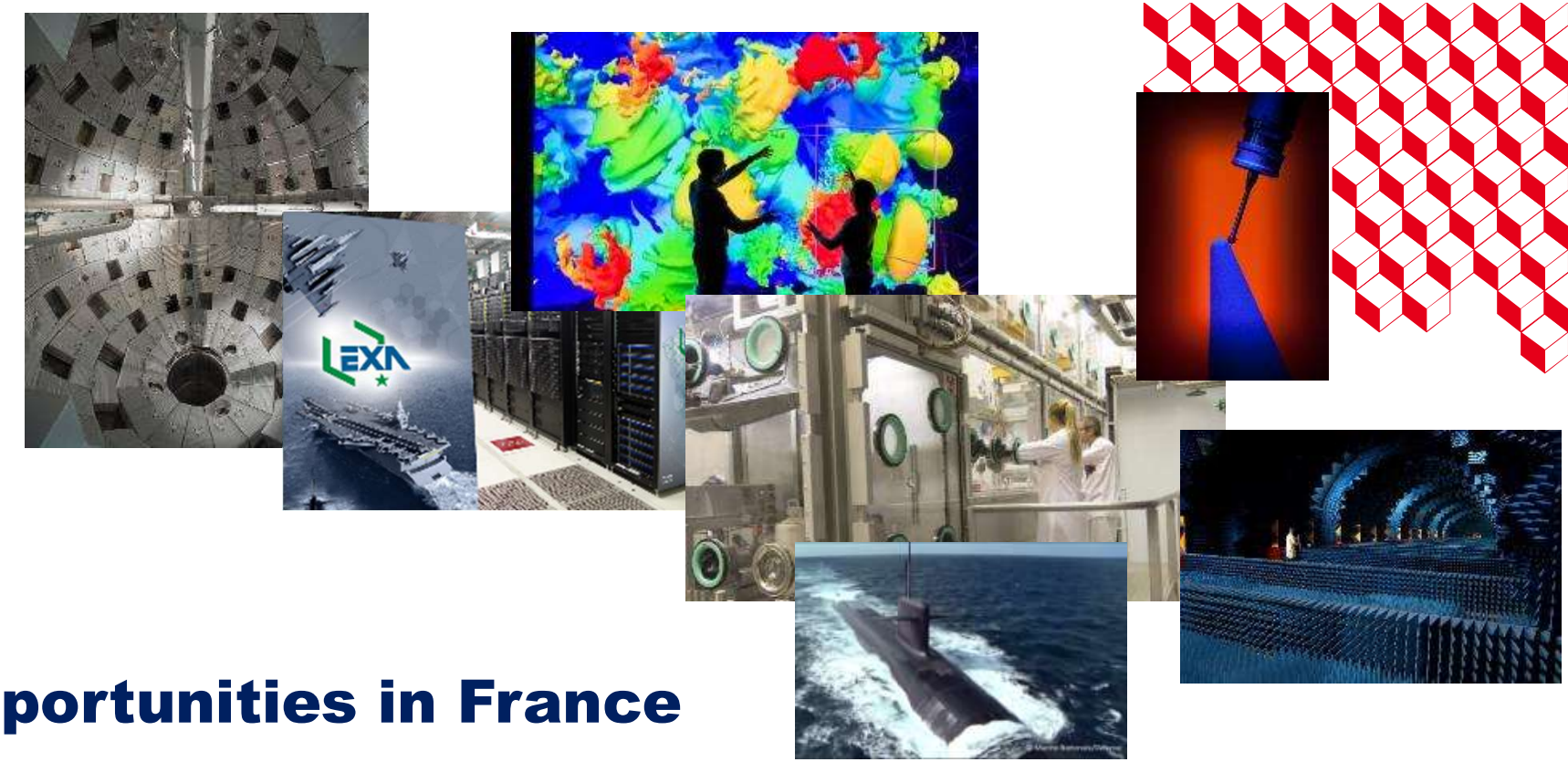


Postdoc Opportunities in France

Olivier VACUS, Scientific Director of the CEA's Military Applications Division

Stockpile Stewardship Academic Program Symposium

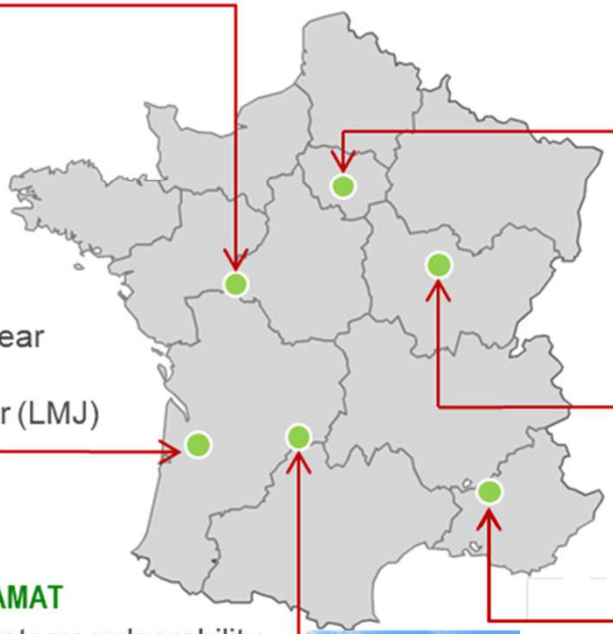
June 11th, 2025, Chicago

DAM centers in France …

LE RIPAULT
- Non-nuclear materials

DAM ÎLE-DE-FRANCE
- Physics package conception and guarantee
- Basic physics
- High performance computing
- Treaty monitoring
- Nuclear engineering

CESTA
- Architect of nuclear warheads
- Megajoule Laser (LMJ)



VALDUC
- Nuclear materials
- EPURE

GRAMAT
- Systems vulnerability and conventional weapons efficiency

INBS PN CADARACHE

(no student)

... to enjoy a postdoc experience

CEA and CEA's Military Applications Division

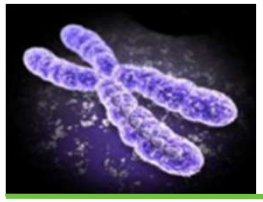
CEA

Defense & Security

Nuclear and renewable energies

Technological research for industry

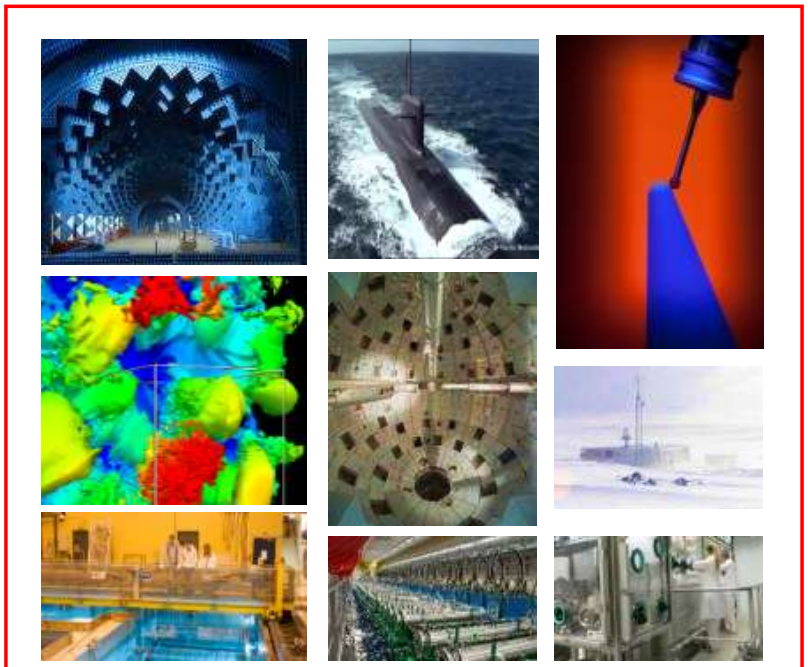
Fundamental research (physical sciences and life sciences)



4 Operational Divisions
9 Centers
9 Administration Divisions

17 100 staff

DAM



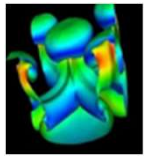
5 Program Directorates
5 Operational Directorates (Centers)
5 Administration Directorates

4 990 staff

CEA/DAM missions

« CONTRACTING AUTHORITY »

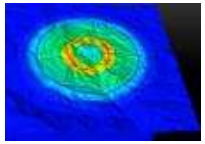
NUCLEAR WARHEADS




NUCLEAR PROPULSION


NUCLEAR MATERIALS
(weapons and nuclear propulsion)






SECURITY AND NON-PROLIFERATION OF NUCLEAR WEAPONS


CONVENTIONAL DEFENSE


TECHNOLOGY TRANSFER IN DEFENSE AND INDUSTRY

CEA/DAM Organization

« CONTRACTING AUTHORITY »

NUCLEAR WARHEADS

NUCLEAR PROPULSION

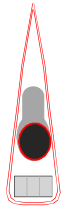
NUCLEAR MATERIALS

SECURITY AND NON-PROLIFERATION

CONVENTIONAL DEFENSE

« PRIME CONTRACTOR » : warheads & materials recycling

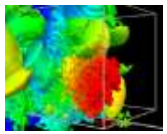
A goal of sovereignty



Non-nuclear materials

LE RIPAULT

Physics **package** design and guarantee



DAM ÎLE-DE-FRANCE

Nuclear materials

VALDUC

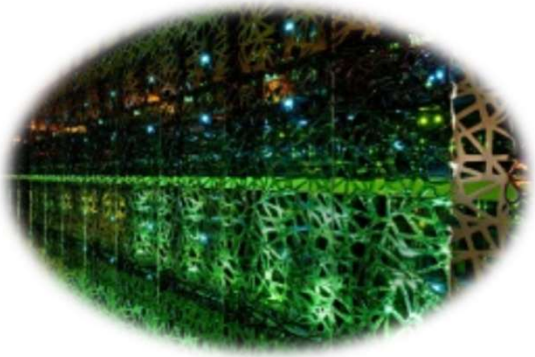
Architect of **Nuclear warheads**

CESTA

GRAMAT

INBS-PN CADARACHE

Students at CEA's DAM



5000 employees

56% researchers/engineers

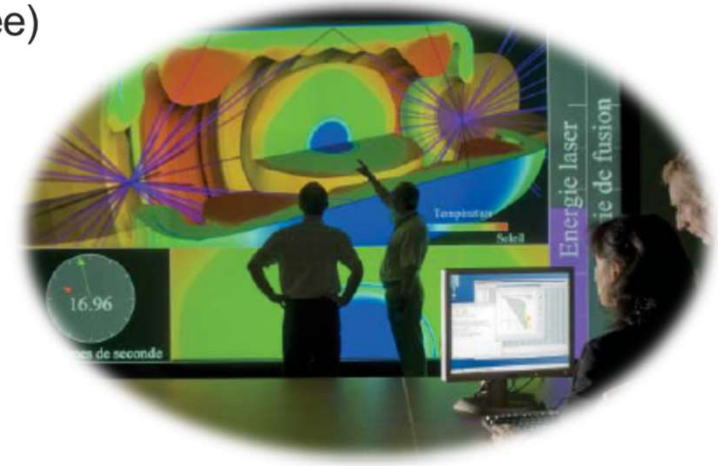
- 35% Ph D
- 65% engineer

700 students

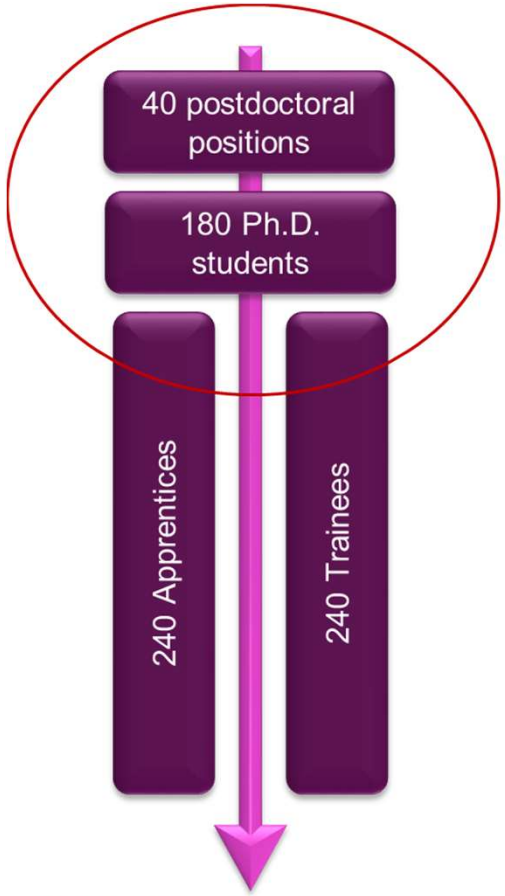
Apprentices and trainees
(From high school to master's degree)

Doctoral students

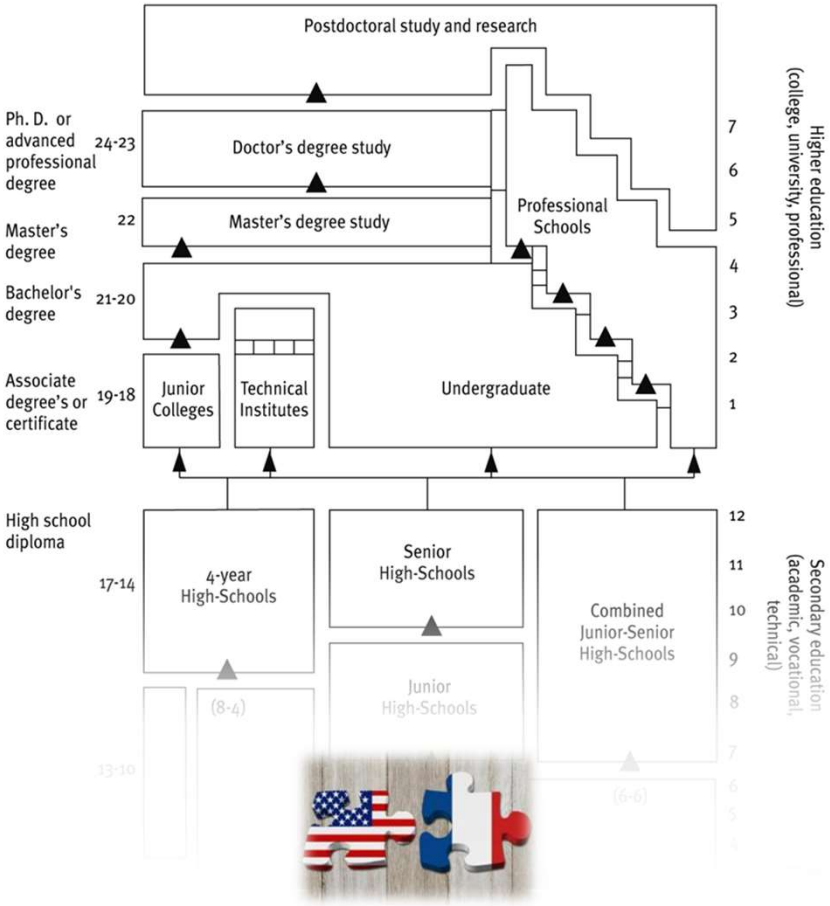
Postdoctoral students



Students working and students hired per year at DAM



700 Students
working at CEA's DAM



250 students hired

DAM centers

LE RIPAULT
- Non-nuclear materials

DAM ÎLE-DE-FRANCE
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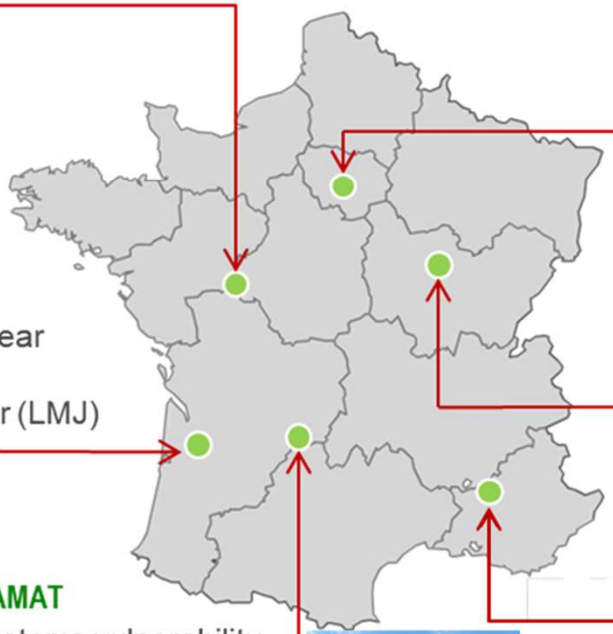

VALDUC
- Nuclear materials
- EPURE

GRAMAT
- Systems vulnerability and conventional weapons efficiency

INBS PN CADARACHE

(no student)

French academic partners: LULI, CELIA, GANIL

LE RIPAULT
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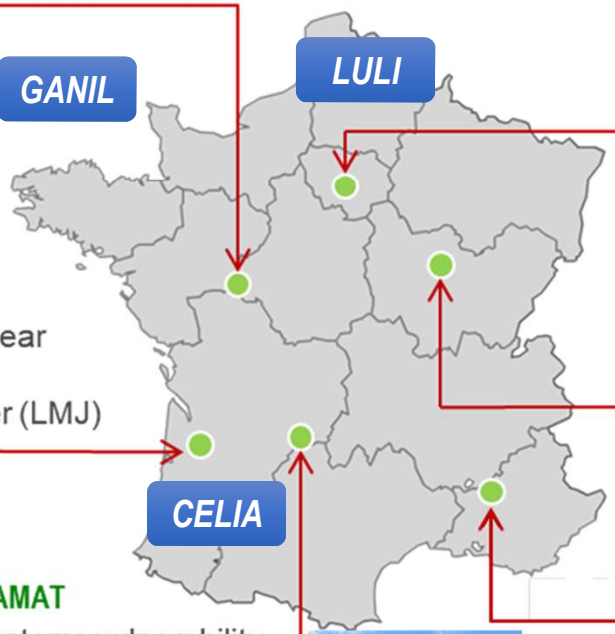


VALDUC
- Nuclear materials
- EPURE

GRAMAT
- Systems vulnerability and conventional weapons efficiency

INBS PN CADARACHE

(no student)

LULI stands for « LAboratoire pour l'Utilisation des Lasers Intenses »

LULI is a plasma physics research center operating three Laser facilities

LULI2000 dedicated ot the study of High Energy Density Science

- kJ/ns laser coupled to a 60J/ps laser
- Facility open to the international community via a call for proposal`
- Member of the European laserlab network

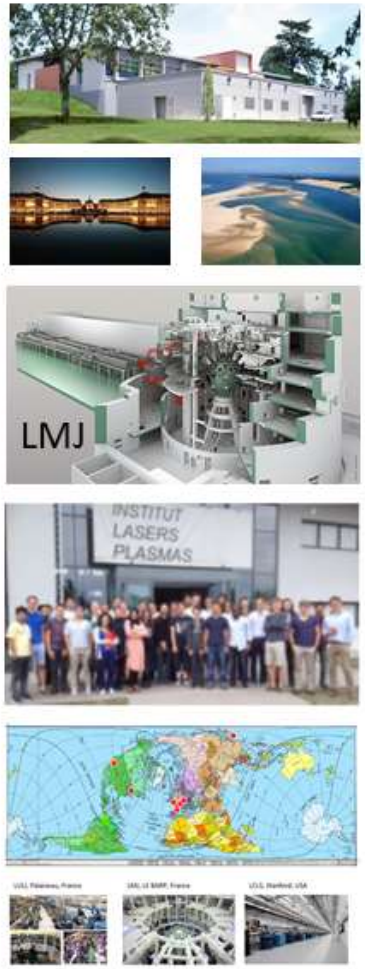
Research Infrastructure Apollon dedicated to the extreme light study

- Multi PW, Multi beams
- Facility open to the international community via a call for proposal
- Member of the European laserlab network

Hera platform dedicated to Material study

- 200J x2 ns laser, a shot every 20', cm size focal spot
- Industrial and academic access via beam time purchase

CELIA stands for “Centres d’études des lasers intenses et applications”



CELIA : a research center on laser/matter interaction in Extreme regimes

- Located near Bordeaux and close to breathtaking seaside landscapes.
- About 90 people with 33 permanent researchers and 30 PhDs and Post-docs.
- About 70 publications / year, numerous National and EU grants awarded to CELIA’s physicists

- **Founded for providing an academic support to the nearby MegaJoule Laser facility**

- **Strong involvement in student training at Bordeaux University :**
  - ✓ Bachelor and Master degrees in laser technology
  - ✓ Master degree in Physics with EUR Light S&T
  - ✓ National gathering in Bordeaux of Master formations in Laser Plasma Physics

- **Strong involvement in industrial transfer :**
  - ✓ 5 start-ups created incl. Amplitude Systems
  - ✓ 1 Labcom, several industrial maturation projects granted, about 3 patents / year

Amplitude

- **Strong involvement in international collaborations :**
  - ✓ MOU’s, IRP LUMAQ, Weizmann-CNRS partnership, Eurofusion projects, PI of experimental campaigns on large scale facilities (NIF, LMJ, LLE, ILE, ELI, GSI, LULI, CLPU, LCLS, EU-XFEL,…)

CELIA stands for "Centres d'études des lasers

NOBEL PRIZE IN PHYSICS (2023) awarded to ANNE L'HUILLIER and PIERRE AGOSTINI for their work on attosecond laser pulses at CEA.

- **Four main scientific axes :**
  - ✓ Physics and technology of high average power, intense, u
  - ✓ Ultra-high repetition rate laser **processing** in burst mode
  - ✓ **Attoscience** and Ultra-fast processes (as–fs) in atoms, molecules and condensed matter
  - ✓ HDE and UHI **Plasma physics**: FCI, magnetized plasmas, Astrophysics, warm dense matter, particle acceleration
- **10 beamlines :** laser, XUV X-rays
- **In house code dev. capabilities :** TDSE, TDDFT, 3D Hydro-rad, PICs, ….
- **3 Platforms open to acess**

CELIA is a member of the European Laserlab network

Platform for UHI Physics : Plasma , HHG

ECLIPSE : 100 TW CPA, 800 nm
150 mJ - 30 fs @ 10 Hz
HCF P-compr. 10 mJ, 10 fs, 10 Hz
2 x 1.5 J, 30 fs, Contrast 10^9, 1 Hz

Platform for ultrafast processes study

AURORE : TW CPA, 800 nm
8 mJ - 25 fs @ 1 kHz
HCF P-compr 1 mJ, 7 fs

Platform for attochirality and TR photoemission

Blastbeat : 2x50 W, Yb, 1030 nm
2 X 300 µJ - 140 fs @ 0.17-2 MHz
HCF P-compr 515 nm, 100 µJ, <20 fs
Complex polarization

GANIL
“Grand Accélérateur National d'Ions Lourds”

GANIL cyclotrons and experimental equipement

EXOGAM

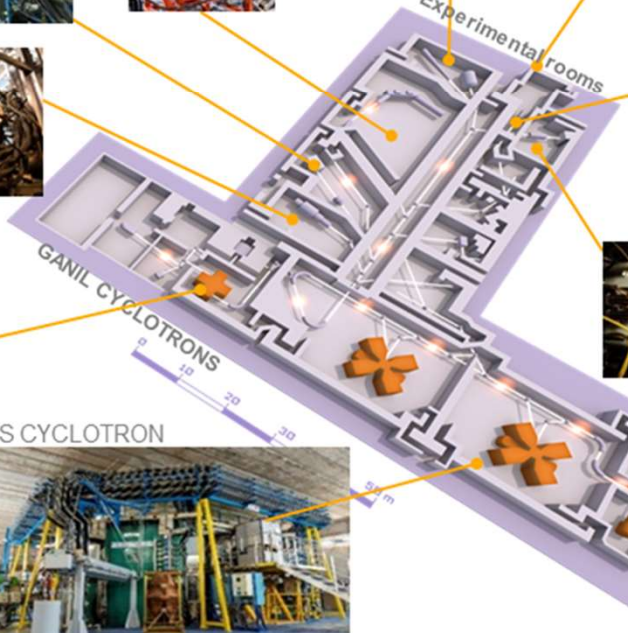
ACTAR TPC

Sample holder for irradiation

MUGAST

VAMOS

AGATA



LISE SPECTROMETER

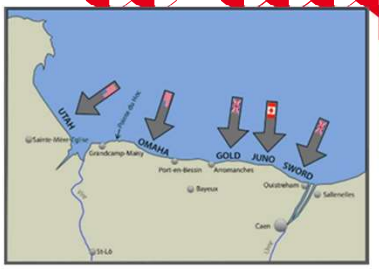
INDRA + FAZIA

CIME CYCLOTRON

CSS CYCLOTRON

ION SOURCES

GANIL spiral2
laboratoire commun CEA/DRF — CNRS/IN2P3



- Stable Beams : ^{12}C to U
- Energy : from <1 MeV up to 95MeV/nucleon
- Up to 4 experiments in parallel

- Exotic beams produced by heavy ion fragmentation
  - ➢ In flight with LISE spectrometer
  - ➢ With ISOL method with SPIRAL1 target-source system, postaccelerated with CIME cyclotron

- State of the art equipment
  - ➢ LISE spectrometer
  - ➢ VAMOS spectrometer
  - ➢ γ detection: EXOGAM, AGATA (2015-2021)
  - ➢ Charged particles: MUGAST, ACTAR TPC
  - ➢ Fragments: INDRA/FAZIA

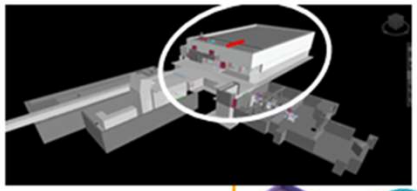
GANIL
“Grand Accélérateur National d'Ions Lourds”

SPIRAL2 LINAC and the new experimental rooms

Experimental room NFS
(Neutrons for Science)

Convertor room

Time of Flight room



Experimental room
DESIR
(Decay, Excitation
and Storage of
Radioactive Ions)

High intensity beams :
5 mA, 33 MeV protons
5 mA, 40 MeV deutons
1 mA, <14,5 MeV/A heavy ions

:ting Linear
LINAC)

Experimental room S3
(Superconducting
Separator Spectrometer)

First beams: end 2019
First NFS experiments: 2021
Commissioning S3: 2024
DESIR construction start: 2023

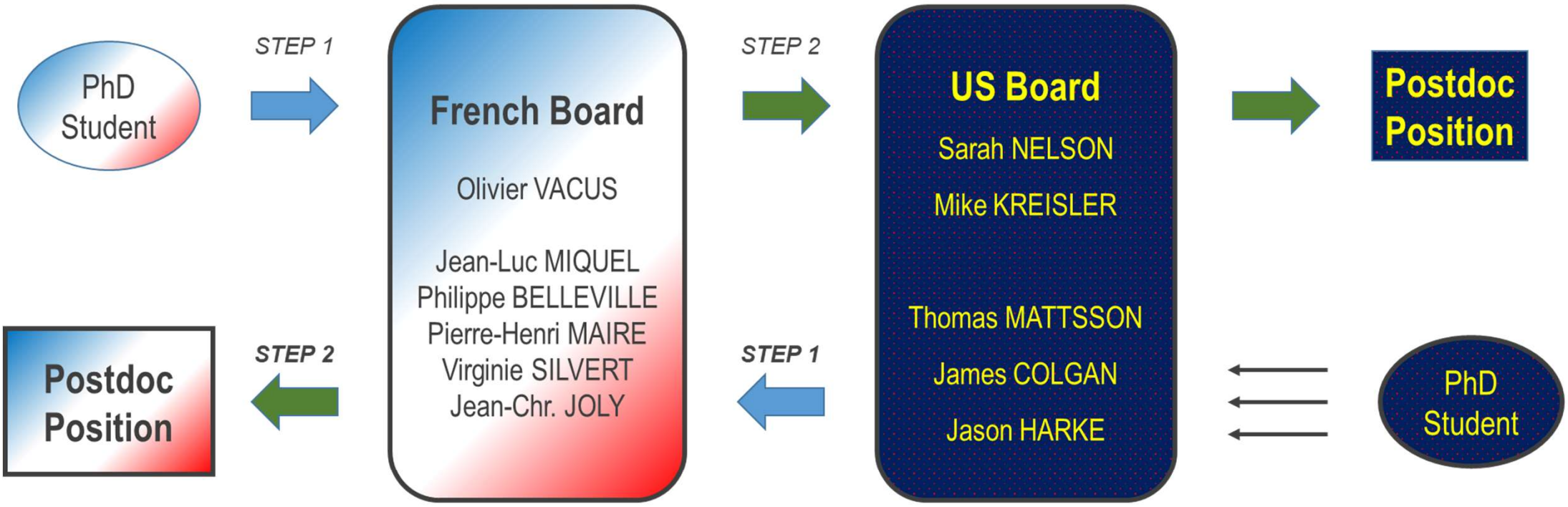
ION SOURCE

GANIL spiral2
laboratoire commun CEA/DRF CNRS/IN2P3

NEWGAIN
NEW GANIL INJECTOR

Eric Bauge program: how to get a postdoc position?

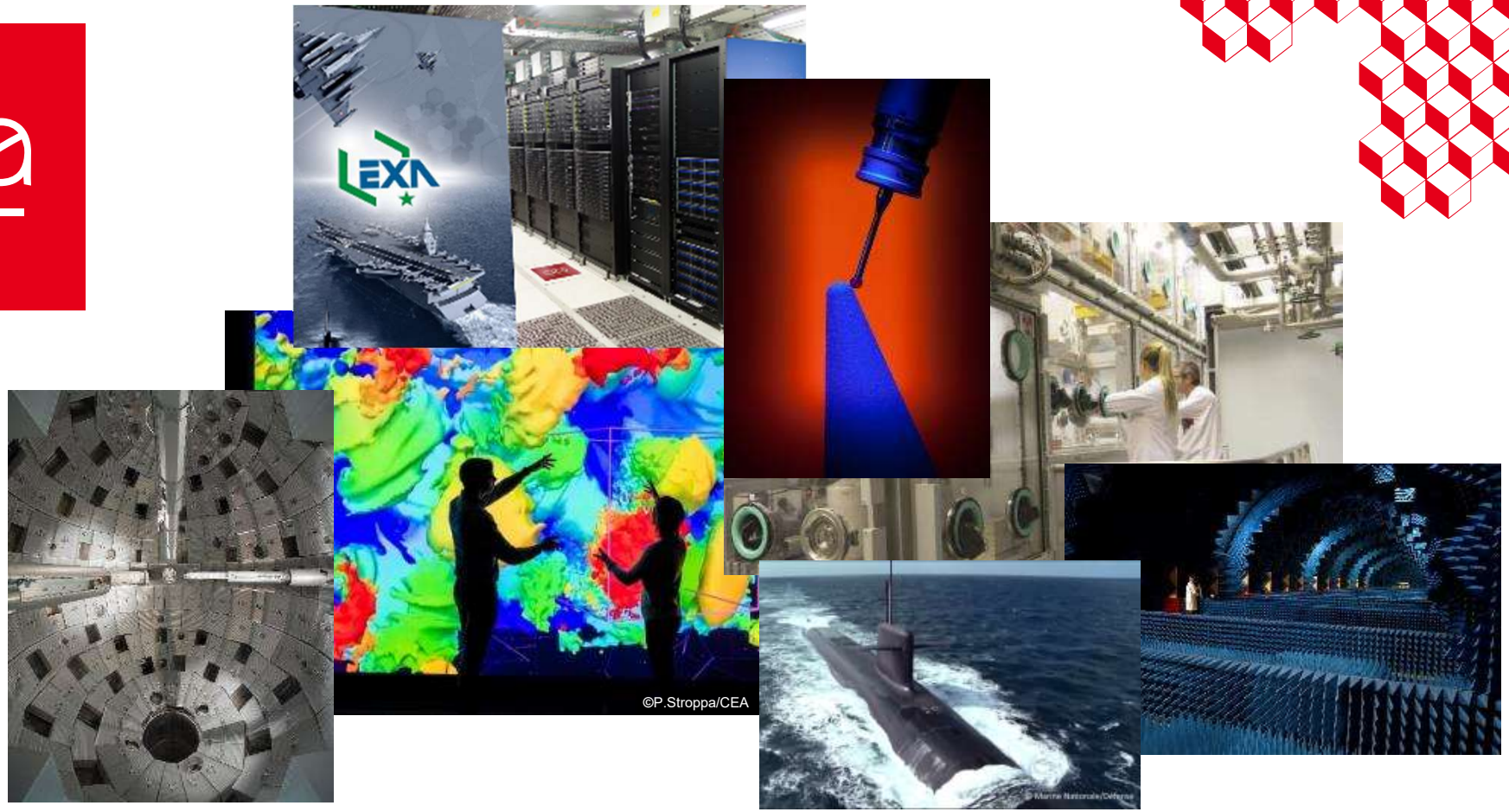
contact your "national" board to apply!



→ *STEP 1 for US students, files (CV+letter) must be first submitted* ***to a member of the US board***

(in any case, the PhD has to be defended before the beginning of proposed postdoc time)

→ *If the US board transfers the files to the French board for STEP 2, answers are generally given 6 weeks later*



Thank you for attention, enjoy the symposium