

Research Institute in Mathematics and Physics - IRMP

1 Research Scope

The Research Institute in Mathematics and Physics (IRMP) develops frontier, fundamental research in several areas of Mathematics and Physics. The research pursued within the institute ranges from the exploration of various mathematical worlds to the systematic study and observation of our Universe at infinitely small and infinitely large space and time scales. Because some of these research topics require advanced technology in the fields of particle accelerators, particle detectors, electronics, computing, and software, the Institute also manages technical facilities and research and development projects in these areas.

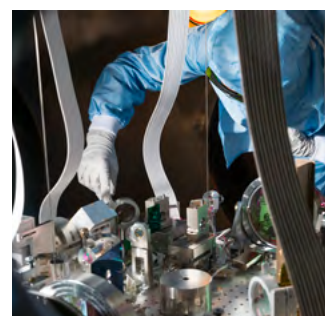
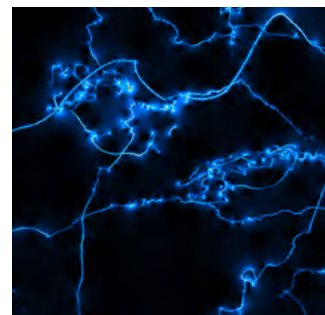
2 Research topics

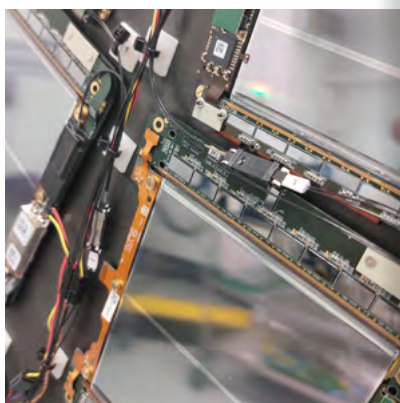
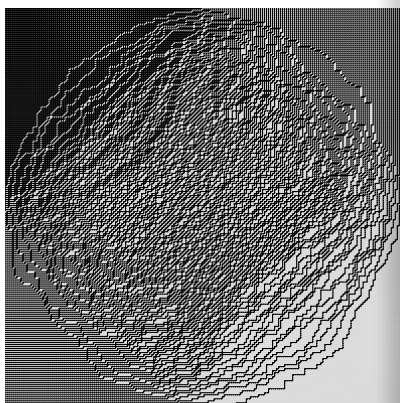
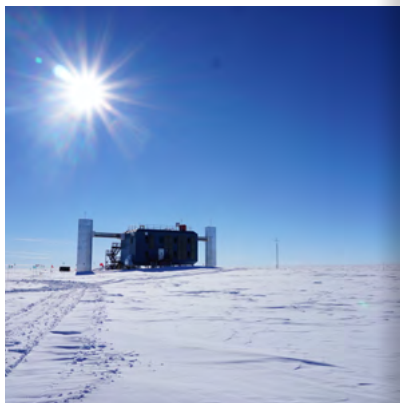
Researchers at the IRMP are organised into four groups that represent the major research domains of the institute:

- **Mathematics (MATH)**
<https://uclouvain.be/en/research-institutes/irmp/mathem>
- **Centre for research in Geometry, Physics and Probability (GPP)**
<https://uclouvain.be/en/research-institutes/irmp/gpp>
- **Centre for Cosmology, Particle Physics and Phenomenology (CP3)**
<https://uclouvain.be/en/research-institutes/irmp/cp3>
- **Cosmology, Universe and Relativity at Louvain (CURL)**
<https://curl.group/>

The main research topics of the IRMP are the following:

- Algebraic topology
- Category theory
- Differential equations and calculus of variations
- Group theory
- Integrable combinatorics and statistical field theory
- Noncommutative geometry
- Random matrix theory
- Mathematical education
- Cosmology
- Astroparticle Physics
- Gravitational Waves
- Particle Physics
- Technology Transfer





3 Technical facilities

The IRMP includes a number of technological facilities whose mission is to provide technical support to researchers of the IRMP or the UCL at large. One of these centers, the CRC described below, also offers services outside UCL.

- The **Cyclotron Resource Centre** (CRC - <https://uclouvain.be/fr/instituts-recherche/irmp/crc>; with a staff of 15 people, is a technological platform for:
 - Research and development in the field of particle accelerators, ion sources and their applications.
 - Production of accelerated ion beams for applications like the testing of irradiated electronics and the production of track-etched membranes.
- The **CP3 computing facility** provides storage and computing resources for several research projects. It consists of a computing cluster, totaling about 4100 cores and more than 4000 TB of disk storage. The cluster is integrated in the UCL CISM technological platform (cf. CISM card).
- The **MOUV (Mechanic, tools, machining and glass)** technological platform
 - Mechanical workshop equipped with numeric milling machines and lathes
 - Technical support for researchers
 - Glass workshop

4 Key numbers

As of December 2025 the IRMP consists of 29 faculty members, 4 research scientists, 1 research project coordinator, 27 technical and administrative staff members, 39 postdoctoral researchers, and 70 PhD students. About 10 PhD theses are defended yearly. Since 2013, members of the IRMP have received, or participated in the following notable grants or recognitions:

- 4 European ERC Starting Grants,
- 3 MSCA Doctoral Networks, more than 10 collaborative Horizon Europe projects and 4 ARC grants,
- 3 Belgian Excellence Of Science grants,
- 1 Belgian Francqui Research Chair,
- 1 Francqui Starting Grant



5 Contact

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"The beauty of mathematics reveals itself in many ways, in particular in the physical laws governing our universe".

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