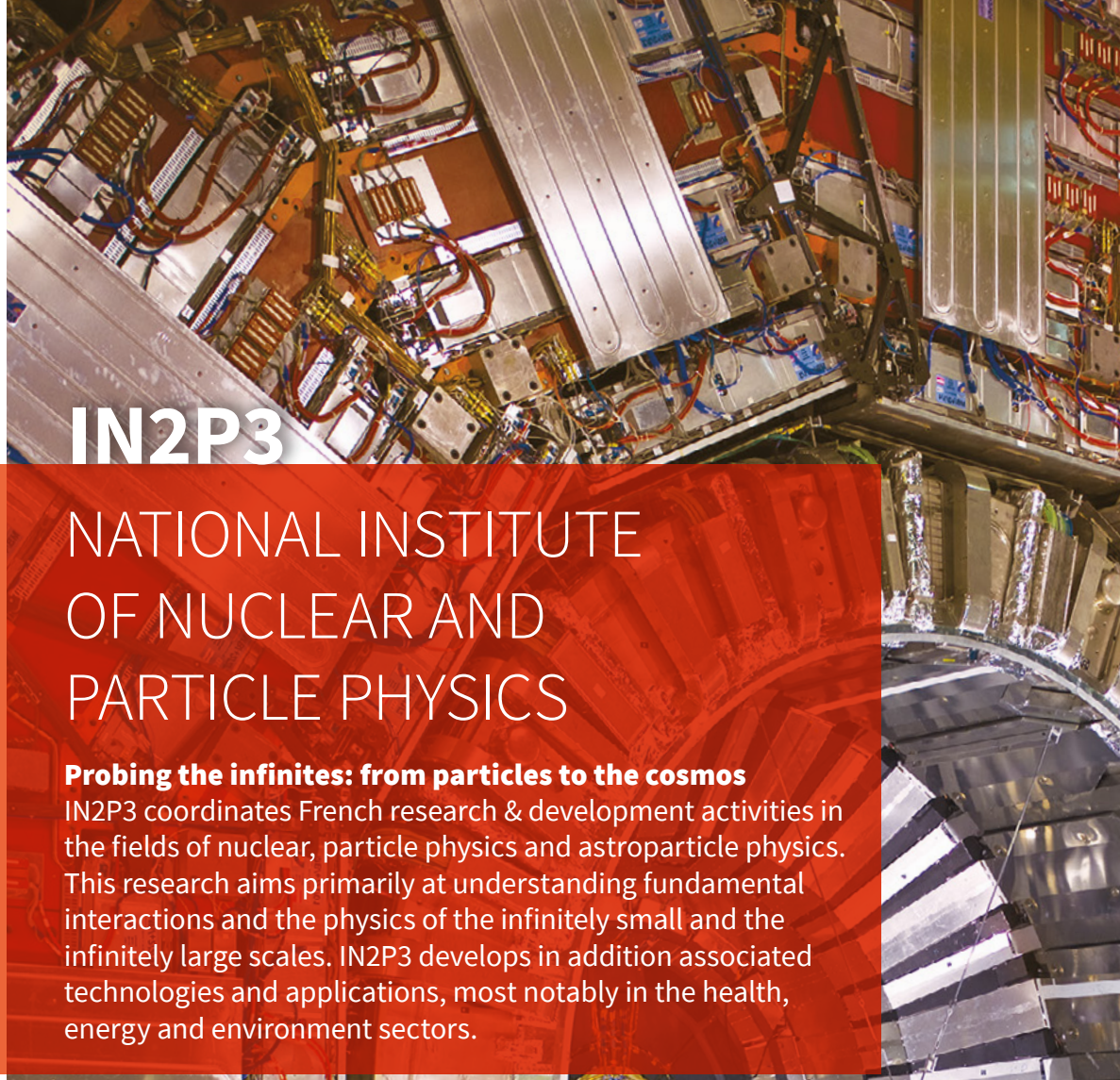

IN2P3

NATIONAL INSTITUTE OF NUCLEAR AND PARTICLE PHYSICS

Probing the infinites: from particles to the cosmos

IN2P3 coordinates French research & development activities in the fields of nuclear, particle physics and astroparticle physics. This research aims primarily at understanding fundamental interactions and the physics of the infinitely small and the infinitely large scales. IN2P3 develops in addition associated technologies and applications, most notably in the health, energy and environment sectors.

SCIENTIFIC FIELDS

- Particle and hadronic physics
- Nuclear physics and astrophysics
- Astroparticle physics and cosmology
- Research and development in computing and data science
- Research and development of particle accelerators
- Interdisciplinary research linked to ionizing radiations in health, energy and environment

STRATEGIC PRIORITIES

- Understanding matter and the Universe

Subatomic physicists from IN2P3 and their colleagues across the world strive to answer three fundamental questions: what are the elementary constituents of the subatomic world and how do they interact? What is the structure of nuclear matter? What is the Universe made of and wich forces govern its behaviour?

- Strengthening ties with other disciplines

IN2P3 scientific and instrumental expertises are shared to advance various fields of research such as astrophysics, chemical sciences, materials physics, and life sciences.

- Developing closer relationships with society and industry

IN2P3 is involved in the design of new instruments for medical diagnosis and therapy, in research on radioactive waste management and future nuclear energy techniques, and in transferring high-tech development to the private sector. The institute also provides its expertise in computing and in processing of very large volumes of data.

- Training future researchers and engineers

The institute actively engages in the training of young scientists, contributing to education in universities and engineering schools, and welcomes many interns and PhD students in its laboratories.

LARGE INTERNATIONAL PROJECTS

IN2P3 conducts large-scale theoretical and experimental research, which requires deploying very large instruments. This research is most of the time carried through large collaborative projects pursued at the European or international levels. The basic instruments used in the discipline are:

- particle and nuclei accelerators
- particle detectors located at high-energy accelerators or in underground laboratories
- instruments for space-based, ground-based or undersea observation of high energy cosmic rays and neutrinos, to study violent phenomena in the Universe
- vast arrays of ultra-sensitive sensors to observe the Universe in its largest dimensions in relation to particle physics and cosmology

Launching of the ORCA lines optical modules for the KM3Net neutrino detector, a second-generation neutrino telescope. © Patrick Dumas - CNRS Photothèque

To facilitate the pooling and optimisation of its resources and expertise, IN2P3 is organized in a limited number of large laboratories and research infrastructures, located in or near France major universities. Its technological platforms are often operated in collaborations with other CNRS institutes, CEA or INSERM laboratories, as well as CNES and major international university or research organisations.

TECHNOLOGICAL TRANSFER AND INDUSTRIAL PARTNERSHIPS

Through a network of laboratory experts, IN2P3 contributes scientific and technical expertises to areas such as heath improvement, in particular medical imaging and radiotherapy, aerospace industry and electronics, as well as radioactivity measurements in the environment.

KEY FIGURES

1000 permanent researchers including **600** CNRS **400** faculties

1500 permanent staff including **600** research engineers

700 non permanent researchers including **400** doctoral fellows

25 laboratories and national research platforms

10 large research infrastructures

50 international collaborative research projects

15 international research laboratories

10 interdisciplinary platforms

15 startups

Situation as on 30/06/2019 (staff, structures and economic valuation)

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Cover photograph: the Compact Muon Solenoid (CMS), a general-purpose detector built on the LHC ring. © Maximilien Brice - CERN

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