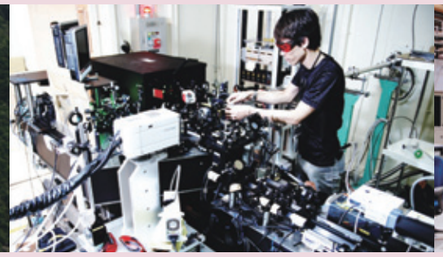
SPring-8

SPring-8

The World's largest synchrotron radiation facility

Seeing is Believing

RIKEN SPring-8 Center
Japan Synchrotron Radiation Research Institute

“What is this material composed of ? What is its structure ? ”
SPring-8 is a facility to provide answers to these questions at the atomic level.

What is SPring-8?

SPring-8 is located in Harima Science Garden City, in the western part of Hyogo Prefecture, Japan. It can be considered as a super-microscope that enables the atomic-level observation of fine structures and behavior using very bright light called synchrotron radiation. SPring-8 is open to researchers all over the world. Currently, a total of about 13,000 users carry out about 2,000 experiments each year.

How bright is synchrotron radiation?

The synchrotron radiation of SPring-8 is about one billion times brighter than the light generated from a conventional light source. This bright synchrotron radiation enables us to observe the atomic world that could not be seen before.

【Images illustrating brightness】


Nighttime (dark)


Daytime (bright)

What is the large circular ring?

It is the ring-shaped facility that symbolizes SPring-8 and has a circumference of about 1.5 km. Very bright synchrotron radiation is produced in this facility and is used by researchers to explore the world of atoms.

Why is the facility ring-shaped?

Owing to the ring shape, many researchers can conduct experiments at the same time. As of October 2009, more than 50 experimental laboratories can be used to carry out experiments around the ring.

Where did the name come from?

SPring-8 is an abbreviation of Super Photon ring-8GeV

Photon: light ring: large donut-shaped structure (equipment) GeV: unit of energy

Management of SPring-8

The operation and maintenance of SPring-8 have been entrusted to the Japan Synchrotron Radiation Research Institute (JASRI) by RIKEN, the owner of SPring-8. As a registered institution for facilities use promotion, JASRI has also implemented the following undertakings to promote the use of synchrotron radiation at SPring-8.

- Operation, maintenance, and upgrading of SPring-8 :
  Maintaining facilities at optimal conditions and making them available to SPring-8 users.
- R&D :
  Development of advanced analytical methods and test research leading to the increased usability of SPring-8.
- Selection of users :
  Reviewing and selecting research proposals.
- User support :
  Providing the latest technical information, support for users’ experiments, and technical assistance.
- Public outreach :
  Public relations to expand the community of SPring-8 users, such as the publication of information magazines.

Main events

The following events are held annually.

SPring-8 Open House
For the general public — Visitors can see experimental equipment up close that is usually off-limits and participate in various hands-on events. Many people visit SPring-8 every year.

SPring-8 Symposium
For the general public and researchers — The annual achievements of SPring-8 are reviewed, and key research achievements and trends are presented at the symposium.

Report Meeting on SPring-8 Industrial Applications
For the general public and industrial researchers — This meeting aims to disseminate the effectiveness of synchrotron radiation in the industrial sector and to promote interaction among industrial users through presentations on the achievements in industrial application research at SPring-8.

SPring-8 Summer School
For final-year undergraduates and postgraduate masters students — This school aims to discover and train the next generation of researchers who will utilize synchrotron radiation in their studies. Students can experience state-of-the-art experiments using synchrotron radiation.

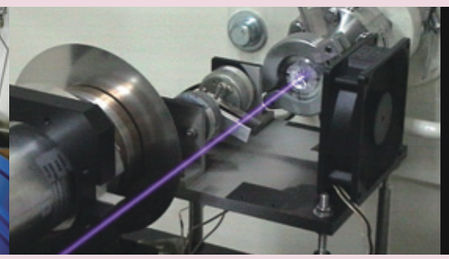
Asia-Oceania Forum for Synchrotron Radiation Research (AOFSRR) Summer School —Cheiron School—
For researchers throughout Asia and Oceania — The aim of this school is to train researchers who will be engaged in research using synchrotron radiation. Researchers from Japan and overseas receive practical training and participate in other programs of study to master the use of synchrotron radiation.

※Note: The above-described events may be changed or withdrawn without prior notice.

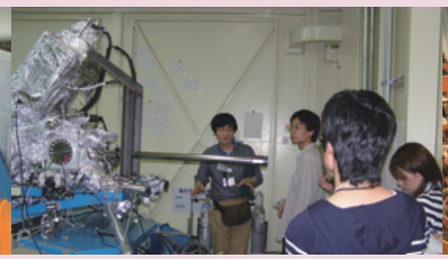
Facility tour free of charge

- Visitors can observe experiments from the experimental hall overlook, following an explanation outlining the facilities and research at SPring-8, and can view display models.
  Tours can be reserved at the SPring-8 website. (http://www.spring8.or.jp/en/about_us/site_tour)
- Available weekdays only, excluding December 1 and the New Year holiday (from December 29 to January 3)

Photos: Satoru Yoshioka



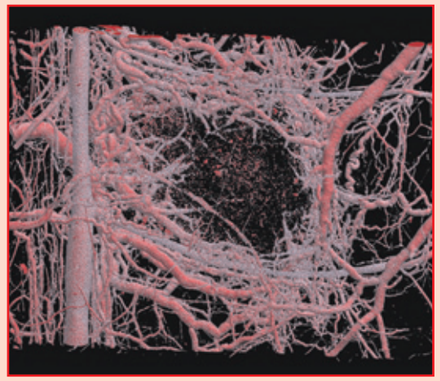



Research Fields

Life Science and Biotechnology

We study human biological functions by determining the structures and functions of DNA and proteins at the molecular and atomic level, thus contributing to the identification of the causes of diseases and their prevention and to the development of new drugs.

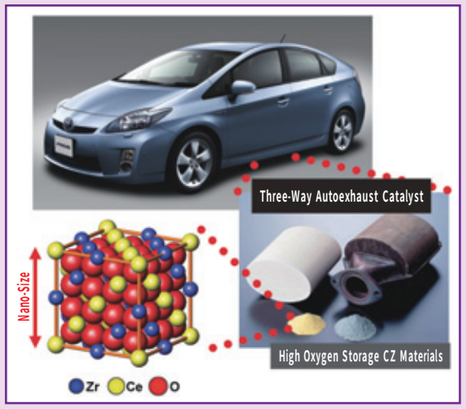
“ Crystal structure of PA bound to the N-terminal of PB1 in influenza virus RNA polymerase. ”
(Yokohama City University)



“ Blood vessels in the rabbit earlobe tumor ”
(Kawasaki Medical School)

Industrial Applications

We are contributing to the development of products in various industries, such as semiconductors used in electronics, materials including metals and polymers, catalysts and fuel cells in environmental and energy-related fields, new drugs, and commodities including shampoos and hair-care products.

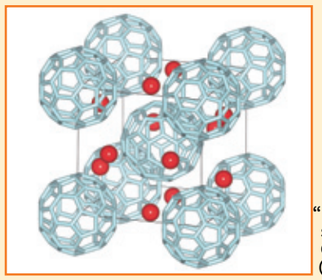


(TOYOTA MOTOR CORPORATION : TOYOTA CENTRAL R&D LABS., INC.)

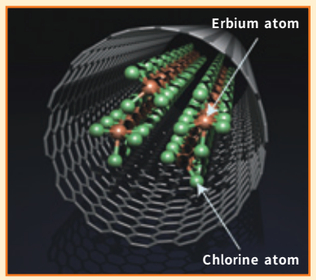
(Kanebo COSMETICS INC.)

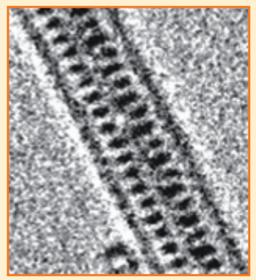
Materials Science and Nanotechnology

We are developing technologies to determine and control the structures and properties of substances at the atomic level, thus contributing to the development of new materials such as superconducting materials, hydrogen-storage materials, and polymers.



“ Crystal structure of high-Tc superconducting fulleride Cs_3C_{60} ”
(Durham Univ. / Univ. of Liverpool)





“ $ErCl_3$ — Nanowires Encapsulated in Carbon Nanotubes ”
(Nagoya University Shinohara-Laboratory)

Archaeology and Scientific Assessment

Synchrotron radiation is also used in archaeology and the scientific assessment of cultural artifacts; for example, the component analysis of ancient bronze mirrors and the identification of materials in statues of Buddha.

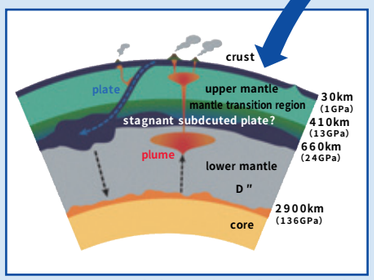
“ Mirror with triangular rim, with figures of four deities and four animals. ”
(Sen-oku Hakuko Kan (Sumitomo Collection))

“ Standing Seshin Bosatsu Wooden statue Kohfukuji Temple, Nara ”
(BIJYUTSUIN)

Earth and Planetary Sciences

The structure of the Earth's deep interior and the composition of meteorite and comet debris are being clarified, which will unveil the mysteries behind the evolution of the Earth and the birth of the solar system.

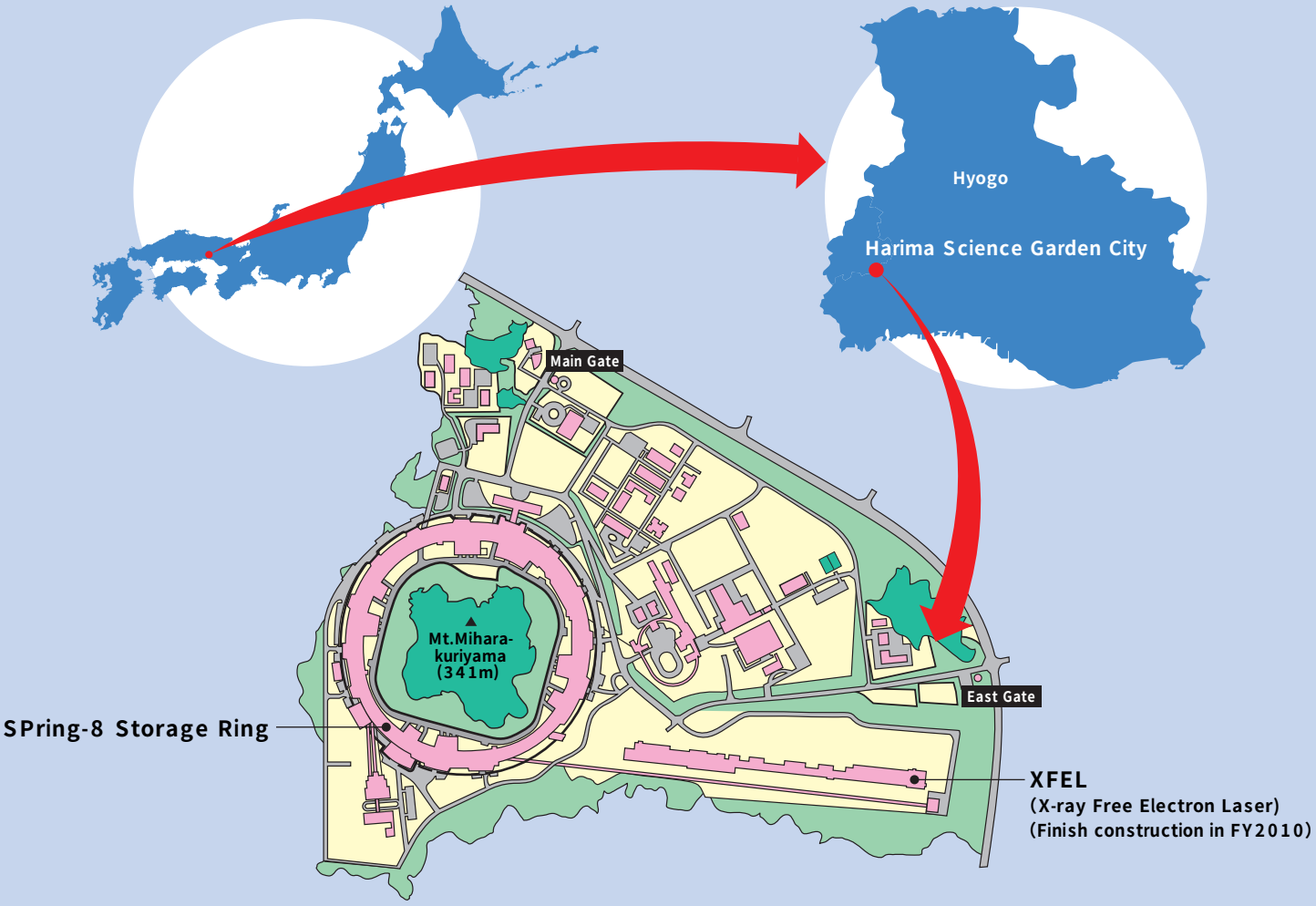
Cross section showing the interior of the Earth ...



“ Structures and dynamics of the Earth's deep interior ”
(Ehime University)

Comet (virtual image)

The 21st century will be the era of light.
We create a bright future with brilliant light technology and contribute to society through the development of light science.



SPring-8 Storage Ring

XFEL (X-ray Free Electron Laser) (Finish construction in FY2010)

The World's largest synchrotron radiation facility > For further information http://www.spring8.or.jp

RIKEN SPring-8 Center

http://www.harima.riken.jp

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