Groupement de recherche

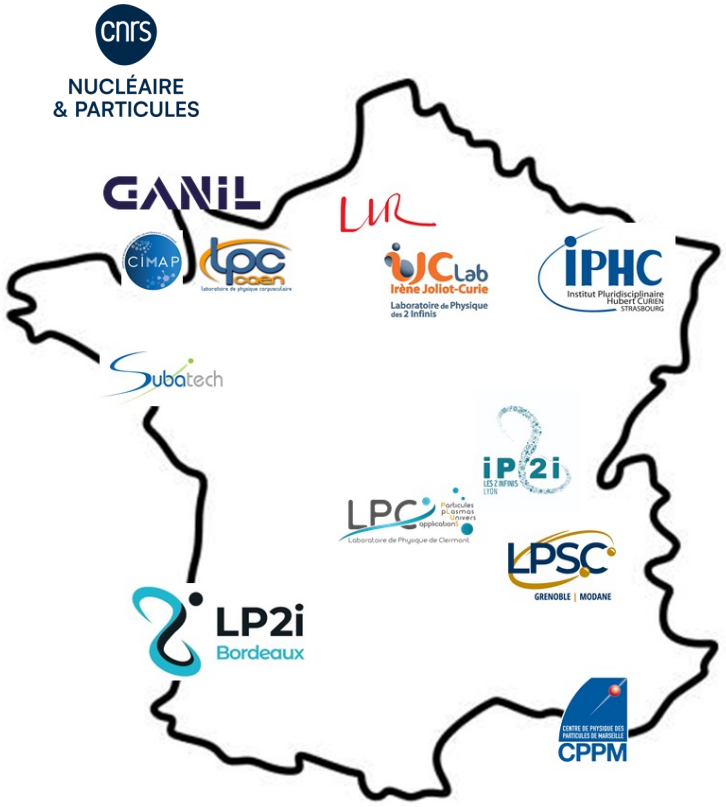
MI2B Outils et méthodes nucléaires pour la lutte contre le cancer

Atelier Accélérateur Recherche et Société

ML Gallin-Martel mlgallin@lpsc.in2p3.fr

LPSC, Grenoble March 25th-27th 2026

GDR MI2B

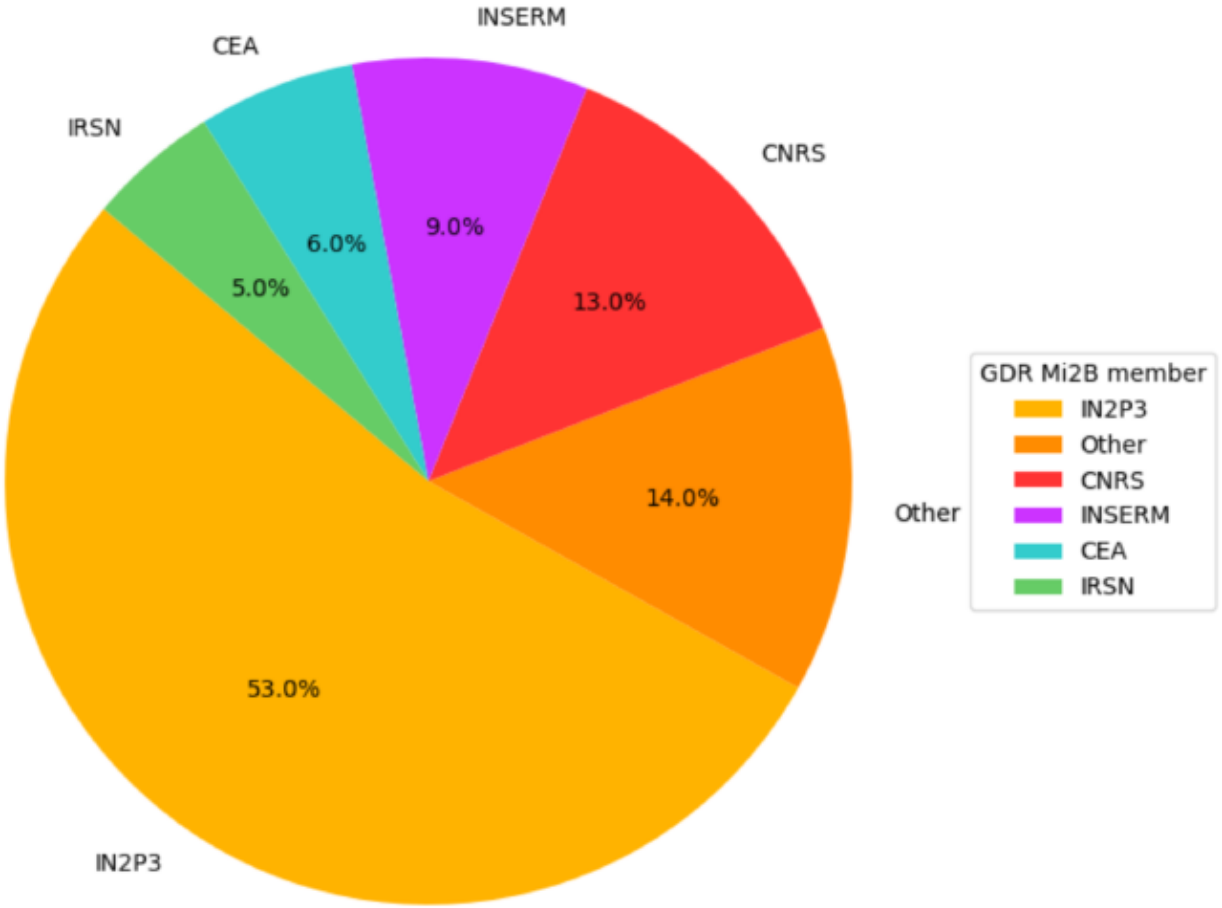


- **The GDR MI2B**: a scientific **coordination research group**
- Open to **CNRS- Biology** teams (deputy management), but also to **CNRS Engineering**, **CNRS Physics**, **CNRS Computer Sciences**, **Inserm**, **ASNR**, …
- **36** partner teams, including:
  - **12 IN2P3** (CNRS Nuclear & Particle Physics)

    + platforms:
    AIFIRA (Bordeaux) – **CYRCÉ** (Strasbourg) – **ALTO** (Orsay) – **Arronax** (Nantes) – **GANIL** (Caen)
  - **11 CNRS Biology**

=> ~280 subscribers to the mailing list

GDR MI2B members



Largely open to other institutes working in the field of health, with a majority from IN2P3 which initiated its creation

Research Areas and Cross-cutting Themes

4 Key Research Areas or Domains

- **Methods and Instruments in Biomedical Imaging**
- **Tools and Physical Methods for Innovative Radiotherapies**
- **Effects of Radiation on Living Organisms**
- **Radionuclides for Imaging and Therapy**

Research Areas and Cross-cutting Themes

Methods and Instruments in Biomedical Imaging

- **High-sensitivity multimodal diagnostic imaging** (PET, PET/CT and PET/MRI, X-ray PC-CT, 3-gamma imaging, …)
- **Treatment planning** (proton tomography)
- **Image-guided therapy** (prompt gamma imaging for dose delivery monitoring in hadron therapy, intraoperative imaging in surgery)
- **Preclinical imaging** (demonstrators, multimodal platforms, simultaneous hybrid imaging, intracranial probes for imaging in awake animals)

Research Areas and Cross-cutting Themes

Tools and Physical Methods for Innovative Radiotherapies

- **Improving the therapeutic index of radiation treatments**
  ⇒ Increase the probability of tumor control without increasing complications to healthy tissues.
- **Quality control of treatment delivery**
- **Innovative dose delivery methods** *(energy, position, timing)*
- **Optimization of treatment planning**

Research Areas and Cross-cutting Themes

Effects of Radiation on Living Organisms

- **Understanding the mechanisms involved in low-dose exposure**
- **Contributing to the challenges of modeling living systems and associated predictive models**
- **Studying radiolysis of water and biomolecules**
- **Assessing changes at different scales** *(molecular, cellular, whole body)*
- **Understanding the mechanisms involved in therapeutic exposures**
- **Optimizing conventional radiotherapy protocols and developing innovative therapies**
- **Estimating radiation risk associated with each modality**

Research Areas and Cross-cutting Themes

Radionuclides for imaging and therapy

- The challenge is **to stimulate research related to innovative radionuclides in a theranostic approach** (combining imaging and therapy).
- The main questions addressed in this context are:
  - **Which innovative radionuclides should be promoted?**
  - **Which biological agents are suitable for selective delivery?**
  - **How can we produce these radionuclides with suitable purity and quantity for medical applications**
  - **How can the radionuclide be stably attached to the biological vector?**

Research Areas and Cross-cutting Themes

4 Key Research Areas or Domains

5 crossing themes

Methods and Instruments in Biomedical Imaging

High-sensitivity multimodal diagnostic imaging (PET, PET/CT and PET/MRI, X-ray PC-CT, 3-g

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Tools and Physical Methods for Innovative Radiotherapies

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⇒ Increase the probability of
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Effects of Radiation on Living Organisms

Understanding the mechanisms involved in low-dose exposure

Contributing to the challenges of modeling living systems

Estimating radiation risk associated with each modality

Radionuclides for imaging and therapy

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Biology

Clinical Application

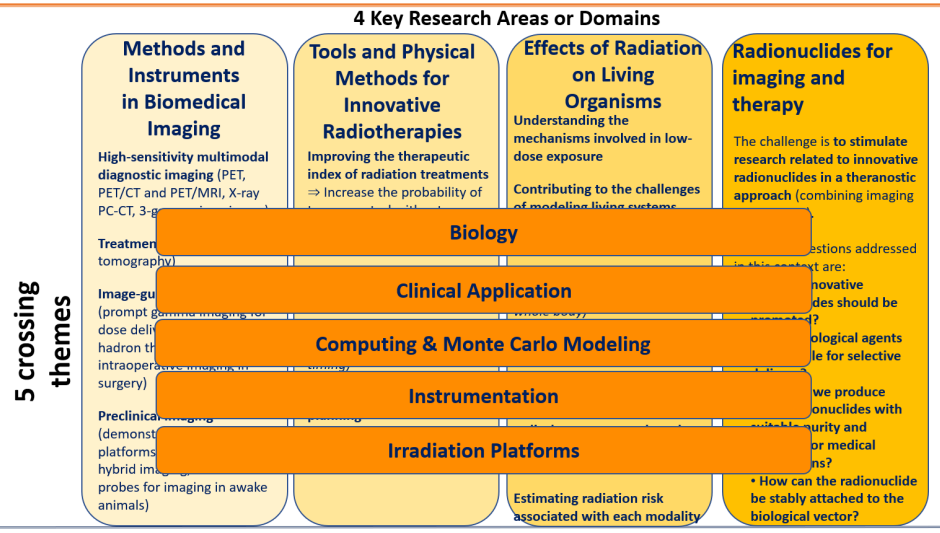
Computing & Monte Carlo Modeling

Instrumentation

Irradiation Platforms

GDR MI2B Governance

Research Areas and Cross-cutting Themes



Direction

Marie-Laure Gallin-Martel
(LPSC – IN2P3)
Lucie Sancey
(IAB – CNRS Biology)

Division Heads

Imaging
Marc-Antoine Verdier (IJClab- IN2P3)
Mathieu Dupont (CPPM – IN2P3)

Radiotherapies
Rachel Delorme (LPSC-IN2P3)
Jean-Michel Letang (CREATIS CNRS-Engineering)

Radiation Effects
Mathilde Badoual (IJClab – IN2P3),
Michael Beuve (IP2I Lyon – IN2P3),
Patrick Vernet (LPCA-IN2P3), Lucie Sancey (IAB – CNRS Biology)

Radionucleides
Ferid haddad (SUBATECH-IN2P3 / GIP ARRONAX)
Ali Ouadi (IPHC – IN2P3)

Cross-cutting Themes

Biology
Lucie Sancey (IAB- CNRS Biology),
François Paris (Inserm)

Clinical Applications
Juliette Thariat (LPC-IN2P3/CHB Caen)

Computing
Lydia Maigne (LPCA – IN2P3), Jean-Michel Letang (CREATIS- CNRS Engineering)

Instrumentation
Mathieu Dupont (CPPM-IN2P3)

Irradiation Platform
Charbel Koumeir (GIP ARRONAX)

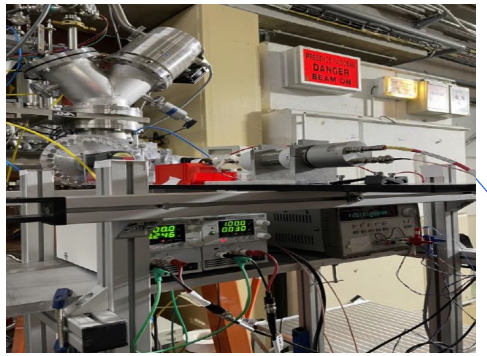
External Relations

SFPM	SFBR	Inserm
Ludovic Ferrer	Julie Costanzo	Jean-François Paris

Irradiation platforms

GDR MI2B Groupement de recherche — Outils et méthodes nucléaires pour la lutte contre le cancer

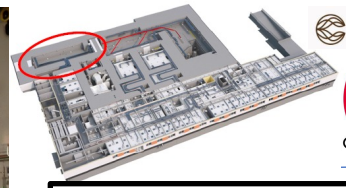
GANIL



ALTO

ARRONAX

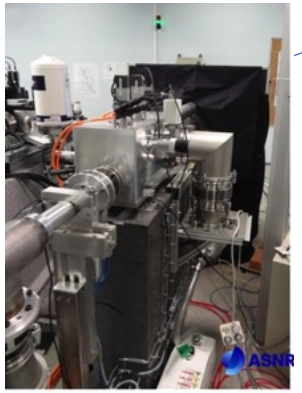
CYRCé



C400, carbon beams

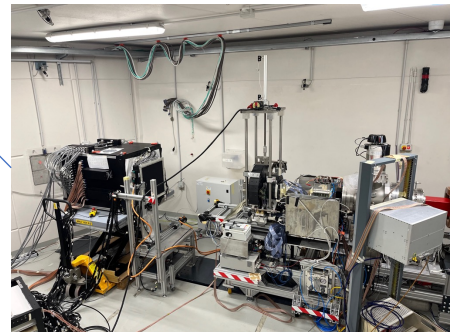
With dedicated « research rooms » = on-going discussion with IN2P3 and others partners!

AIFIRA



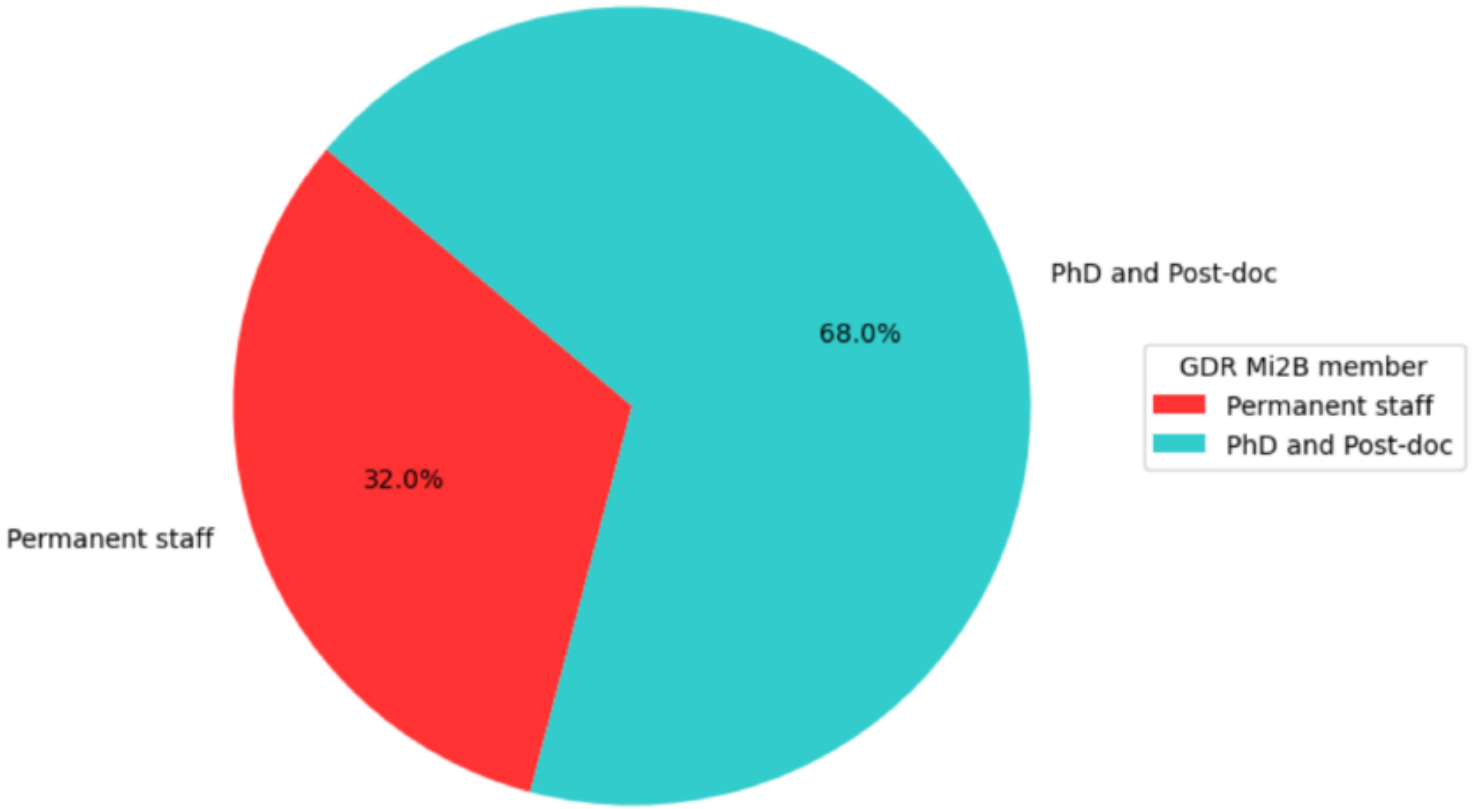
CAL, Nice

CNAO



GDR MI2B members

Predominant role played by non-permanent staff – mainly Young Scientists



Role of GDR: education and training

- **Young researchers present at AGs** (oral/poster)
- **Thematic schools:**
  - **"Physics for Radiobiologists"** (Aussois 2024, Corrençon en Vercors 2026) is to be repeated every two years starting in 2026.
  - Alternating with a **similar initiative: "Radiobiology for Physicists",** inspired by the 2024 Joliot-Curie school in Oléron (potential partners: RADIOTRANSNET, SFBR, …).

Fothcoming events

Ecole de Physique pour les Radiobiologistes - School of Physics for Radiobiologists

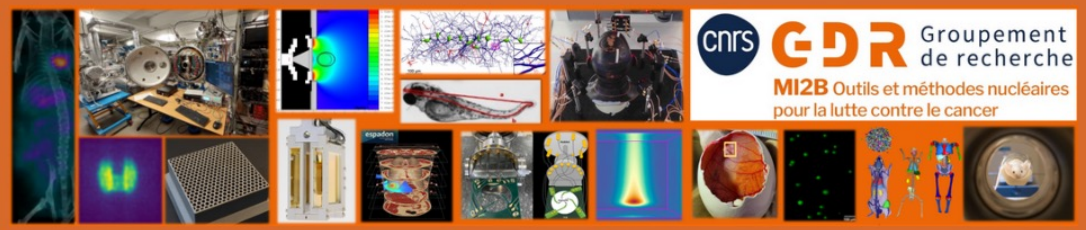
20–24 avr. 2026
Zecamp
Fuseau horaire Europe/Paris

Entrer le texte à rechercher

- Accueil
- Comité d'Organisation
- Inscription
- Intervenants

Le Comité d'Organisation
gdrmi2becole2026@lps...

English below...



Assemblée Générale 2025 - 2026 du GdR Mi2B

29 juin 2026 à 1 juillet 2026
Hexagone
Fuseau horaire Europe/Paris

Entrer le texte à rechercher

- Accueil
- Ordre du jour
- Inscription
- Liste des participants

cnrs GDR Groupement de recherche

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Thanks for your attention