SPring-8

I. Introduction

SPring-8 was stably operated throughout FY2022 achieving a total accelerator complex operation time and user beam time of 5259.3 h and 4416.0 h, respectively, and a downtime of 19.7 h. SPring-8 completed all its operations by the middle of February 2023.

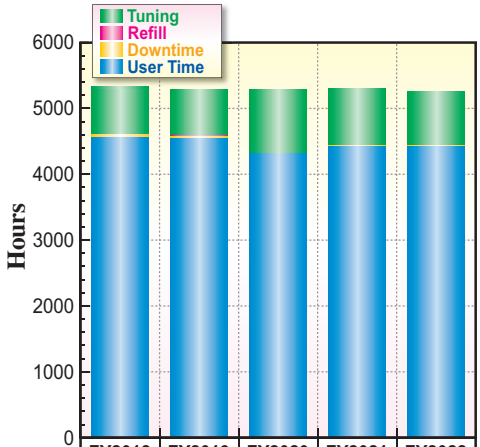
For the contract beamlines, interim reviews were conducted at QST Quantum DynamicsI (BL11XU, National Institutes for Quantum Science and Technology), QST Quantum DynamicsII (BL14B1, National Institutes for Quantum Science and Technology), JAEA Actinide ScienceI (BL22XU, Japan Atomic Energy Agency), JAEA Actinide ScienceII (BL23SU, Japan Atomic Energy Agency), Advanced Softmaterial (BL03XU, Advanced Softmaterial Beamline Consortium), NSRRC ID (BL12XU, National Synchrotron Radiation Research Center), and NSRRC BM (BL12B2, National Synchrotron Radiation Research Center). Subsequently, these beamlines projects were authorized to continue.

Following the contract cancellation, a post-evaluation was conducted for the University-of-Tokyo Outstation Beamline for Materials Science (BL07LSU) in August 2022. At present, the number of SPring-8 users is as high as 14,000, all of whom are members of the SPring-8 Users Community (SPRUC).

To facilitate dialogue between users and facility staff, it is important for SPring-8 to organize scientific events in collaboration with SPRUC, such as the SPring-8 Symposium. In 2022, the SPring-8 Symposium was held online on September 25–26, with 497 participants. SPring-8 also facilitates communication between users and industry. The Joint Conference on Industrial Applications of SPring-8 was held in Hyogo Prefecture from August 31 to September 1, 2022, with 214 participants. Moreover, as part of its continuous effort towards fostering human resources in synchrotron sciences, SPring-8 organized the 22nd SPring-8 Summer School with 77 students of graduate schools nationwide, in cooperation with the University of Hyogo, Kwansei Gakuin University, the University of Tokyo, Okayama University, Osaka University, Ibaraki University, Japan Atomic Energy Agency, National Institutes for Quantum and Radiological Science and Technology, and RIKEN. Furthermore, SPring-8 and SPRUC organized the 6th SPring-8 Autumn School with 60 participants, which included university students and corporate researchers.

II. Machine Operation

The operation statistics for the last five fiscal years are shown in Fig. 1. In FY2022, the operation time of the storage ring was 5259.3 h, 84.0% of which (4416.0 h) was devoted to the SR experiments. This excellent figure for the user time represents a storage ring availability of 99.5%. The total downtime caused by failures amounted to 19.7 h accounting for 0.45% of the total user time. For 99.4% of the user time in FY2022, the stored beam current was maintained at 100 mA via the top-up operation wherein the stored beam was filled up on demand at any time. Extreme stability of the light source intensity better than 0.1% was provided by the top-up operation.



	FY2018	FY2019	FY2020	FY2021	FY2022
Accelerator Operation Time	5329.8	5285.7	5284.6	5300.2	5259.3
Storage Ring Operation Time	5316.7	5271.2	5274.8	5300.2	5259.3
Tuning & Study (Acc. & BL)	721.8	701.7	964.6	860.2	819.3
Refill	5.3	5.6	3.6	3.1	4.3
Downtime	43.1	40.5	7.4	10.0	19.7
Mean Time Between Failures	168.9	206.3	718.2	553.4	232.4
Achieved User Time	4559.6	4537.9	4309.0	4426.9	4416.0
Planned User Time	4608.0	4584.0	4464.0	4440.0	4440.0
Availability (%)	98.9	99.0	99.7	99.7	99.5

Fig. 1. Operation statistics for five most recent fiscal years.

Table 1. Operation modes in FY2022

	Single bunch current (mA)	Share of operation time (%)
203 bunches		39.5
4 bunch-train × 84		7.0
11 bunch-train × 29		17.8
1/7-filling + 5 single bunches	3	6.5
2/29-filling + 26 single bunches	1.4	0
1/14-filling + 12 single bunches	1.6	6.5
4/58-filling + 53 single bunches	1.0	3.2
406 × 11/29-filling + 1 single bunch	5	19.5

The variety of operation modes for SR experiments is one of the characteristics of SPring-8. The operation modes are classified into two types: several-bunch and hybrid-filling modes. The several-bunch mode comprises equally spaced bunches or trains of bunches such as 203 bunches or 29 trains of 11 bunches. Whereas, the hybrid-filling mode is composed of a long train of bunches and isolated single bunches. Sufficient isolated bunch purity is maintained by the SACLA linac's spurious bunch sweeper and the storage ring's bunch cleaning system. The operation modes of SPring-8 are listed in Table 1, along with a share of each operation mode for FY2022. Table 2 summarizes the beam parameters of the storage ring.

Table 2. Beam parameters of SPring-8 storage ring

Energy [GeV]	8
Number of buckets	2436
Tunes (ν_x / ν_y)	41.14 / 19.325
Current [mA]:	
single bunch	12
multi bunch	100
Bunch length (σ) [psec]	13
Horizontal emittance [nm·rad]	2.4 *
Vertical emittance [pm·rad]	4.8 *
Coupling [%]	0.2
RF Voltage [MV]	14.4 ** ~ 16
Momentum acceptance [%]	3.2 (~256 MeV)
Beam size (σ_x / σ_y)* [μm]	
Long ID section	333 / 7
ID section	316 / 5
BM1 section	94 / 12
BM2 section	100 / 12
Beam divergence (σ_x' / σ_y')* [μrad]	
Long ID section	8 / 0.7
ID section	9 / 1.0
BM1 section	58 / 0.5
BM2 section	68 / 0.5
Operational chromaticities (ξ_x / ξ_y)	+2 / +2 ***
Lifetime [hr]:	
100 mA (multi bunch)	~250
1 mA (single bunch)	~30
Horizontal dispersion [m]:	
Long ID section	0.153
ID section	0.146
BM1 section	0.039
BM2 section	0.059
Fast orbit stability (0.1 – 200 Hz) [μm]:	
horizontal (rms)	~4
vertical (rms)	~1

* Assuming 0.2% coupling
** Power saving mode
*** With bunch-by-bunch feedback

III. Beamlines

The SPring-8 storage ring can accommodate up to 62 beamlines: 34 insertion devices, 4 long undulators, and 24 bending magnets. At present, 54 beamlines are in operation, covering a wide variety of research fields involving synchrotron radiation science and technology. The beamlines are classified into the following three types.

(1) Public Beamlines (26 beamlines operating),
(2) Contract Beamlines (15 beamlines operating), and
(3) RIKEN Beamlines (13 beamlines operating).

Currently, 26 public beamlines are fully operating. Beamlines that have been proposed and constructed by external organizations, such as universities, research institutes, private companies and consortiums, are referred to as contract beamlines and these are used exclusively by contractors for their own research purposes. Currently, 15 contract beamlines are operational. Beamlines constructed by RIKEN or transferred to RIKEN, except for public beamlines, are referred to as RIKEN beamlines and are primarily used for RIKEN's own research activities, with partial availability for public use. RIKEN operates 13 beamlines. To illustrate the beamline portfolio of SPring-8, a beamline map is shown in Fig. 2 along with the beamline classification. The research fields for each beamline are listed in Table 3.

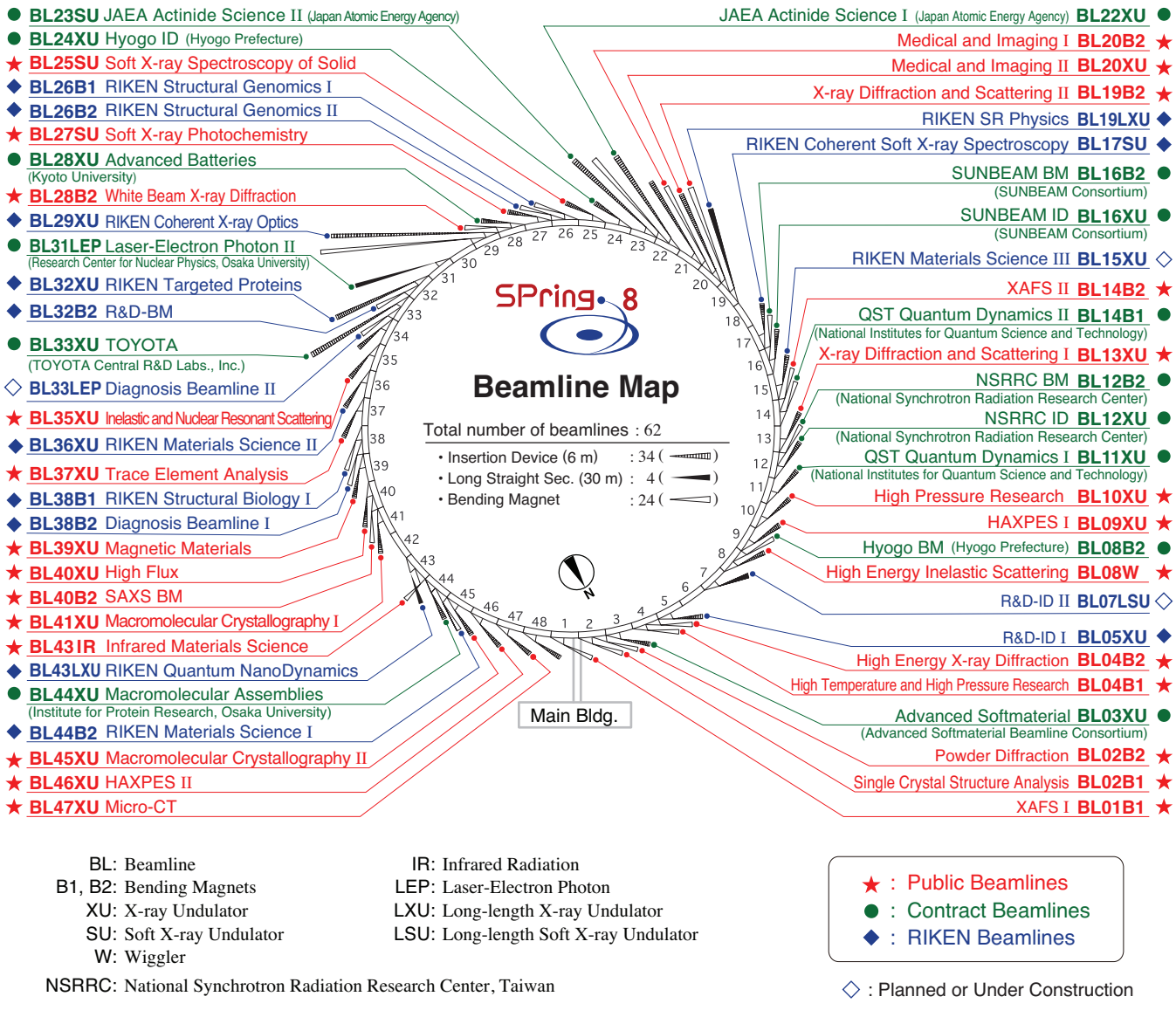


Fig. 2. Beamline map.

Table 3. List of beamlines

BL #	Beamline Name	(Public Use) or (First Beam)	Areas of Research and Available Techniques
★ Public Beamlines as of April 2023			
BL01B1	XAFS I	(Oct. 1997)	Wide energy range (3.8–113 keV), XAFS of dilute systems and thin films, time-resolved XAFS by quick scan (time-resolved QXAFS), depth-resolved XAFS, XAFS at low and high temperatures, simultaneous XAFS and XRD measurements, simultaneous XAFS and IR measurements.
BL02B1	Single Crystal Structural Analysis	(Oct. 1997)	Charge density study using high energy X-ray, *in situ* single crystal experiments, microcrystal structure analysis.
BL02B2	Powder Diffraction	(Sep. 1999)	Charge density study from powder diffraction, structural phase transition, *ab initio* structure determination from powder diffraction, crystal structure refinement by Rietveld method, *in situ* powder diffraction experiment under gas and vapor adsorption/desorption.
BL04B1	High Temperature and High Pressure Research	(Oct. 1997)	X-ray diffraction measurements and radiography under extreme conditions using large-volume press.
BL04B2	High Energy X-ray Diffraction	(Sep. 1999)	Structural analysis of glass, liquid, and amorphous materials.
BL08W	High Energy Inelastic Scattering	(Oct. 1997)	Magnetic Compton scattering, high-resolution Compton scattering, Compton scattering imaging, high-energy X-ray scattering, high-energy X-ray fluorescence analysis (XRF), time-resolved pair distribution function analysis (PDF).
BL09XU	HAXPES I	(Oct. 1997)	Resonant hard X-ray photoelectron spectroscopy (HAXPES), polarization-dependent HAXPES using diamond phase retarder, depth analysis of electron state, materials science, and applied materials science.
BL10XU	High Pressure Research	(Oct. 1997)	Crystal structure analysis under high pressure using diamond-anvil cells, *in situ*/*operando* observation of phase transition and compression behavior under extreme conditions, material sciences under extreme conditions, high pressure Earth and planetary science.
BL13XU	X-ray Diffraction and Scattering I	(Sep. 2001)	X-ray diffraction and reflectivity measurements, atomic-scale structural analysis of crystal surfaces and interfaces, ultrathin films, and nanostructures, residual stress measurement, time-resolved X-ray diffraction, *in situ* process observation using X-ray diffraction, *operando* X-ray diffraction, high-resolution powder X-ray diffraction and X-ray total scattering, structural refinement using Rietveld analysis, *in situ*/*operando* powder X-ray diffraction, time-resolved powder X-ray diffraction, analysis of local structures using nanodiffraction.
BL14B2	XAFS II	(Sep. 2007)	X-ray imaging, XAFS in a wide energy range (3.8–72 keV), XAFS of dilute systems and thin films, time-resolved XAFS by quick scan (time-resolved QXAFS), XAFS at low and high temperatures.
BL19B2	X-ray Diffraction and Scattering II	(Nov. 2001)	Residual stress measurement, structural analysis of thin film, surface and interface, powder X-ray diffraction, X-ray topography, ultrasmall-angle X-ray scattering.
BL20B2	Medical and Imaging I	(Sep.1999)	Micro-radiography, micro-angiography, micro-tomography, and refraction-contrast imaging are the mainly used techniques. BL20B2 is also applicable to small-animal experiments for medical research. Research and development of basic techniques for evaluation of optical devices and X-ray imaging.
BL20XU	Medical and Imaging II	(Sep. 2001)	X-ray micro-/nano-imaging: micro-tomography (micro-CT), nano-CT (15–37.7 keV), refraction/phase contrast imaging, X-ray diffraction tomography (XRD-CT), microbeam/scanning X-ray microscope, research and development of X-ray optics and optical elements, coherent X-ray optics, ultrasmall-angle X-ray scattering (USAXS, 23 keV).
BL25SU	Soft X-ray Spectroscopy of Solid	(Apr. 1998)	Research on electronic states by photoemission spectroscopy (PES), Research on electronic band structures by angle-resolved photoemission spectroscopy (ARPES), study of magnetic states by magnetic circular dichroism (MCD) of soft X-ray absorption, analysis of surface atomic arrangement by photoelectron diffraction (PED), nano-spectroscopic analysis using low-energy/photoemission electron microscope (SPELEEM).
BL27SU	Soft X-ray Photochemistry	(May 1998)	Soft X-ray photoabsorption spectroscopy of dilute samples in partial fluorescence yield mode, surface and interface analysis using depth-resolved soft X-ray photoabsorption spectroscopy, soft X-ray photoabsorption spectroscopy underambient atmospheric pressure, spectroscopy using soft X-ray microbeam, observation of electron state in solids by soft X-ray emission spectroscopy.
BL28B2	White Beam X-ray Diffraction	(Sep. 1999)	White X-ray diffraction: X-ray topography, energy-dispersive strain measurement, high energy (~200 keV) X-ray microtomography, high-speed X-ray imaging.
BL35XU	Inelastic and Nuclear Resonant Scattering	(Sep. 2001)	Phonons in solids and atomic dynamics in disordered materials by inelastic X-ray scattering, atomic and molecular dynamics by nuclear resonant inelastic scattering and quasi-elastic scattering, synchrotron-radiation-based Mössbauer spectroscopy, nuclear excitation.
BL37XU	Trace Element Analysis	(Nov. 2002)	X-ray microbeam/nano-beam spectrochemical analysis, X-ray spectroscopic imaging, ultratrace-element analysis, high-energy X-ray fluorescence analysis. Projection/scanning/imaging XAFS microscopy, high brightness XAFS, coherent diffraction imaging XAFS microscopy.
BL39XU	Magnetic Materials	(Oct. 1997)	X-ray magnetic circular dichroism (XMCD) spectroscopy and element-specific magnetometry (ESM), XAFS and XMCD spectroscopy under extreme conditions (high pressure, high magnetic field, and low/high temperature), XAFS and XMCD spectroscopy using micro/nanobeam and variable X-ray polarization (horizontally/perpendicularly linear or circular), scanning XAFS and XMCD microscopy using micro/nanobeam, X-ray emission spectroscopy (XES) and high-energy resolution fluorescence detected (HERFD) XAFS spectroscopy.
BL40XU	High Flux	(Apr. 2000)	Fast time-resolved X-ray diffraction and scattering experiments, X-ray photon correlation spectroscopy, X-ray fluorescence analysis, microbeam X-ray diffraction and scattering experiments, micro-crystallography.
BL40B2	SAXS BM	(Sep. 1999)	Small-angle X-ray scattering (SAXS).
BL41XU	Macromolecular Crystallography I	(Oct. 1997)	Macromolecular crystallography, micro-crystallography, ultrahigh resolution structural analysis.
BL43IR	Infrared Materials Science	(Apr. 2000)	Infrared microspectroscopy.
BL45XU	Macromolecular Crystallography II	(Apr. 2019)	Macromolecular crystallography, micro-crystallography, automation and high throughput data collection for protein crystallography.
BL46XU	HAXPES II	(Nov. 2000)	Hard X-ray photoemission spectroscopy, ambient pressure hard X-ray photoemission spectroscopy.
BL47XU	Micro-CT	(Oct. 1997)	X-ray micro-/nano-imaging including CT (7–15 keV), refraction/phase contrast imaging, high speed X-ray imaging, microbeam/scanning X-ray microscope.

BL #	Beamline Name	(Public Use) or (First Beam)	Areas of Research and Available Techniques
	● Contract Beamlines		as of April 2023
BL03XU	**Advanced Softmaterial** (Advanced Softmaterial Beamline Consortium)	(Nov. 2009)	Structural characterization of softmaterials using small- and wide-angle X-ray scattering, grazing-incidence small- and wide-angle X-ray scattering for thin films.
BL08B2	**Hyogo BM** (Hyogo Prefecture)	(Jun. 2005)	XAFS in a wide energy region, small angle X-ray scattering, X-ray topography, imaging, X-ray diffraction for multipurpose.
BL11XU	**QST Quantum Dynamics I** (National Institutes for Quantum Science and Technology)	(Oct. 1998)	Nuclear resonant scattering, surface and interface structure with MBE, resonant inelastic X-ray scattering, X-ray emission spectroscopy.
BL12B2	**NSRRC BM** (National Synchrotron Rad. Res. Center)	(Oct. 2000)	X-ray absorption spectroscopy, powder X-ray diffraction, high resolution X-ray scattering, protein crystallography.
BL12XU	**NSRRC ID** (National Synchrotron Rad. Res. Center)	(Dec. 2001)	Non-resonant or resonant inelastic X-ray scattering, hard X-ray photoemission spectroscopy.
BL14B1	**QST Quantum Dynamics II** (National Institutes for Quantum Science and Technology)	(Dec. 1997)	Materials science at high pressure, XAFS, time-resolved energy-dispersive XAFS (DXAFS).
BL16B2	**SUNBEAM BM** (SUNBEAM Consortium)	(Oct. 1998)	Characterization of various industrial materials for secondary batteries, fuel cells, catalysts, steels, semiconductors, optical and magnetic devices and others using X-ray absorption fine structure, X-ray diffraction (including X-ray reflectivity technique), X-ray topography and computed tomography/laminography.
BL16XU	**SUNBEAM ID** (SUNBEAM Consortium)	(Oct. 1998)	Characterization of various industrial materials for secondary batteries, fuel cells, catalysts, steels, semiconductors, optical and magnetic devices and others using X-ray diffraction, X-ray microbeam based evaluation techniques, hard X-ray photoelectron spectroscopy and X-ray fluorescence analysis.
BL22XU	**JAEA Actinide Science I** (Japan Atomic Energy Agency)	(May 2002)	HAXPES, microbeam XAFS, residual stress/strain distribution analysis, X-ray imaging, time-resolved X-ray diffraction, surface X-ray diffraction, high-energy X-ray diffraction, high-pressure science, coherent X-ray diffraction.
BL23SU	**JAEA Actinide Science II** (Japan Atomic Energy Agency)	(Feb. 1998)	Surface chemistry with supersonic molecular beam, photoelectron spectroscopy, magnetic circular dichroism, STXM.
BL24XU	**Hyogo ID** (Hyogo Prefecture)	(May. 1998)	Microbeam small- and wide-angle X-ray scattering for local structure analysis, scanning and imaging microscope, micro-tomography, coherent diffractionm, microbeam X-ray diffraction and bright field X-ray topography for electronic device materials, near-ambient pressure hard X-ray photoelectron spectroscopy.
BL28XU	**Advanced Batteries** (Kyoto University)	(Apr. 2012)	Characterization of rechargeable battery reactions and battery related materials by resonance X-ray diffraction, X-ray absorption spectroscopy (XAS), X-ray diffraction spectroscopy (XDS), and hard X-ray photoemission spectroscopy (HAXPES).
BL31LEP	**Laser-Electron Photon II** (RCNP, Osaka University)	(Oct. 2013)	Production of high intensity GeV photon beam by laser-backward Compton scattering, hadron physics via photonucleon and photonuclear reactions, test and calibration of detectors with GeV gamma-ray and converted electrons/positrons.
BL33XU	**TOYOTA** (TOYOTA Central R&D Labs., Inc.)	(Apr. 2009)	Time-resolved XAFS. 3DXRD, characterization of industrial materials and devices (e.g., catalysts, lightweight bodies, secondary batteries, fuel cells, and power modules).
BL44XU	**Macromolecular Assemblies** (IPR, Osaka University)	(May 1999)	Crystal structure analysis of biological macromolecular assemblies (e.g., membrane protein complexes, protein complexes, protein-nucleic acid complexes, and viruses).
BL05XU	**R&D-ID I**	(Mar. 2004)	R&D of high-energy X-ray optics, instruments, and applications; structural and dynamical research using small and wide angle scattering.
BL07LSU	**R&D-ID II**	(Oct. 2009)	R&D of soft X-ray optics, instruments, and applications.
BL15XU	**RIKEN Materials Science III**	(Oct. 2021)	Advanced diffraction and scattering with high-energy X-rays.
BL17SU	**RIKEN Coherent Soft X-ray Spectroscopy**	(Sep. 2003)	High resolution photoemission spectroscopy; soft X-ray emission spectroscopy; soft X-ray diffraction spectroscopy; soft X-ray microspectroscopy.
BL19LXU	**RIKEN SR Physics**	(Oct. 2000)	SR science with highly brilliant X-ray beam.
BL26B1	**RIKEN Structural Genomics I**	(Apr. 2002)	Structural biology research based on single crystal X-ray diffraction.
BL26B2	**RIKEN Structural Genomics II**	(Apr. 2002)	Structural biology research based on single crystal X-ray diffraction.
BL29XU	**RIKEN Coherent X-ray Optics**	(Dec. 1998)	X-ray optics, especially coherent X-ray optics.
BL32XU	**RIKEN Targeted Proteins**	(Oct. 2009)	Protein microcrystallography.
BL32B2	**R&D-BM**	(May 2002)	X-ray computed tomography; X-ray diffraction; X-ray absorption fine structure; R&D of SR instruments.
BL36XU	**RIKEN Materials Science II**	(Mar. 2020)	Time resolved XAFS and X-ray diffraction; 2D/3D scanning XAFS imaging; 3D computed tomography/laminography XAFS imaging; X-ray emission spectroscopy; ambient pressure hard X-ray photoelectron spectroscopy; pink beam experiments.
BL38B1	**RIKEN Structural Biology I**	(Oct. 2000)	Structure study of non-crystalline biological materials using small-angle scattering and diffraction techniques.
BL38B2	**Diagnosis Beamline**	(Sep.1999)	Accelerator beam diagnostics.
BL43LXU	**RIKEN Quantum NanoDynamics**	(Oct. 2011)	High resolution inelastic X-ray scattering for investigating atomic and electronic dynamics.
BL44B2	**RIKEN Materials Science I**	(Feb. 1998)	Structural materials science research using powder X-ray diffraction.

IV. User Program and Statistics

In principle, SPring-8 calls for public use proposals twice a year. Since the 2022B term, nine public beamlines have started inviting proposals six times annually, including the beamlines previously intended for industrial applications. Submitted proposals are reviewed by the SPring-8 Proposal Review Committee (SPring-8 PRC). Since 1997, SPring-8 has accepted a variety of proposals. For the promotion of research on industrial applications at SPring-8, currently, Industrial Application Proposals account for approximately 16%–19% of the total number of proposals conducted at various public beamlines. Certain companies and research institutes find retaining specialized staff and accommodating the need for quick access to SPring-8 difficult. The SPring-8 Measurement Service has been provided to appropriately respond to these circumstances.

In this framework of service, JASRI staff members perform measurements on behalf of users. Users may visit SPring-8 and be present during the measurements or simply send their samples to SPring-8. BL28XU was added to the Measurement Service BL in 2022B. JASRI expanded the purview of the SPring-8 Measurement Service to include five measurement methods (XAFS, Powder X-ray Diffraction, Small Angle X-ray Scattering, High energy X-ray CT, Hard X-ray Photoemission Spectroscopy). In addition, JASRI provides Protein Crystallography Automatic Data Collection at the Macromolecular Crystallography beamlines. Therefore, users can choose to be present at SPring-8 during the measurements or simply send their samples to SPring-8. Since 2022A, JASRI has begun suggesting Hour-based usage at most public beamlines as part of its proprietary time-designated proposals. According to this change, the feasibility study proposals for industrial applications have been integrated into this proposal program. Further, SPring-8 is developing a remote operation system that allows users to control the experimental instruments from outside to promote remote access. The numbers of experiments conducted and user visits to public and contract beamlines are presented in Fig. 3. Part of the proposals are for proprietary use, and do not require refereed reports. Figures 4 to 13 show information related to the user programs.

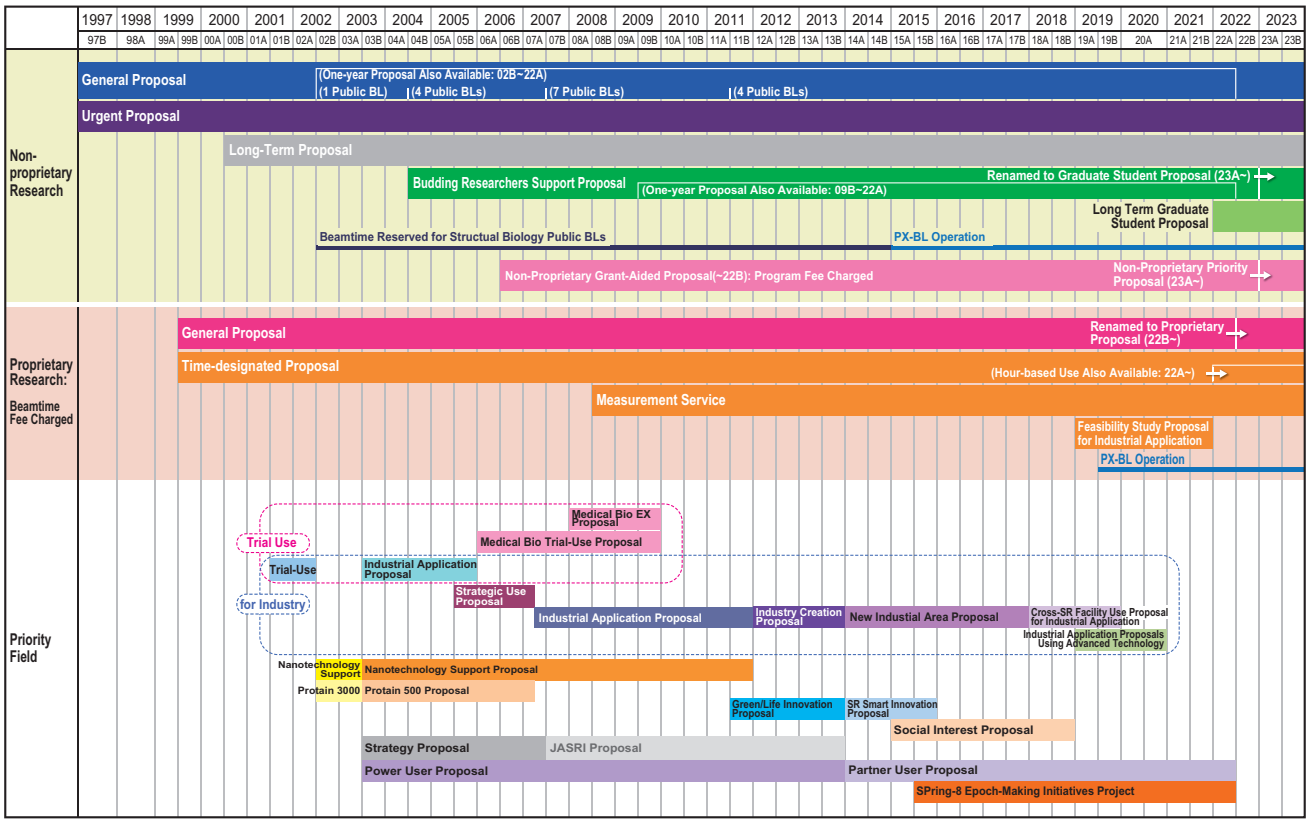


Fig. 3. Categories of proposals for the public beamlines.

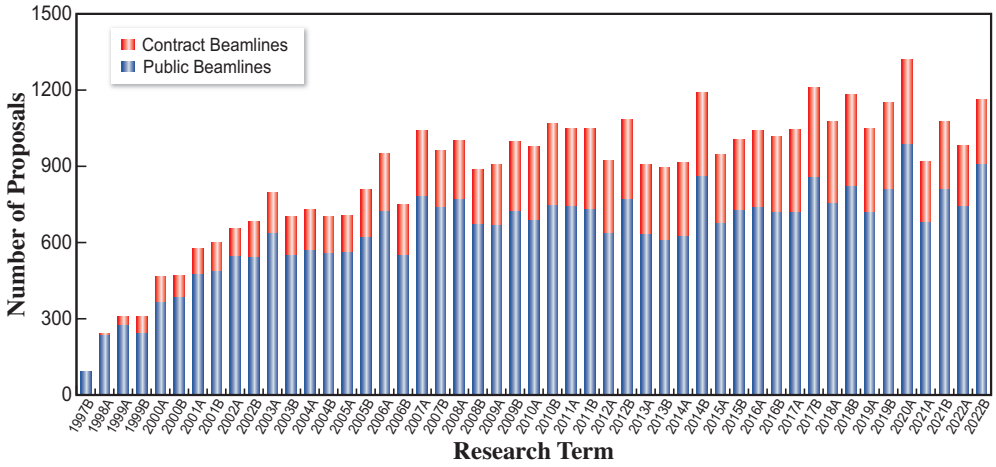


Fig. 4. Numbers of conducted experiments.

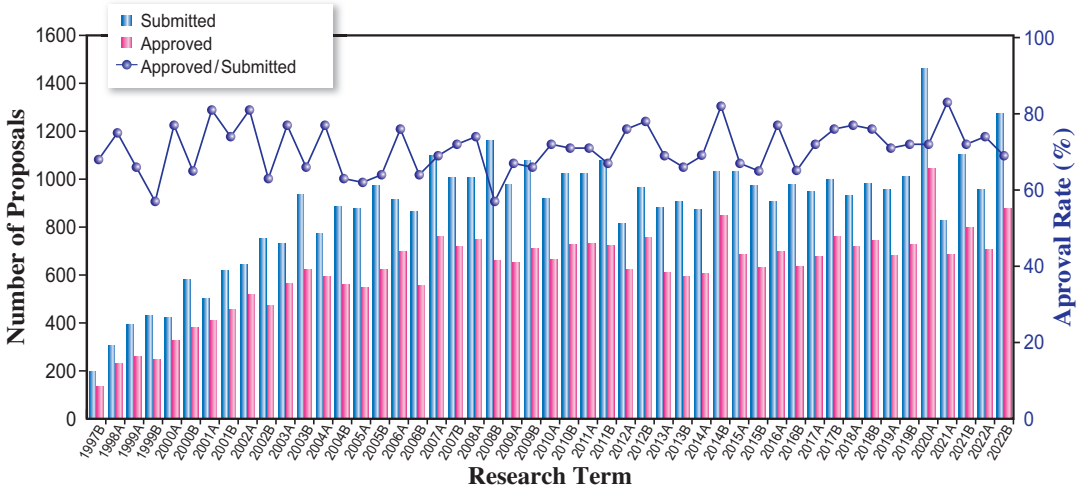


Fig. 5. Numbers of submitted proposals and approved proposals by research term (public beamlines).

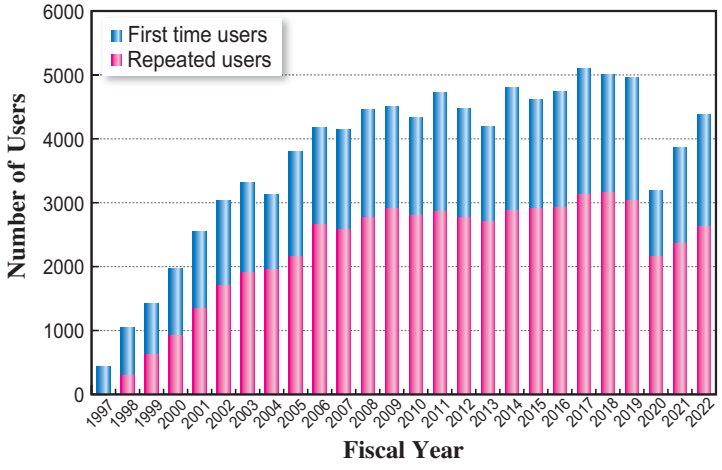


Fig. 6. Numbers of users by fiscal year.

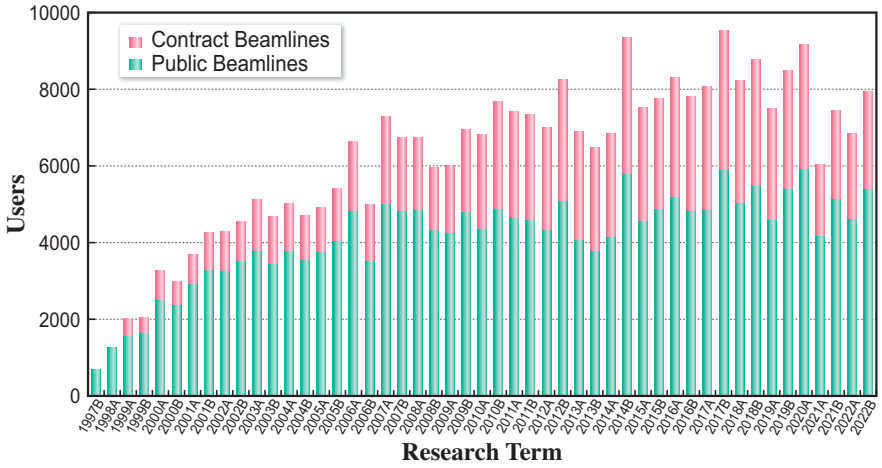


Fig. 7. Numbers of users visits by research term.

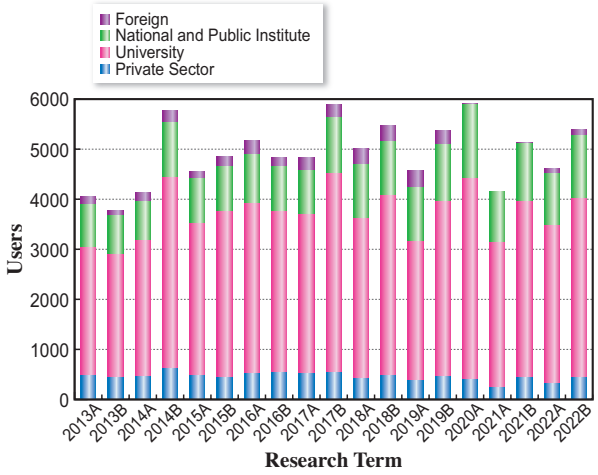


Fig. 8. Numbers of users by affiliation categories (public beamlines).

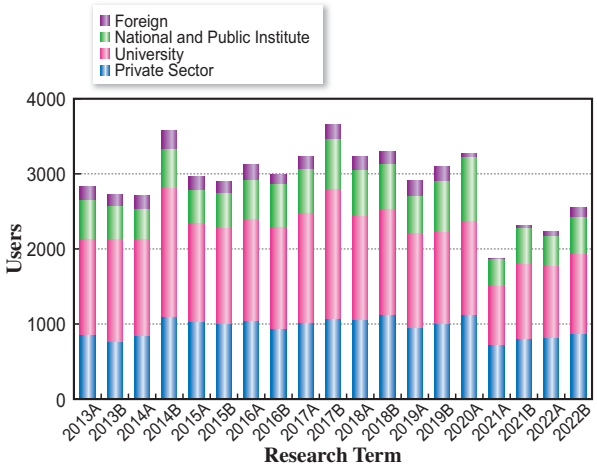


Fig. 9. Numbers of users by affiliation categories (contract beamlines).

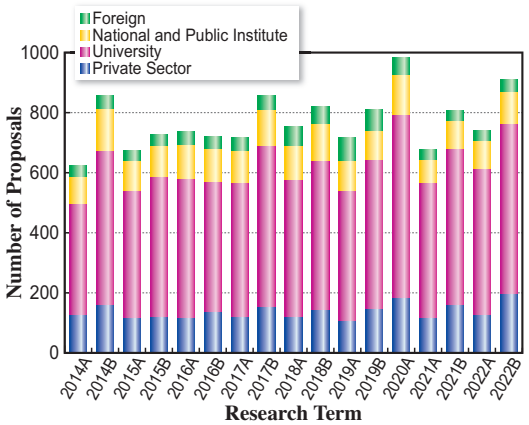


Fig. 10. Numbers of conducted proposals by affiliation (public beamlines).

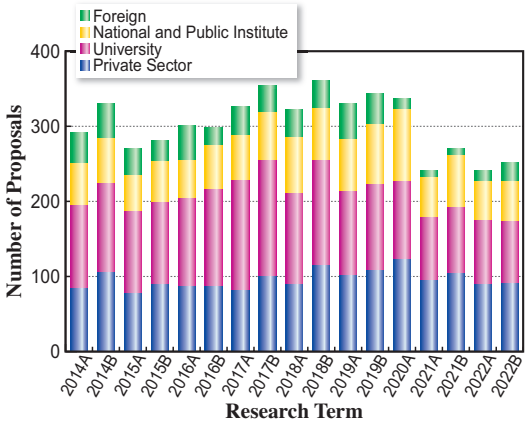


Fig. 11. Numbers of conducted proposals by affiliation categories (contract beamlines).

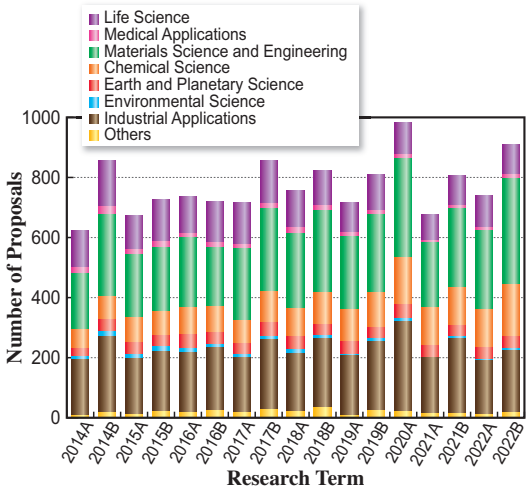


Fig. 12. Numbers of conducted proposals by research area (public beamlines).

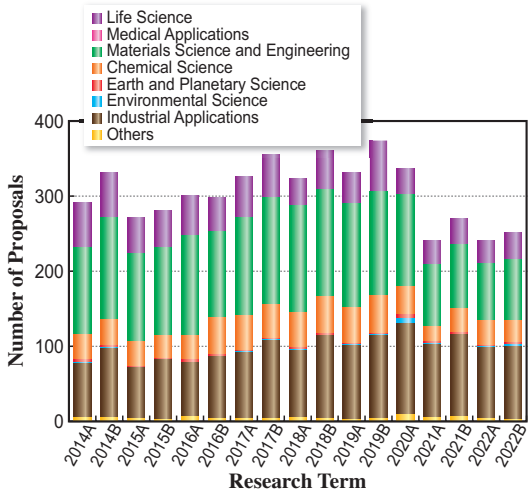


Fig. 13. Numbers of conducted proposals by research area (contract beamlines).

V. Research Outcome

As of March 2023, the total number of registered refereed papers from SPring-8 is 181. Figure 14 shows the annual statistics of refereed papers.

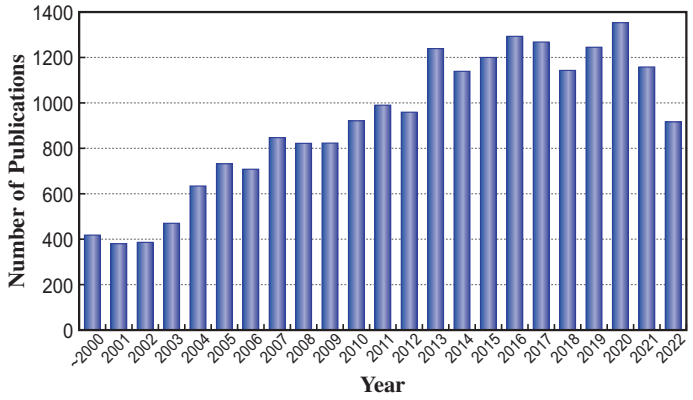


Fig. 14. Number of refereed publications.

VI. Research Complex

The facilities of SPring-8, SACLA, and NewSUBARU form the Center of Excellence (COE) on the SPring-8 campus where JASRI, public beamline users, contractors of contract beamlines, RIKEN, and the University of Hyogo work in close cooperation. Thus, a research complex has been formed, where each member has their own role in achieving high-quality results in the field of synchrotron radiation science and technology. The organizational charts of RIKEN and JASRI, which are at the center of this research complex, are shown in Figs. 15 and 16, respectively.

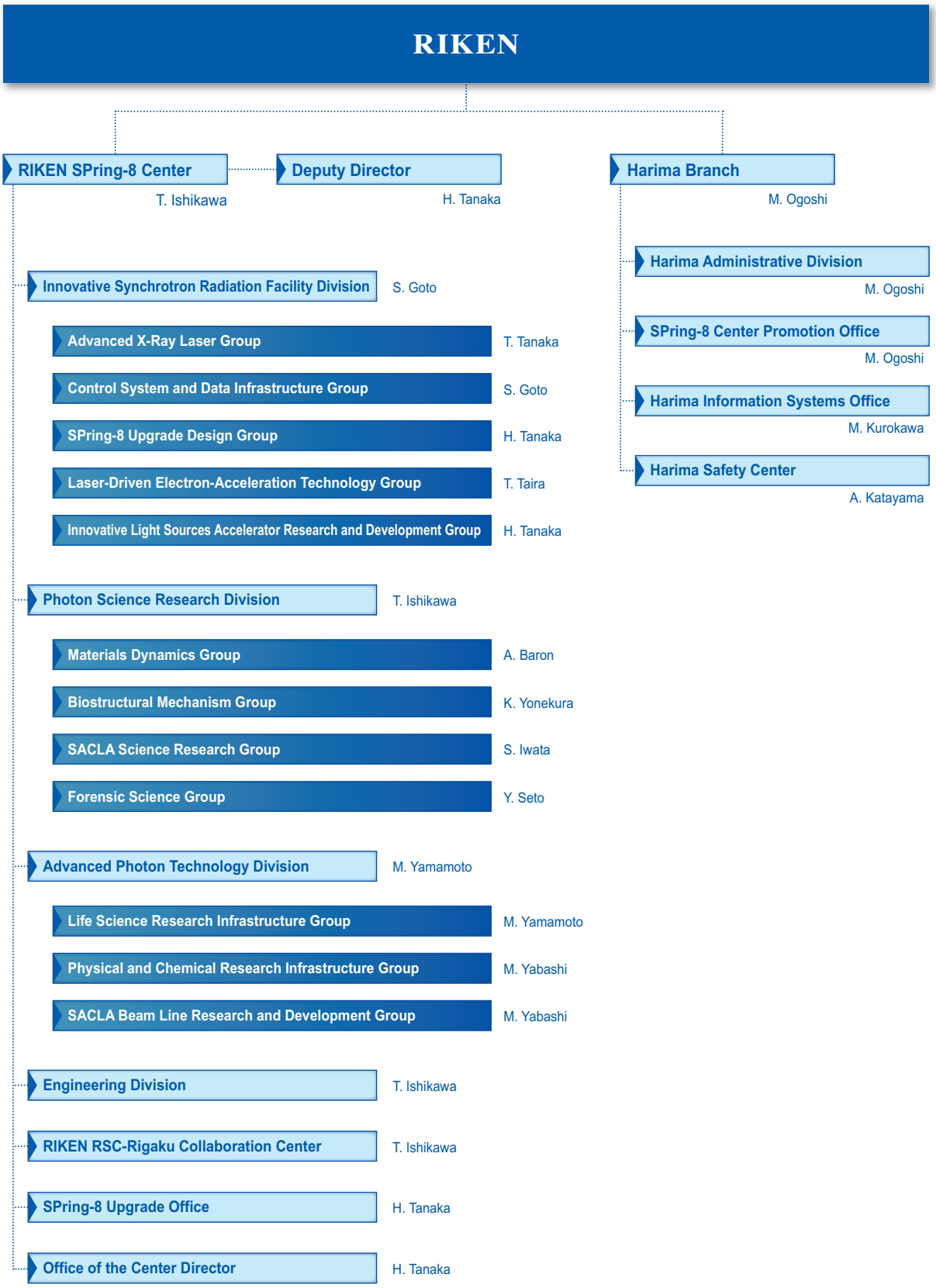


Fig. 15. RIKEN Harima Campus chart as of April 2023.

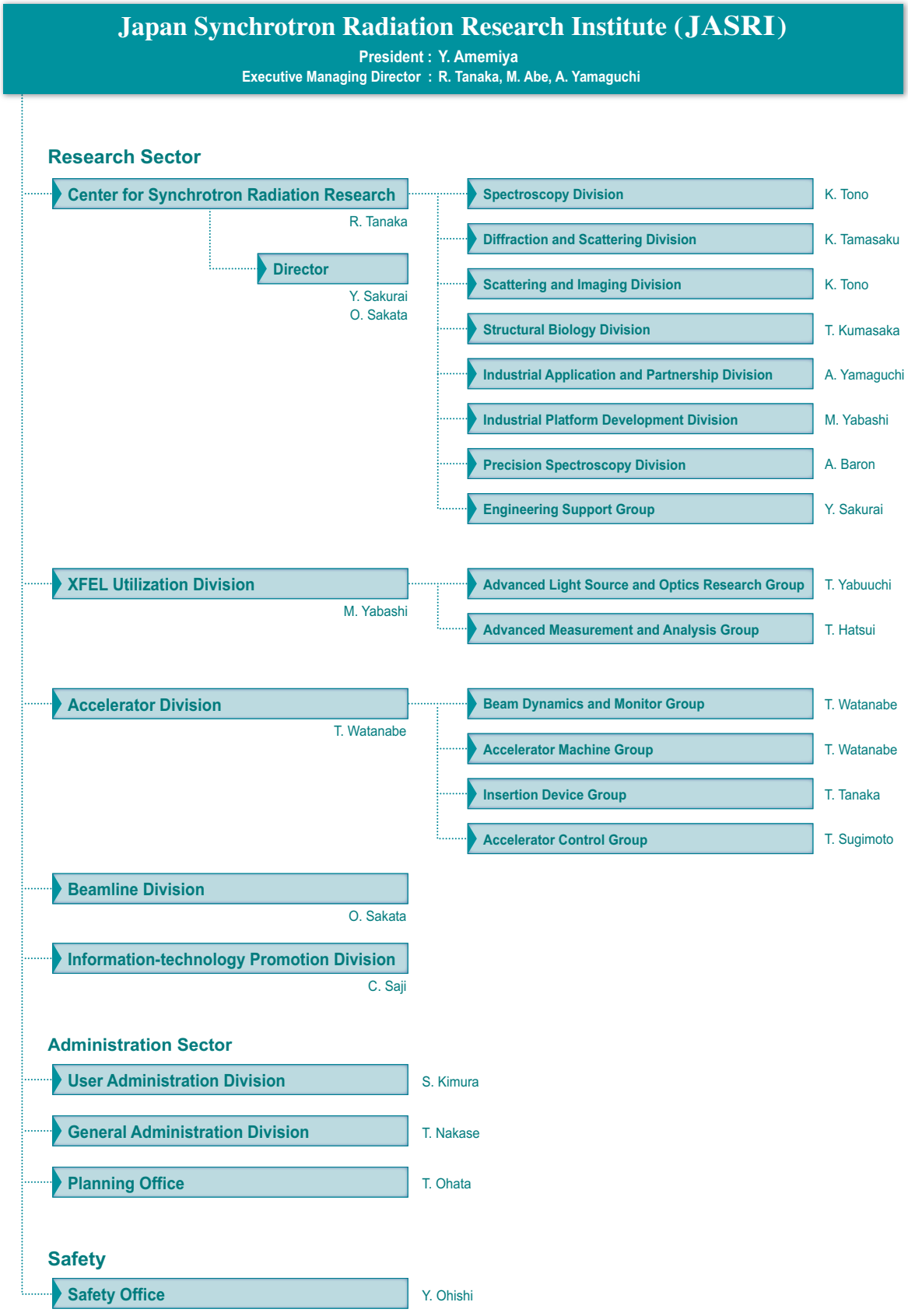


Fig. 16. JASRI chart as of April 2023.

VII. SPring-8 Users Community (SPRUC)

Professor E. Nishibori
University of Tsukuba
SPRUC Chairman FY2022

The SPRUC is a user society comprising of all users of SPring-8/SACLA. In addition to individuals, representative organizations comprising 26 institutes (principal universities, national/international research institutes, industries, and beamline consortiums) participate in the SPRUC to discuss strategies and perspectives to promote the utilization of SPring-8 and SACLA.

The SPring-8 Symposium is an important annual event of the SPRUC. SPring-8 Symposium 2022 was jointly organized by the University of Tokyo, RIKEN, and JASRI and held on September 25–26 in a hybrid manner on-site (the SPring-8 campus) and online presentations. The symposium theme was "Linkages between Academia and Society at SPring-8." Approximately 500 people attended the symposium, and many topics related to industry-academia collaboration were presented and discussed. In addition, a ceremony was held for the SPRUC 2022 Young Scientist Award, during which the award selection committee conferred the award to Dr. Ichiro Inoue from RIKEN SPring-8 Center, and Dr. Yoshihiko Furuike from Institute for Molecular Science. The upcoming SPring-8 Symposium 2023 is scheduled for September 26–27 at Osaka University.

The SPRUC supported the "SPring-8 Summer School" held in July for the enhancement of research competency of users, and hosted the "SPring-8 Autumn School" on September 4–7 in collaboration with JASRI for acquiring new users and human resource development. The Autumn School was postponed to December 2021 owing to COVID19, however, it was held in September 2022 for the first time in three years. The SPRUC research groups contributed to the planning of lectures at the Autumn School. To facilitate easier participation people from companies and students who were not yet affiliated with a laboratory, the school was opened to them without the requirement of registration as radiation workers.

SPRUC2022 Young Scientist Award
Dr. I. Inoue, Prof. E. Nishibori, and Dr. Y. Furuike

The SPRUC cohosted the 5th Beamlines Upgrade Workshop on March 10 with RIKEN and JASRI, as it did in previous years. The workshop was held to enhance information exchange between members of the SPRUC and the facility, focusing mainly on the progress of each beamline upgrade such as the diffraction and scattering beamlines, X-ray micro-CT beamlines, and HAXPES beamlines. In addition, the progress of automated measurements, renewal of the proposal systems at SPring-8, and development of light sources and accelerators for SPring-8-II were described and discussed.

The 6th SPRUC research groups were voluntarily organized in each research field and comprised 35 research groups. In 2022, the 6th SPRUC research groups welcomed a new addition, the angle-resolved scattering spectroscopy group. The research groups actively held meetings to collect ideas and determine the need for beamline upgrades in each research field.

SPring-8 Symposium 2022

VIII. Outreach Activities

To reach new users in unexplored application fields, SPring-8 holds various serialized seminars named "Workshop on Advanced Techniques and Applications at SPring-8." Representative examples are as follows:

- 77th: Collaborative usage of Synchrotron Radiation and Neutron Beam Advances in Measurement Informatics and Data Processing Using External Computational Resources
  May 20, 2022 • Video conference

- 81st: Current Status and Future of Protein Structural Biology Research at SPring-8
  September 15, 2022 • Osaka University and Video conference

- 84th: Cutting-Edge of Silicon Semiconductor Manufacturing Technology and Ceramic Device Development in Synchrotron Radiation
  December 20, 2022 • AP Shinagawa

In addition, by exploring the advantages of video conferencing, we have been holding a "Seminar on Advanced Techniques and Applications at SPring-8" every Tuesday evening since January 2021. Over 2000 participants have been involved in the eight seminars conducted during the period of May 11 to June 28, 2022.