SOLEIL TODAY

Large Scale National Research Infrastructure, and a tool at the service of scientists and industry, SOLEIL is a source of light whose characteristics make it possible to unravel the most intimate secrets of matter, down to the atomic scale.

Every year, the SOLEIL teams (around 450 people) welcome and support in their research process 2,500 scientists (or "users") who come from all over the world to use the facilities, and guarantee them optimal experimental conditions.

These teams are also developing, internally or in partnership, their own research themes on many subjects that are currently mobilizing the scientific community.

SOLEIL is a source of extremely intense light, the synchrotron radiation, produced by a particle accelerator. Extracted from a metal pellet the size of a coin, electrons are gradually accelerated to a speed close to that of light, brought to a very high energy in two successive phases, in accelerators called LINAC and booster, and then injected into the 354-meter perimeter storage ring where they run 24 hours a day.

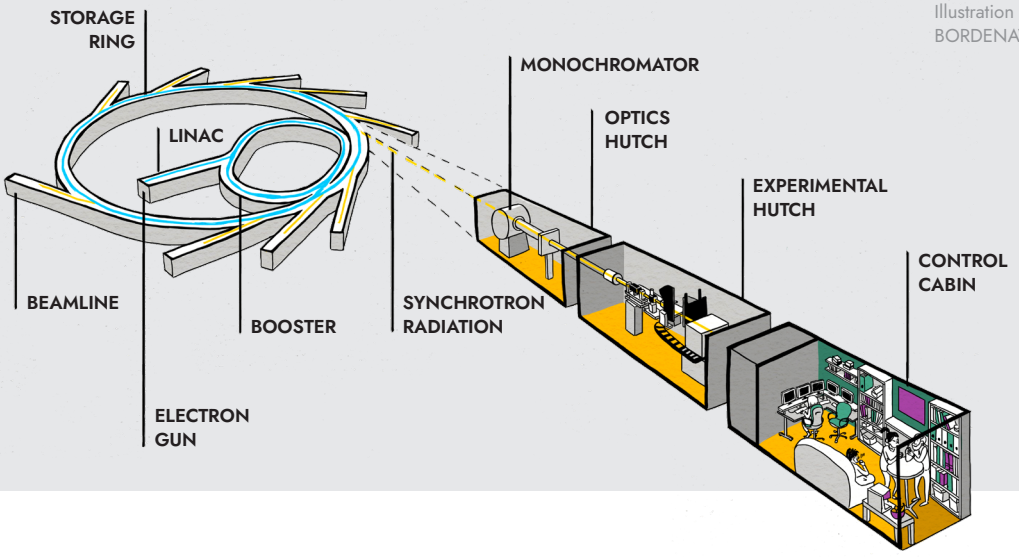

Illustration by Aurélie BORDENAVE

Along their path in this ring imposed by magnetic fields, the electrons lose some of their energy in the form of light radiation, or photons. With every turn, this extremely bright light is emitted, over a range of wavelengths from infrared to X-rays, and covering visible and ultraviolet light. To produce even more intense beams of light, the electrons also pass through specific magnetic devices that make their trajectory undulate.

KEY FIGURES

(end of 2022)

24-hour operation **7 days a week** with **99% reliability**

More than **14,000** **users** since 2008

Contributing to the research of nearly **1,000** **user laboratories** per year

99% **of user scientists** are very satisfied or satisfied

More than **7,900** **publications** since 2008

Nearly **120** **user companies, from start-ups to large corporations**

More than **26,000** **high school and university students** have visited SOLEIL since 2010

More than **1200** **PhD theses** including results obtained at SOLEIL, since 2008

Nearly **300** **international partnerships** with **46 countries**

Around the electron accelerators are built 29 specialized laboratories, the «beamlines», instrumented to prepare and analyze the samples to be studied, then record the information collected.

All different but complementary, beamlines are designed especially for specific wavelength ranges, analysis techniques and types of samples, that can be materials surfaces, , cells, living tissues, gels, liquids or gases.

As it enters the beamline, before arriving at the object to be studied, the synchrotron radiation passes through different optical systems that select its wavelength and focus it for the experiment. When the extremely intense light reaches the sample, penetrating the the matter that composes it, the sample «responds», deflecting or absorbing it, or even releasing other photons or electrons. Recorded by very specific detectors, these data are then decoded by researchers, who deduce the structure and geometry - on the surface or in volume - or the properties - chemical, electronic, magnetic - of the sample. And this down to the level of the atoms that constitute it.

At the heart of the Paris-Saclay scientific and technological cluster, SOLEIL offers a very wide range of specific analysis techniques:

- **X-ray Diffraction or Scattering:** structural information on the analyzed sample.
- **Infrared, ultraviolet and X-ray spectroscopies; circular dichroism; photoemission:** study of the chemical, electronic or magnetic properties of the sample.
- **Imaging, Radiography, Tomography:** shape and organization of the sample at different scales (from a few millimeters down to a few tens of nanometers).

Synchrotron SOLEIL
L'Orme des Merisiers - Départementale 128 - 91190 Saint-Aubin - FRANCE
www.synchrotron-soleil.fr