

Institut Pluridisciplinaire Hubert Curien



UNIVERSITÉ DE STRASBOURG

Multi-disciplinarity at IPHC (1)

□ IPHC is supervised by **CNRS** (French National Center for Scientific Research) and **University of Strasbourg**.



□ IPHC is the progeny of one of the earliest Nuclear Laboratory in France:

- **End of WWII**: Institute of Nuclear Research at University of Strasbourg.
- **1956**: creation of the laboratory of Subatomic Research, (CNRS + University of Strasbourg):
 - Several Cockroft & Van de Graaff.
 - 5 departments, of Nuclear Physics, Biology and Chemistry.
- **2006**: IPHC is one of the first French « common laboratory », based on 3 different laboratories: Biology, Chemistry, Physics.



Multi-disciplinarity at IPHC (2)

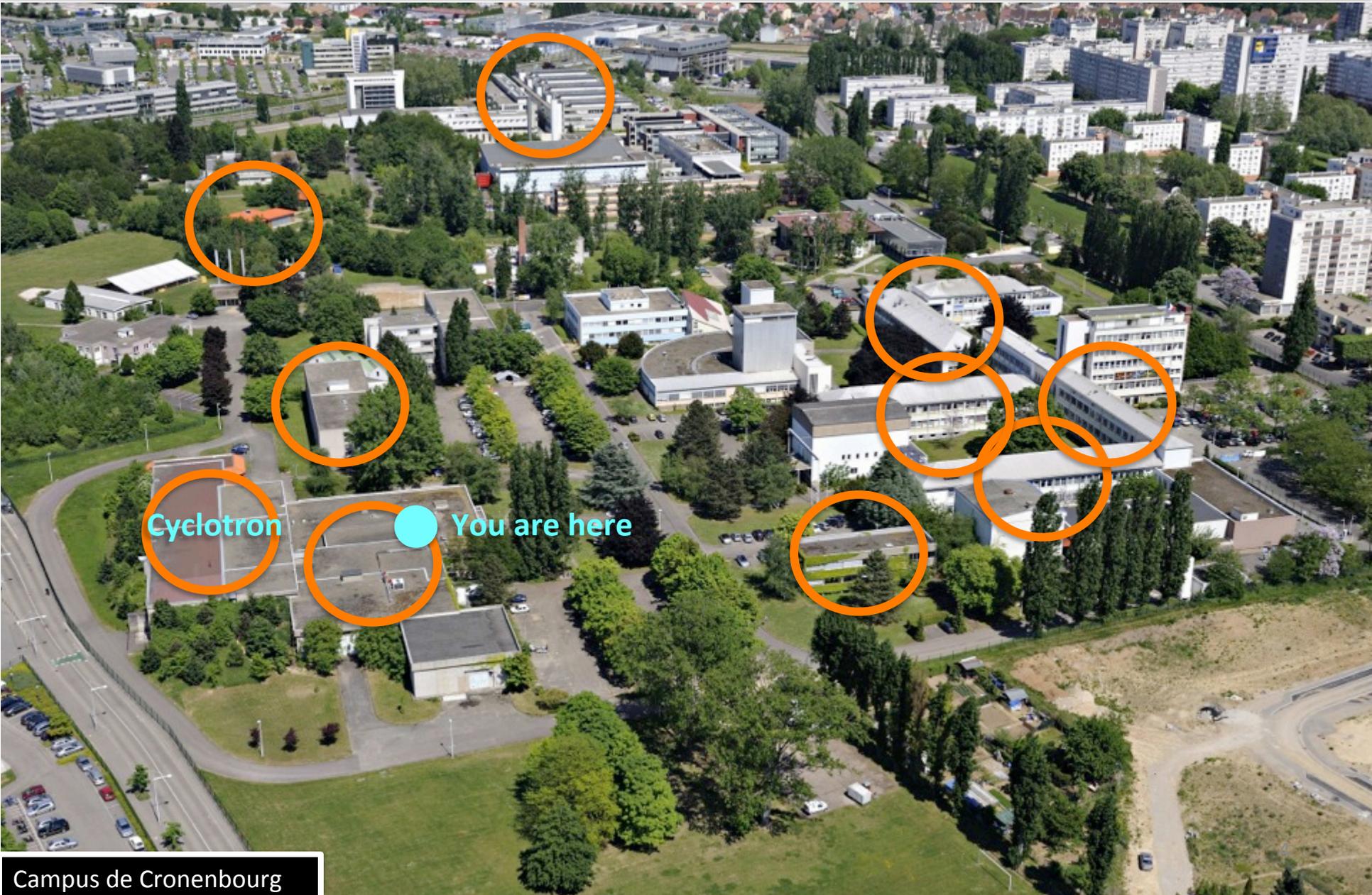


History:

- 2012: building of the **cyclotron** CYRCE.
- 2016: 4 departments, dedicated to defined scientific fields
 - Subatomic Research
 - Analytical Chemistry
 - Ecology, Physiology and Ethology
 - Radiobiology, Hadrontherapy and Molecular Imaging

→ transversal interdisciplinary projects born from this juxtaposition

IPHC in the campus of Cronenbourg

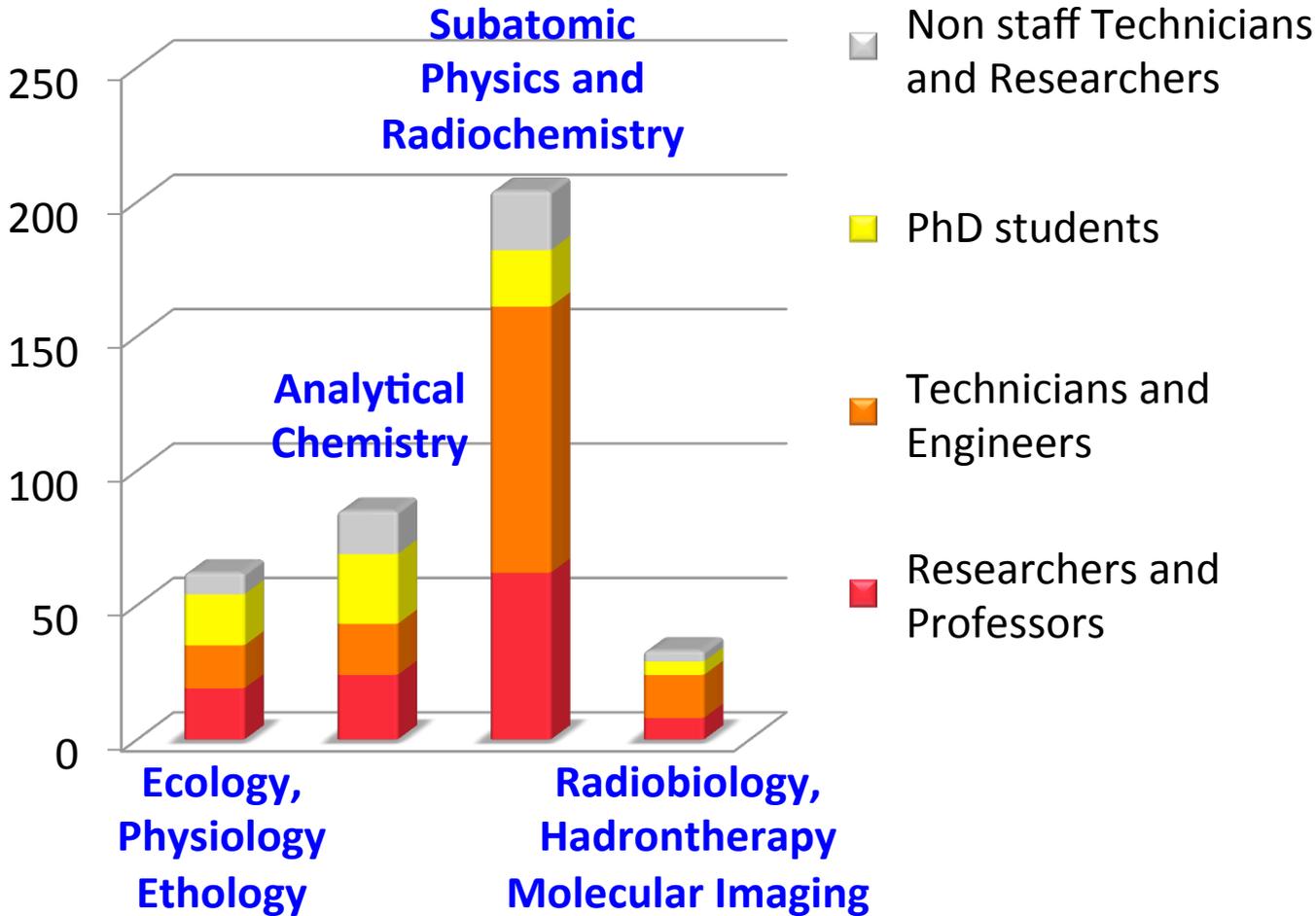


Cyclotron

You are here

Human resources

IPHC: 380 employees (260 staffs)



Institut Pluridisciplinaire Hubert Curien UMR 7178

Assistants de prévention :
 E. Schaeffer (coord), Z. Asfari, I. Chery, S. Georg
 Communication : N. Busser
 Documentation : B. Gaillard
 Qualité : S. Suzanne-Ochsenbein
 Valorisation : J. Schihin

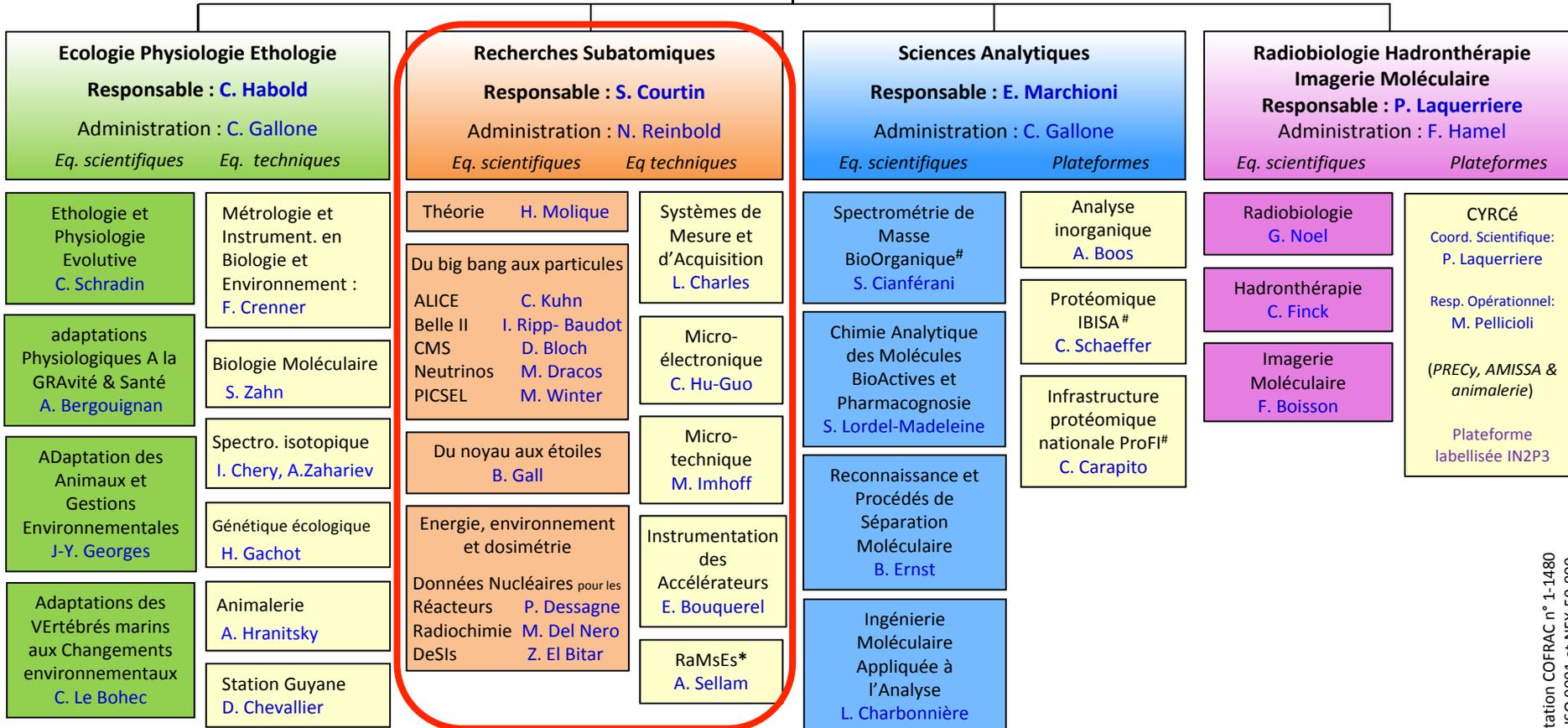
Directeur : R. Barillon

Assistante : F. Diemer

MiPHC
 (Mission pour
 l'interdisciplinarité à l'IPHC)

Instances du Laboratoire

Conseil de Laboratoire
 Conseil Scientifique
 Cellule de Suivi Technique des Projets
 Commission Paritaire Locale
 Commission locale H&S et Conditions de Travail



Pôle Administratif commun : J. Schihin

Ressources Humaines : R. Sommer

Logistique : D. Kissenberger

Pôle Technique commun : L. Gross

Service informatique : J-M. Gallone

Service Mécanique : M. Krauth

Service de Radioprotection : D. Oster

Plateforme commune

Grille/Cloud : C. Carapito, J. Pansanel, Y. Patois

Ecology, Physiology and Ethology

FOUR TEAMS GATHERING **60 SCIENTISTS**
WORLDWIDE RECOGNIZED IN ECOPHYSIOLOGY...



Behavioral Ecophysiology
Coevolution of
sociality & fitness

**Environmental
Management**
Understanding animal
adaptation to promote
regional biodiversity



... STUDYING EVOLUTIONARY ORIGIN &
PLASTICITY OF ANIMAL ADAPTATIONS...



**Adaptation of Marine
Vertebrates**
Population dynamics
under
global changes

Adaptation to Gravity
Impact on health
from inactivity
of animals & humans

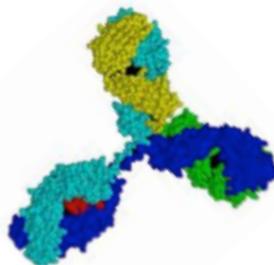


...TO BETTER UNDERSTAND **THE FUTURE OF ANIMAL
BIODIVERSITY** AND ITS STATUS IN MODERN SOCIETY .

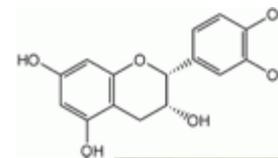
Analytical Chemistry

- Study of molecule structure and properties
 - Synthesis of new molecules
 - Characterisation of new complex molecules
 - Study of interactions between molecules

Macrobiomolecules (proteins)
Development of new methods to characterise biomolecules e.g., with proteomics



Food analysis through its chemical components
Search for components possibly inducing human pathologies.



Physical chemistry and separative sciences

Study of ion complexation. New separation supports.

Chemical synthesis, coordination chemistry

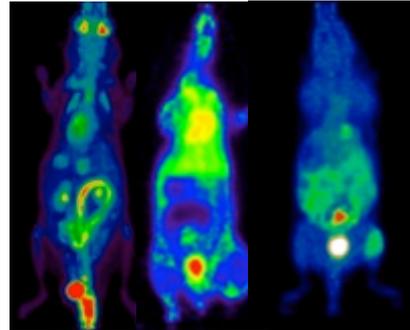
New complex molecules



Radiobiology, Hadrontherapy, Molecular Imaging

From cell to therapy:

- Molecular imaging
- Hadrontherapy
- Radiobiology



Pre-clinic technical set around plateforms :

- CYRCé : production of radiotracers
- PRECy : radiobiology at Cyrcé
- AMISSA : multimodal imaging of small animals
- Animal house and biology labs



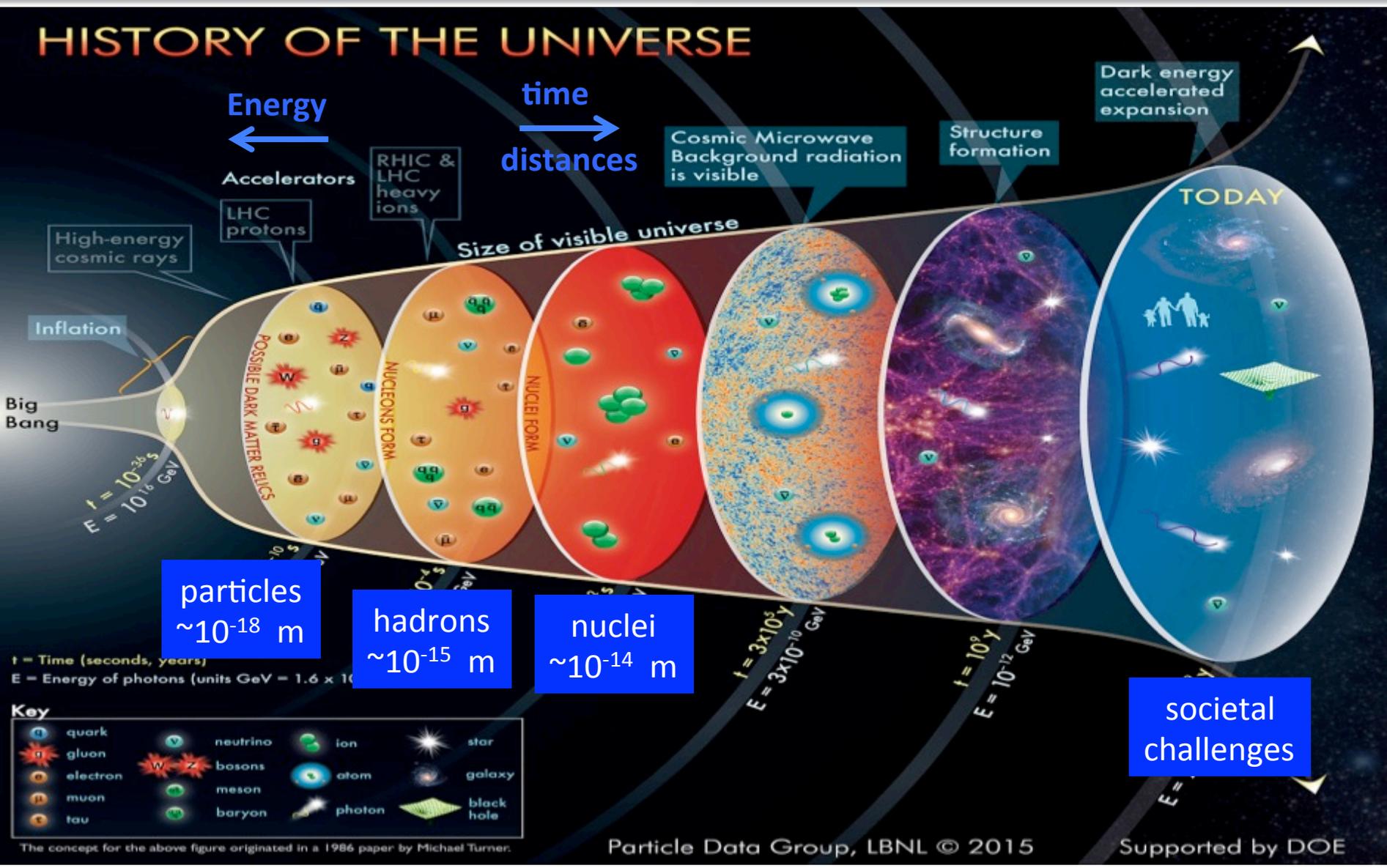
Physicists, chemists, biologists, clinicians
grouped within a same departement

Cyclotron TR24 (ACSI)

- Proton energy: 16 ro 24 MeV
- Current: 300 μ A
- 2 extracted beams



Subatomic Research



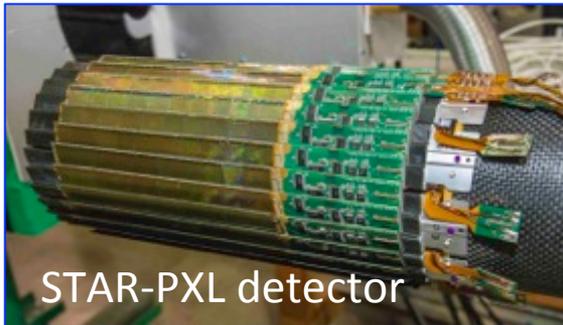
Particle and Heavy Ion Physics at IPHC



- ❑ **ALICE**: upgrade of the Si tracker, heavy flavour production.
- ❑ **Belle II**: radiative decays, upgrade of the Si tracker.
- ❑ **CMS**: upgrade of the Si tracker, Higgs and top properties, susy searches.
- ❑ **Neutrinos**: Double Chooz, JUNO (Top Tracker), Antares and KM3NeT.
- ❑ **PICSEL**: ILC, CMOS sensor and vertex detector R&D.
- ❑ **High energy theory**: scalar potential, supergravity.



ALICE



STAR-PXL detector



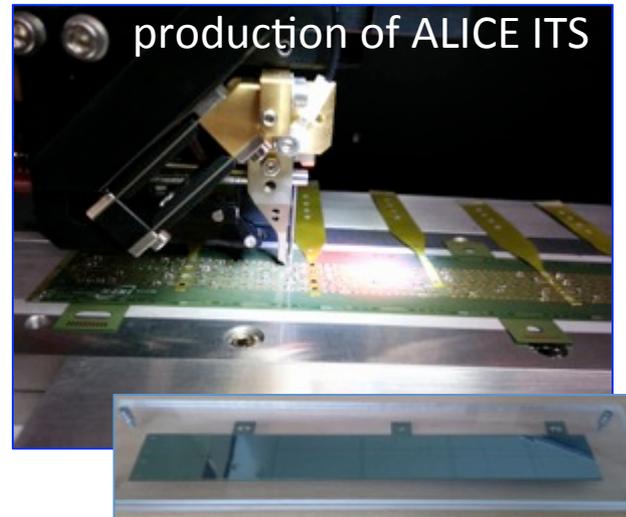
Top Tracker JUNO



CMS Tracker



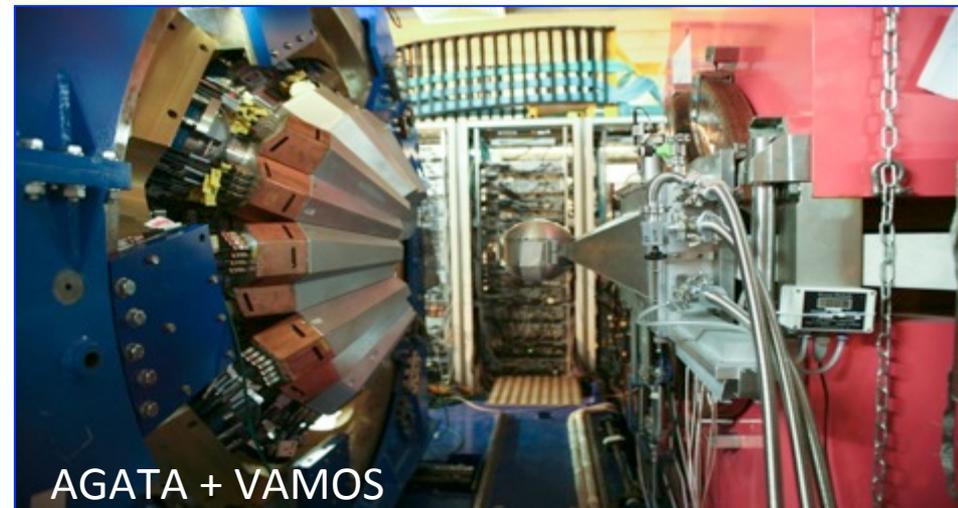
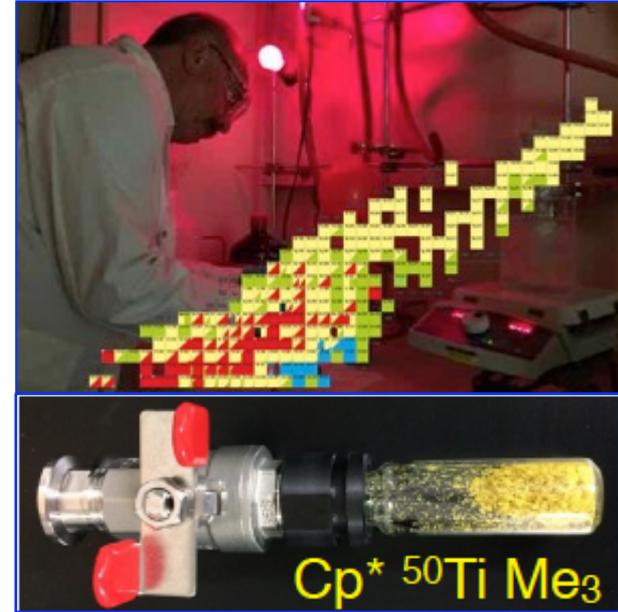
DOM ORCA



production of ALICE ITS

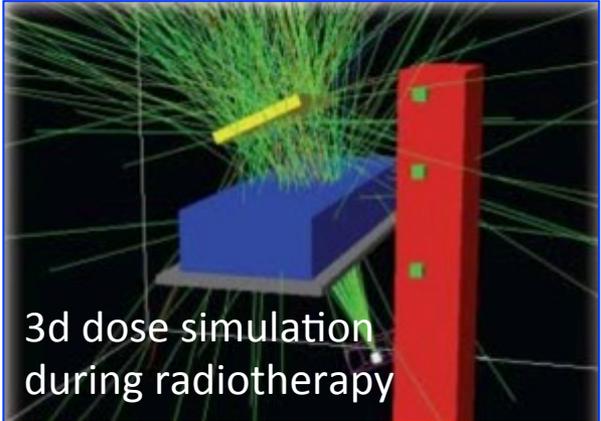
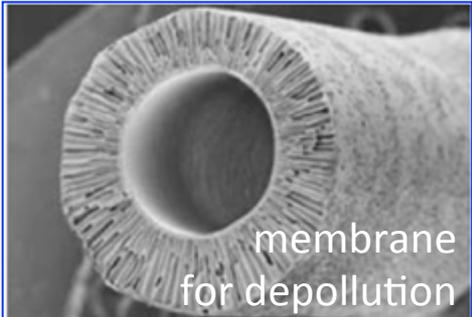
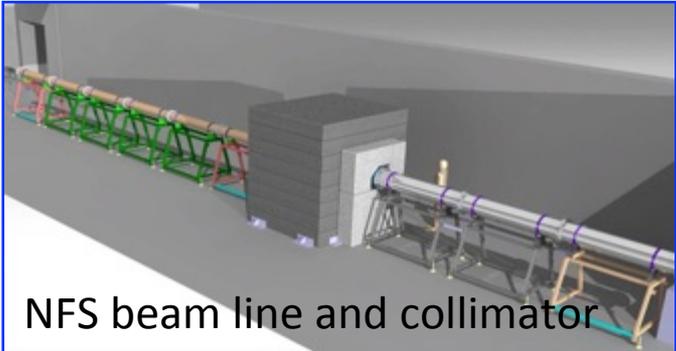
Nuclear Physics at IPHC

- ❑ **Exotic nuclei:** AGATA (SPIRAL2, SPES).
- ❑ **Superheavy nuclei:** MIVOC beams (SHE factory, GARIS II, ...).
- ❑ **Stellar nucleosynthesis:** STELLA (ALTO, Andromede, ...).
- ❑ **Low energy theory:** shell model and ab initio calculations, support to experiments (SuperNEMO, GBAR, SPIRAL2, FAIR, ...).



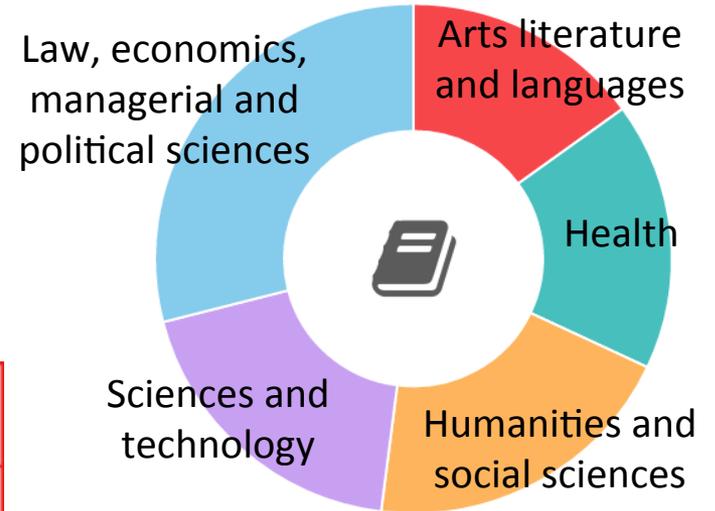
Applications to societal challenges at IPHC

- ❑ **Nuclear data for reactors:** U-Pu and Th-U nuclear fuel cycle optimization (data campaign at JRC-Geel, IFIN-HH-Bucarest, NFS-SPIRAL2).
- ❑ **DESI:** dosimetry and micro-dosimetry, radiation metrology and simulation.
- ❑ **Radiochemistry:** chemical speciation and radiation induced chemical modifications (ground and river pollution, impact on organic matter).



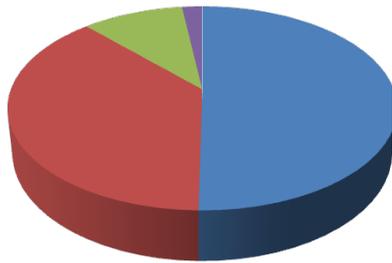
University of Strasbourg

- ❑ Funded in the 16th century.
- ❑ About 50 000 students, 20 % of foreign students.
- ❑ 72 laboratories.
- ❑ 37 faculties.
- ❑ 4 Nobel prizes.



Faculty of Physics and Engineering

- 200 teachers-researchers.
- > 1000 students, including 250 PhD students.



- 50% Master
- 38% Bachelor
- 10% Professional Bachelor
- 2% Erasmus exchange



P&I Faculté de **physique et ingénierie**
Université de Strasbourg