CNRS Physics

Fundamental laws, matter and radiation.
To better understand the world around us, researchers at CNRS Physics laboratories combine experiments, theory and modeling. The work also includes the development of advanced instrumentation and the implementation of simulations, as well as the creation of new objects or concepts. The research covered by CNRS Physics focuses on the understanding of matter, radiation and their interactions, while at the same time generating concrete innovations and testifying to the interest that fundamental research arouses in modern society.

cnrs PHYSICS

STRATEGY

Research in physics focuses on understanding the mechanisms underlying the observable phenomena of matter, radiation and their interactions. To achieve this, CNRS Physics teams conduct experiments, carry out theoretical work, and model and numerically simulate these phenomena. They design the instruments and tools necessary for their research, supported by infrastructures and technological platforms, in particular the very large research infrastructures (IR*), working collectively to advance knowledge.
To achieve its primary mission, which is to broaden the scope of knowledge in its discipline, CNRS Physics focuses its activities on eight main strategic areas of research:

- Advanced electronics and photonics
- Matter, light and quantum processes
- Physics of extreme regimes
- Physics of complex matter
- Physics of living matter
- Fundamental laws
- Physics of complex systems
- New challenges for numerical methods

These areas cover the scope of disciplinary sections of the French National Scientific Research Committee: *Physical theories: methods, models and application* ; *Condensed matter physics: structures and electronic properties* ; *Physics of atoms, molecules and plasmas. Optics and lasers* ; *Condensed matter physics: structure and dynamics*, as well as the interdisciplinary commission *Experimental methods, concepts and instrumentation in material sciences and life sciences engineering*. These are managed by CNRS Physics, which is also a secondary institute for section *Soft matter: synthesis, development, assemblies, structure, properties, functions* and for interdisciplinary commissions: *Mathematical, computer and physical modeling for life sciences* ; *Science in society: production, circulation and use of knowledge and technology*.

INTERNATIONAL

CNRS Physics' international policy aims to enhance the impact, relevance and visibility of its research by promoting exchanges with research teams around the world. Using CNRS structures, this is achieved through the creation of laboratories shared with international universities. CNRS Physics promotes relations with the European Union and countries with strong scientific potential. It maintains collaboration with Canada, the USA, Japan and Singapore, thanks to the establishment of International Research Laboratories (IRL), and in recent years has extended its collaborations to India, Latin America and Africa. Today, two-thirds of CNRS Physics' scientific publications stem from international collaborations.

TOP-QUALITY RESEARCH

Physics contributes to the progress and reputation of French science at the highest international level. As proof, 17 Nobel Prizes have been awarded to French physicists. Among the latest, Serge Haroche in 2012 for the development of innovative experimental methods enabling the measurement and manipulation of individual quantum systems, Gérard Mourou in 2018 for the development of a method for generating ultra-short, high-intensity optical pulses, Alain Aspect in 2022 for his research into quantum entanglement, and Pierre Agostini and Anne L'Huillier in 2023 for experimental methods enabling the generation of attosecond light pulses to study electron dynamics in matter.

INNOVATION

The societal impact of physics has always been considerable. Numerous advances in physics have resulted in products that are on the market today: optical fibers, sensors for smartphones, GPS... The research carried out at CNRS Physics, although often far ahead of industrial applications, is a real source of innovation serving major societal challenges, particularly in the fields of materials, sustainable energy, climate, health and quantum and digital technologies.

In line with the objectives set by CNRS, the innovation strategy of CNRS Physics is based on on the early involvement of industrial partners in research processes.

INTERDISCIPLINARITY

Physics is mainly about developing methods and tools for observing, measuring, modeling, and interpreting natural phenomena. Physicists create instruments and theoretical frameworks for these purposes, which are then utilized by other scientific disciplines.

Thus, the scope of physics is very broad. It begins with the understanding of matter and waves, from elementary particles to cosmology. It extends to micro and nanotechnologies, chemical and biological processes, interactions in ecosystems and societies, and AI.

Research at the interfaces feeds on the heart of this discipline, and CNRS Physics encourages this interdisciplinary dynamic.

KEY NUMBERS

2970 Researchers and academics including **1210** CNRS

1730 Engineers and technicians including **1000** CNRS

2450 PhD students and post-docs

110 units, including **70 research units** and 10 federative research structures
6 support units
24 research groups

5 International Research Laboratories

29 Joint laboratories with businesses and EPIC[1]

47 International Research Projects

5 Start-ups created per year

15 International Research Networks

24 International Exploratory Actions

1. **EPIC :** Etablissement public à caractère industriel et commercial (Industrial and commercial public establishment)

cnrs PHYSICS
3, rue Michel-Ange
75794 Paris Cedex 16
inp.cnrs.fr

Print: CNRS DR16 IFSeM secteur de l'imprimé
September 2024