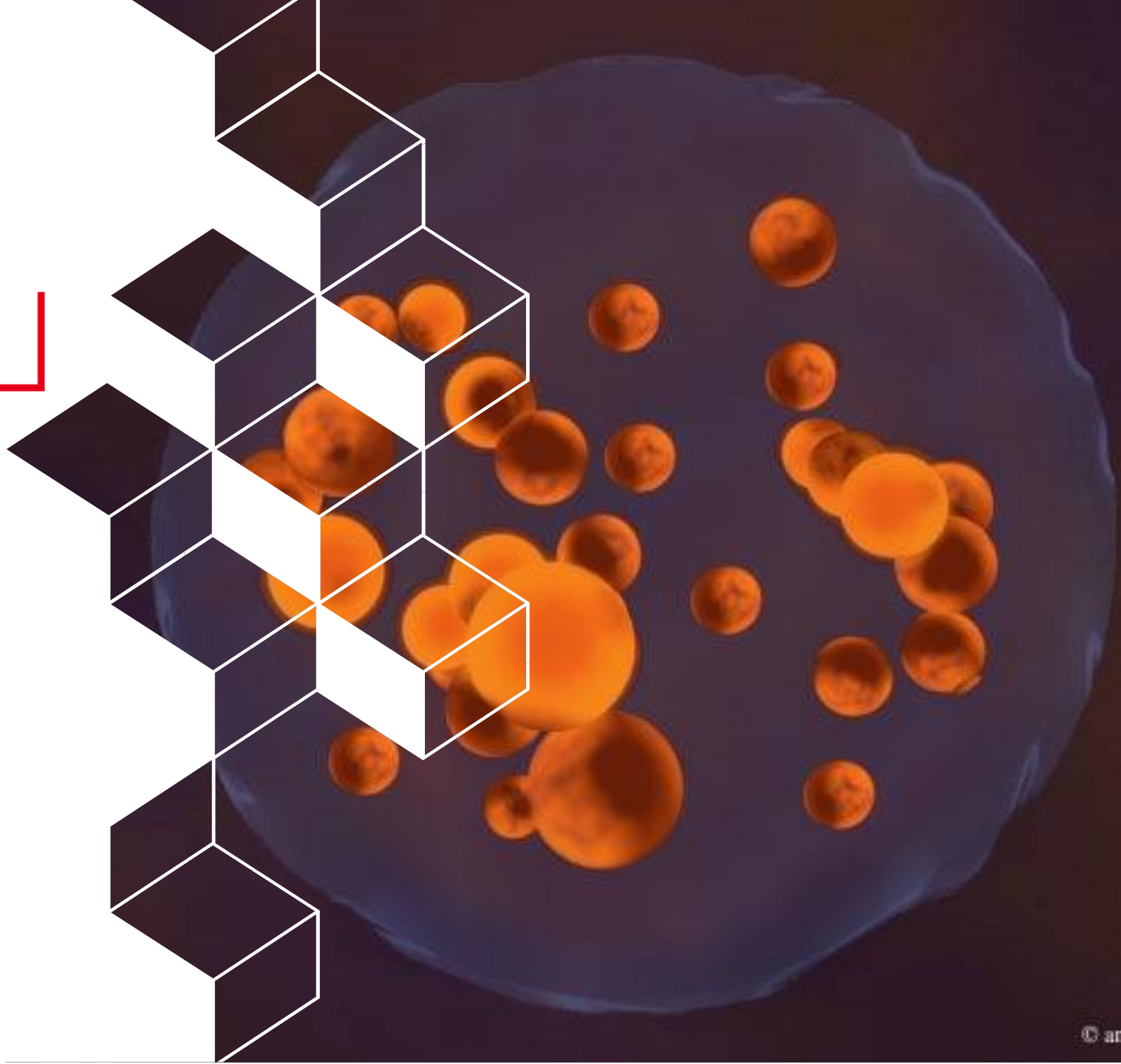


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Views from IRFU

Anna Corsi

Orsay, September 9th 2024



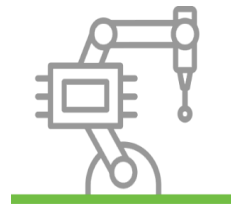
CEA at a glance (in 2021)



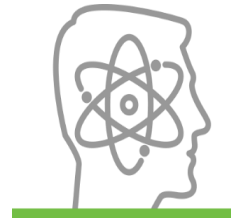
Defence and security



Nuclear and renewable energy



Technology research for industry



Fundamental research

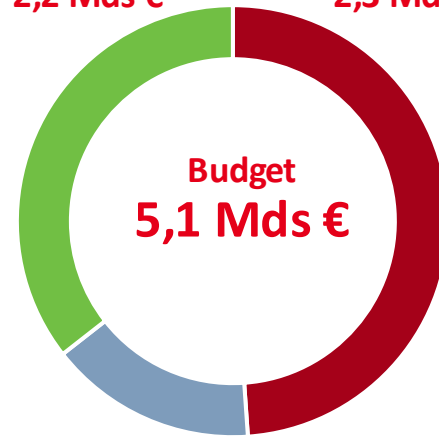
Staff: about 20000 persons

- 16500 permanent
- 1000 fixed-term
- 1500 PhD students
- 200 postdocs
- 1000 apprentices

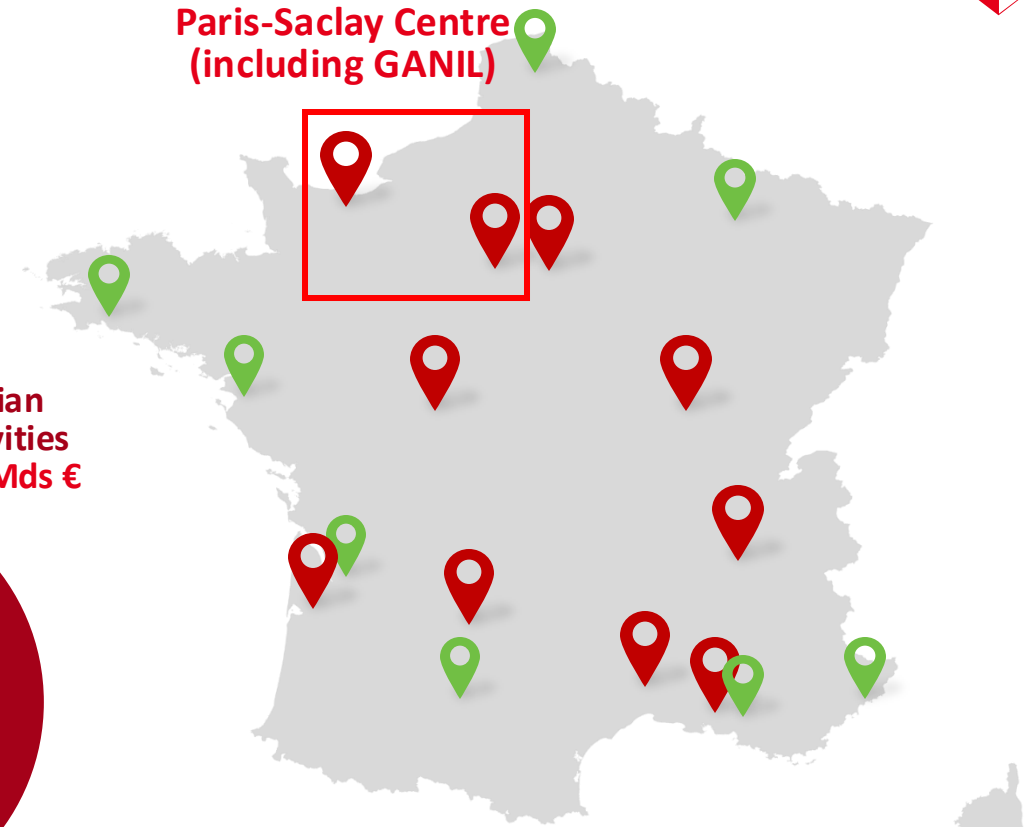


Military applications
2,2 Mds €

Civilian activities
2,3 Mds €



Decommissioning-remediation
0,6 Md€



9 centres

7 regional platforms for technology transfer

Science: about 5000 publications/year

- 65% international copublications
- 45% in fundamental research





**Fundamental
Research division**

Institute of research into the
fundamental laws of the Universe

IRFU

Head: Franck Sabatié

Accelerator, cryogenics and
magnetism
DACM

Astrophysics
DAp

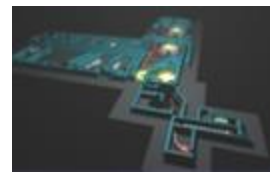
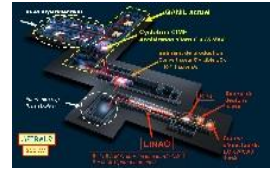
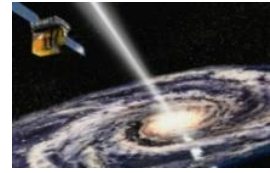
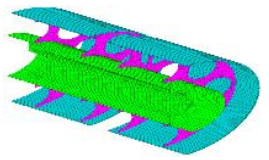
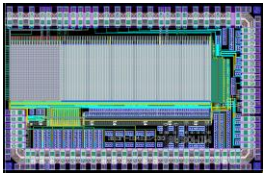
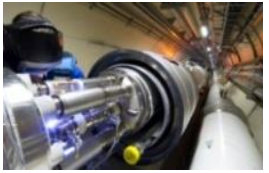
Electronics, detectors and
computing
DEDIP

Nuclear physics
DPhN

System engineering
DIS

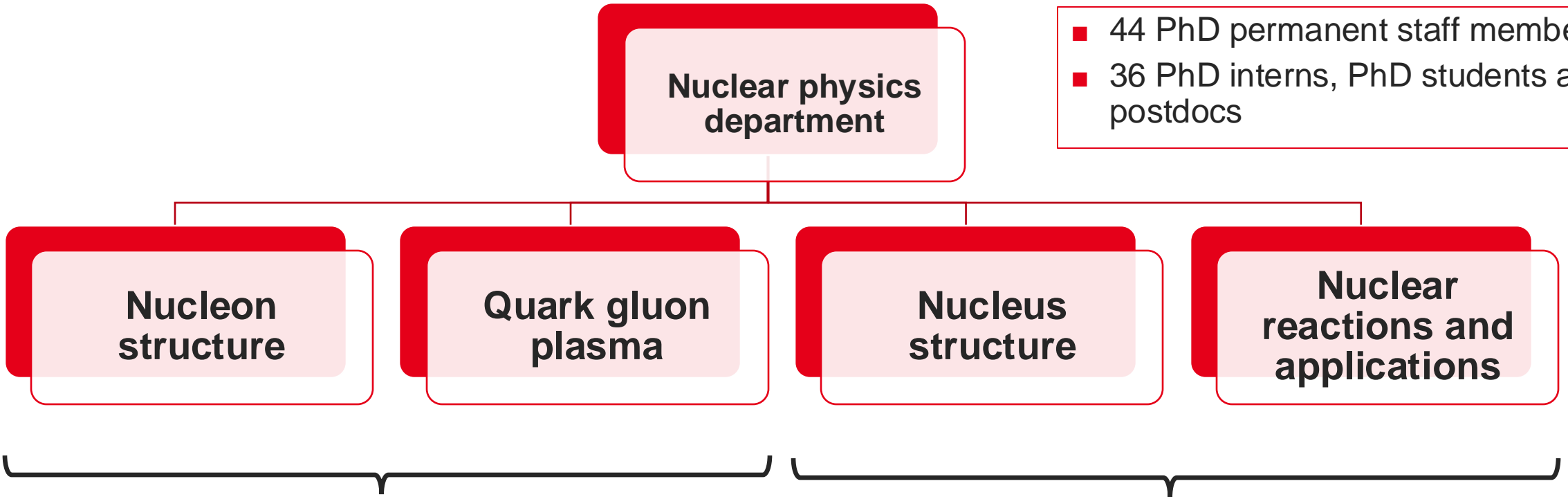
Particle physics
DPhP

Grand accélérateur national d'ions
lourds
GANIL



- 670 permanent staff members
- 94 PhD students
- 44 postdocs

Nuclear physics, from quarks to nuclei



- 44 PhD permanent staff members
- 36 PhD interns, PhD students and postdocs

Cold and hot QCD

Low energy nuclear physics

Theory

- Model building
- Phenomenology
- Computing codes

Experiments

- Detector R&D
- Design and data taking
- Data analysis

Applications

- Nuclear data evaluation
- Compact neutron sources
- Beyond nuclear physics: neutrinos and gravitation

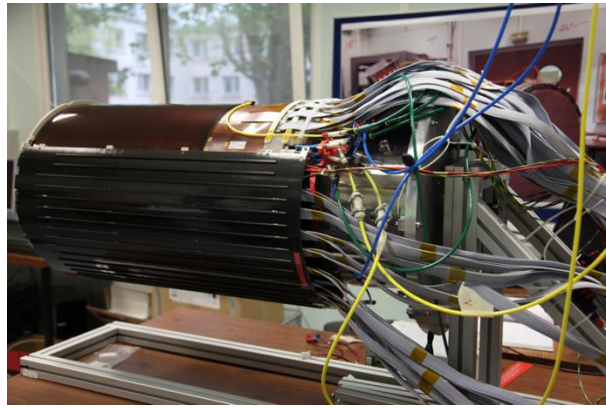
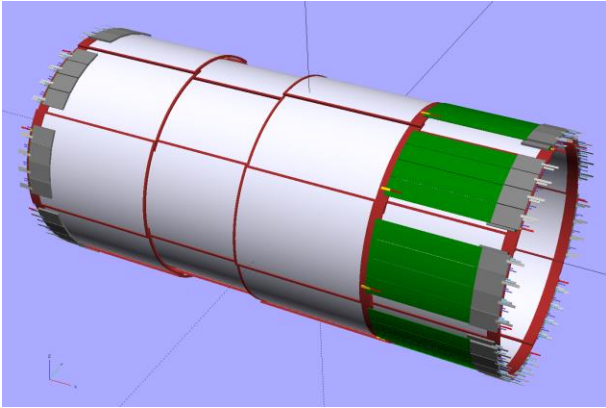
CEA Saclay in EIC

Long history of CEA Saclay interest in EIC

- INT report on the joint BNL/INT/Jlab program on the science case for an EIC (2011)
- Involvement in the writing of the EIC White Paper (2014)
- Co-organization of the 6th POETIC conference in Palaiseau (2015)
- Co-organization (with IJCLab) of the 2019 EICUG meeting in Paris
- Submission of an EoI in 2020
- Involvement in the EICUG (Charter Committee)
- EIC Yellow Report and Detector Proposal
 - Convenership of several working groups
 - Strong involvement in the ATHENA detector proposal
 - Development of an event generator for DVCS and DVMP processes from the PARTONS software



CEA Saclay in EIC and ePIC at a glance



Micromegas barrel layer for ePIC

- Low material budget Micromegas 2D detectors.
- Based on the technology developed for the CLAS12 experiment at Jlab.

ASIC for MPGD readout

- New versatile ASIC for Micromegas and μ RWELL readout.
- Partnership with Sao Paulo University.
- Close synergy with the detector development.

ASIC for AC-LGAD

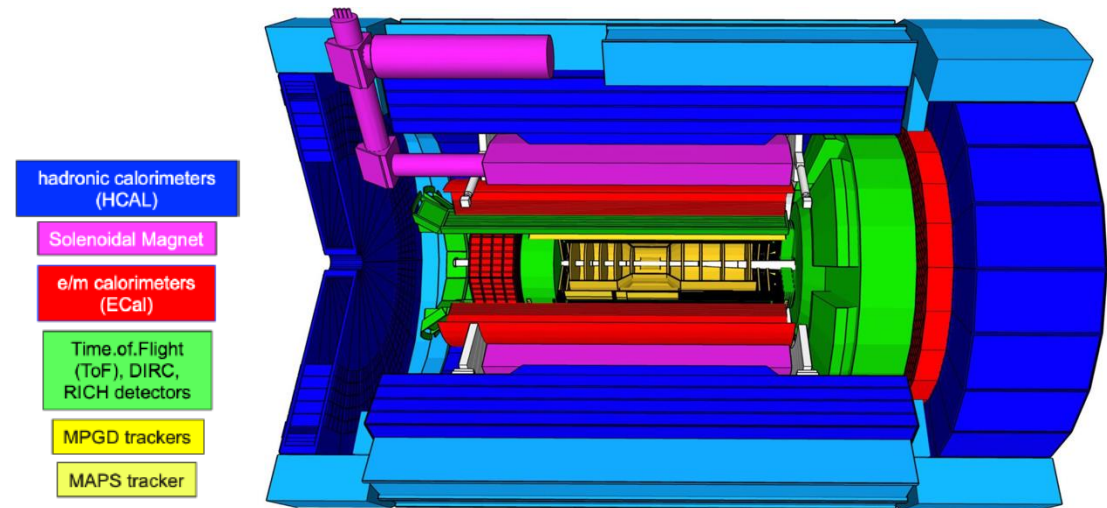
- Collaboration: IJCLab, OMEGA, CEA, BNL.

The MARCO solenoid for ePIC

- The design of a new superconducting 1.7 T solenoid.
- Collaborative effort with JLab and BNL.

Spin rotator solenoids for the interaction region

- Design of 8 superconducting 8.5 T solenoids for electron spin rotation.
- Challenging spatial and radiation constraints.
- In collaboration with BNL.



Expertise in Micromegas design and production

Synergy with DEDIP for development and testing

MINOS TPC

- 8.5 cm radius, low material budget

ATLAS NWS

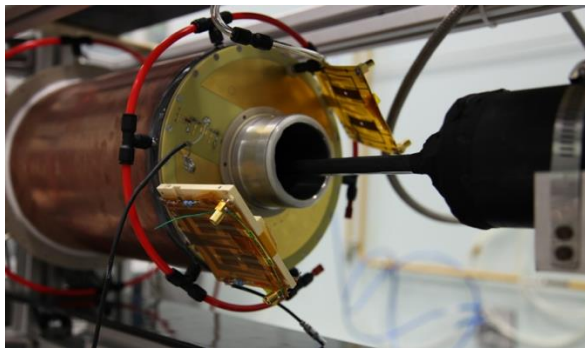
- 392m² out of 1200m² of resistive Micromegas produced at Saclay.
- mechanical precision of 100μm.

CLAS12 BMT

- ~4m² of resistive curved Micromegas.
- Taking data since 2017.

sPHENIX TPOT

- 10 double sided Micromegas modules for the TPC calibration.
- Delivered to BNL in about 9 months, from conception to shipment.



Minos TPC



CLAS12 BMT



TPOT modules in sPhenix

08/10/2024

SALSA : Versatile readout chip for MPGD

Motivations of the project

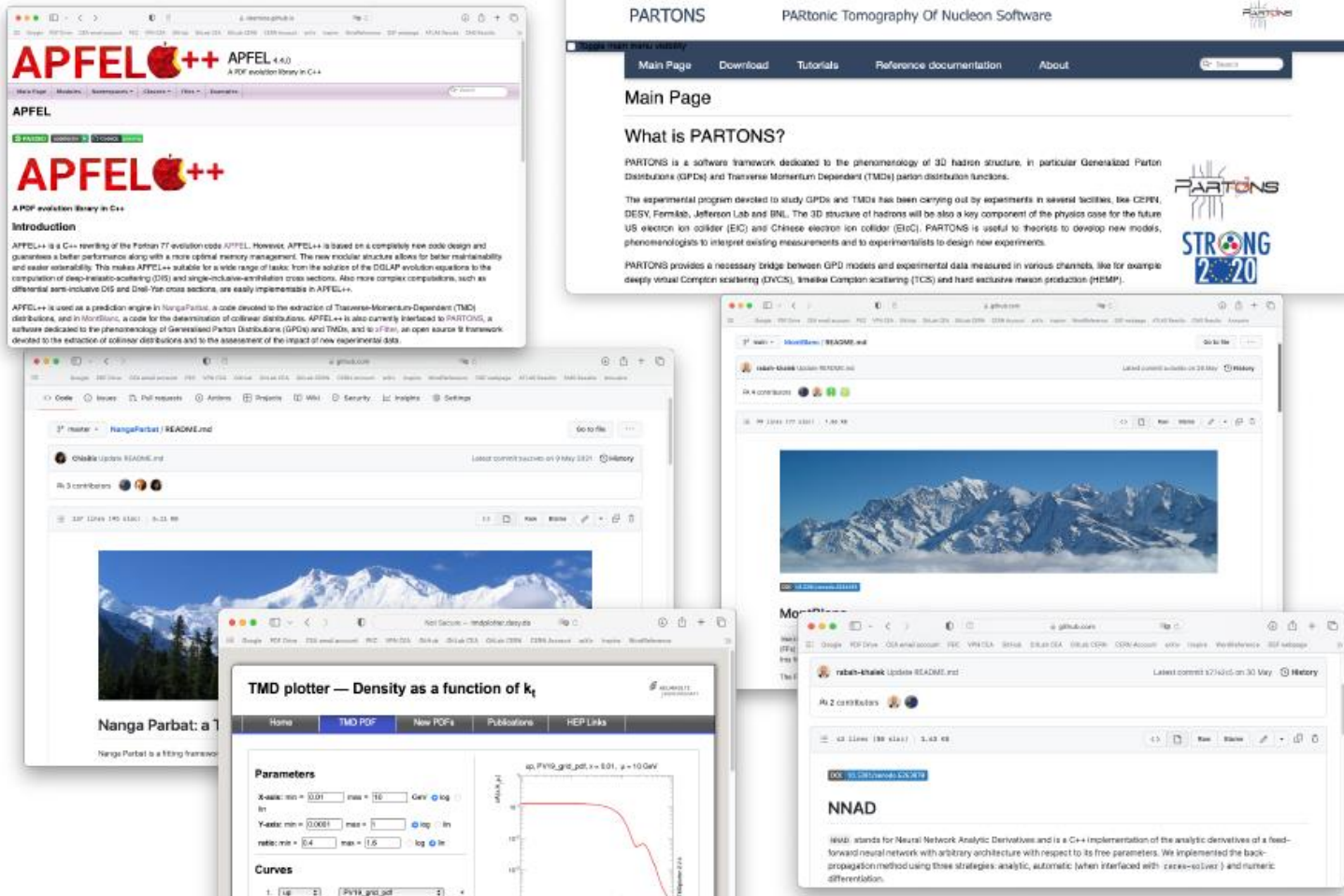
- New versatile multi-channel readout chip in the framework of the EIC project and beyond:
 - Adapted to streaming readout DAQ.
 - Different kinds of MPGD detectors: trackers, TPC, photon detectors, etc.
 - Different kinds of usage: physics readout, calibrations, detector tests, etc.
 - Possible further developments for other kinds of detectors (calorimeters, non-MPGD photon detectors) and/or specific constraints (for instance ps-level time resolutions).
- Large ranges in term of signal amplitudes, electrode capacitances, peaking times, signal rates.

Common initiative of Sao Paulo Universities and IRFU

- ANR grant in 2024

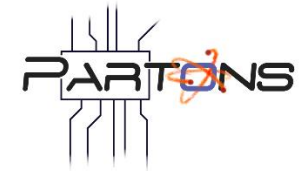


Joint theory effort: modeling and computing



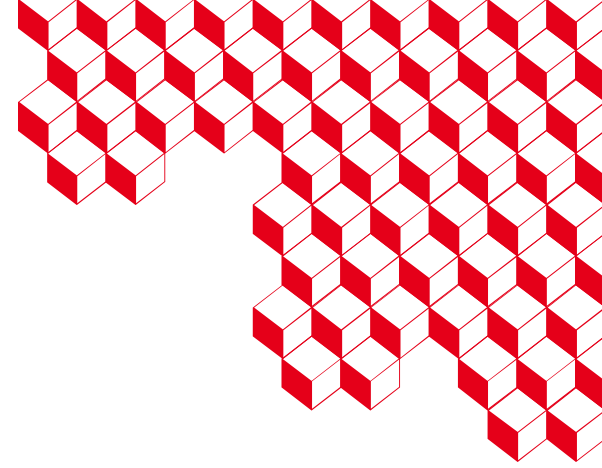
The PARTONS ecosystem

- Framework for 3D proton structure study (GPDs, TMDs, etc.):
 - Open-source codes.
 - Modular architecture.
 - Event generators.
- Adapted to various kinematic domains, from Jefferson Lab to EIC and LHC.





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Thank you!

Any questions?

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