Three-Way Meeting
(User Services Workshop)
Outline (by Susan-san)

• Facility Overview
  – Key information/dates: groundbreaking, first light, first user access,
  – Statistics: user community growth, growth in number of experiments, growth in requests for beam time vs. time available (oversubscription)
  – Number of beamlines (chart or graphic showing growth)
  – Budget, previous and current
  – Future upgrade plans as they affect the user community
  – Overview of process for user registration, beamtime requests, review, allocation, safety process, end of experiment closeout

• Industrial User Program and Proprietary Process/Pricing

• User Office: Function and Staffing

• User Community (user organizations, workshops, meetings, etc.)

• Publications (history, how to collect)

• Education and Outreach (schools, seminars, tours, educational programs)
Summary of Management and Operations

Constructed by RIKEN and JAERI (1991-97)
Open to public: October, 1997
Construction Cost: c.a. ￥110 Billion (US$ 1 Billion)
   at the opening with 10 public beamlines

Owned by RIKEN
Operated by JASRI

Operation Budget (FY2011): c.a. ￥8.4 Billion (US$ 0.1 Billion)
(FY2012): c.a. ￥8.8 Billion (US$ 0.1 Billion)

Users: Total 15,249 users/year (FY2012)
Users’ Beam Time: c.a. 4,156 hours/year
Operating time: 5,063 hours/year (FY2012)
Operation: 24 hours through 3-5 weeks
Beam-loss time: less than 1 % of the total operation time

Jun. 1989: Harima Science Garden City chosen as the construction site.


Nov. 1991: Start of SPring-8 construction.


Oct. 1999: Start of proprietary research (diversification of user program).


Apr. 2000: Start of user support by coordinators.

Sep. 2002: The 1st Interim Review of SPring-8 Project by MEXT

Apr. 2003: Start of priority proposal program.


May 2004: Start of top-up operation.

Aug. 2004: Damage caused to storage ring roof due to typhoons.


Jul. 2006: The JASRI International Advisory Council (JIAC).

Mar. 2007: JASRI selected as the Registered Institution for Facilities (SPring-8) Use Promotion.

Apr. 2007: SPring-8 operation and management assigned to JASRI by RIKEN through competitive bidding.

Jul. 2007: The 2nd Interim Review of SPring-8 Project by MEXT.

Oct. 2007: Ceremony held to commemorate the 10th anniversary of SPring-8 user operation.

Nov. 2008: The SPring-8 Academic Review Committee (SPARC).

Jun. 2009: The number of total user visits to SPring-8 reaches 100,000.

Nov. 2009: Budget project review by the Government Revitalization Unit.

Mar. 2011: JASRI selected as the Registered Institution for Facilities (SPring-8 and SACLA) Use Promotion.

Mar. 2011: Great East Japan Earthquake. (→ Support for Disaster-Affected Quantum Beam Research Facilities)

Mar. 2012: Start of SACLA User Operation

※ The 3rd Interim Review of SPring-8 Project by MEXT is now in progress.
Research Complex
Research Complex

Research Facility

- SPring-8
  - Accelerator Complex
  - Public Beamlines
  - RIKEN Beamlines and other RIKEN facilities
  - Contract Beamlines

- SACLA

- NewSUBARU

Operation and Management

- SPring-8
  - RIKEN/JASRI

- SACLA
  - RIKEN/JASRI

- NewSUBARU
  - Laboratory of Advanced Science and Technology for Industry, University of Hyogo
## Contract Beamlines

<table>
<thead>
<tr>
<th>Beamline Name</th>
<th>Consortium/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Softmaterial (BL03XU)</td>
<td>Advanced Softmaterial Beamline Consortium</td>
</tr>
<tr>
<td>University-of-Tokyo Synchr. Rad. Outstation (BL07LXU)</td>
<td>The University of Tokyo</td>
</tr>
<tr>
<td>Hyogo BM (BL08B2)</td>
<td>Hyogo Prefecture</td>
</tr>
<tr>
<td>Hyogo ID (BL24XU)</td>
<td>Japan Atomic Energy Agency</td>
</tr>
<tr>
<td>JAEA Quantum Dynamics (BL11XU)</td>
<td>National Synchrotron Radiation Research Center, Taiwan</td>
</tr>
<tr>
<td>JAEA Materials Science (BL14B1)</td>
<td>Industrial Consortium</td>
</tr>
<tr>
<td>JAEA Quantum Structural Science (BL22XU)</td>
<td>Kyoto University</td>
</tr>
<tr>
<td>JAEA Actinide Science (BL23SU)</td>
<td>Research Center for Nuclear Physics, Osaka University</td>
</tr>
<tr>
<td>NSRRC ID (BL12XU)</td>
<td>TOYATA Central R&amp;D Labs., Inc.</td>
</tr>
<tr>
<td>NSRRC BM (BL12B2)</td>
<td>The University of Electro-Communications</td>
</tr>
<tr>
<td>WEBRAM (BL15XU)</td>
<td>Institute for Protein Research, Osaka University</td>
</tr>
<tr>
<td>SUNBEAM ID (BL16XU)</td>
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<tr>
<td>SUNBEAM BM (BL16B2)</td>
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</tr>
<tr>
<td>RISING (BL28XU)</td>
<td></td>
</tr>
<tr>
<td>Laser-Electron Photon II (BL31LEP)</td>
<td></td>
</tr>
<tr>
<td>Laser-Electron Photon (BL33LEP)</td>
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<tr>
<td>TOYOTA (BL33XU)</td>
<td></td>
</tr>
<tr>
<td>Catalytic Reaction Dynamics for Fuel Cells (BL36XU)</td>
<td></td>
</tr>
<tr>
<td>Macromolecular Assemblies (BL44XU)</td>
<td></td>
</tr>
</tbody>
</table>
Operation Status of Storage Ring
Electron Beam
The thinner, the brighter, for the same current.

Sectional View of Electron Beam @ ID Center

1) Design
Vertical
~80μm

2) Achieved by Normal Optics
Horizontal
~400μm

3) Achieved by Low Emittance Optics
<10μm
~400μm
<7μm
~300μm

Beam Profile
@ BM (Acc.Diag.BL 38B2)
Top-up Operation (since May 2004)

- Fixed interval (~ Oct. 2007)
  - Interval: 1 min (several, hybrid) or 5 min (multi-bunch)
  - Current stability: 0.1%
- Variable interval (Nov. 2007 ~)
  - Interval depending on lifetime: 20 sec ~ 2 min.
  - Current stability: 0.03% (30 µA/one shot)

Stable Top-up Operation

1. Stored Current Variation < 0.03 %
2. Injection Beam Loss < 10 %
3. Stored Beam Oscillation Free
Operation Hours at SPring-8

Annually, about 5,000 hours of operation has been achieved with downtime due to failure kept to a minimum.

<table>
<thead>
<tr>
<th>Year</th>
<th>Operation Time (hours)</th>
<th>Machine Study</th>
<th>User Time</th>
<th>Downtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1,932</td>
<td>614</td>
<td>1,286</td>
<td>32</td>
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<tr>
<td>1998</td>
<td>4,640</td>
<td>1,527</td>
<td>2,997</td>
<td>116</td>
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<td>1999</td>
<td>5,137</td>
<td>1,426</td>
<td>3,648</td>
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<tr>
<td>2001</td>
<td>5,311</td>
<td>1,254</td>
<td>3,965</td>
<td>92</td>
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<tr>
<td>2002</td>
<td>5,467</td>
<td>1,269</td>
<td>4,001</td>
<td>197</td>
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<tr>
<td>2003</td>
<td>5,363</td>
<td>1,237</td>
<td>3,930</td>
<td>196</td>
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<tr>
<td>2004</td>
<td>4,233</td>
<td>711</td>
<td>3,449</td>
<td>73</td>
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<tr>
<td>2005</td>
<td>5,651</td>
<td>1,246</td>
<td>4,338</td>
<td>67</td>
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<tr>
<td>2006</td>
<td>5,012</td>
<td>1,204</td>
<td>3,770</td>
<td>38</td>
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<tr>
<td>2007</td>
<td>5,055</td>
<td>1,056</td>
<td>3,969</td>
<td>29</td>
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<tr>
<td>2008</td>
<td>5,133</td>
<td>991</td>
<td>4,111</td>
<td>31</td>
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<tr>
<td>2009</td>
<td>5,035</td>
<td>986</td>
<td>4,015</td>
<td>35</td>
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<tr>
<td>2010</td>
<td>5,096</td>
<td>997</td>
<td>4,072</td>
<td>27</td>
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<tr>
<td>2011</td>
<td>4,904</td>
<td>789</td>
<td>4,059</td>
<td>57</td>
</tr>
<tr>
<td>2012</td>
<td>5,063</td>
<td>868</td>
<td>4,156</td>
<td>39</td>
</tr>
</tbody>
</table>

Operation Hours at SPring-8

- Operation Hours Cut Short Due to Damage to Storage Ring Roof Caused by Typhoon (Fall 2004)
- Shortest Downtime: 13 hours

Start of User Operation (October 1997)
Beamline Map and New Beamlines
Beamlines
(as of January 17, 2013)

<table>
<thead>
<tr>
<th>Status</th>
<th>Public Beamlines</th>
<th>Contract Beamlines</th>
<th>RIKEN Beamlines</th>
<th>Accelerator Diagnostics Beamlines</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational</td>
<td>★ 2 6</td>
<td>● 1 8</td>
<td>◆ 9</td>
<td>■ 2</td>
<td>5 5</td>
</tr>
<tr>
<td>Planned or Under Construction Construction</td>
<td>○ 1</td>
<td>◇ 1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>★ 2 7</td>
<td>● 1 9</td>
<td>◆ 9</td>
<td>■ 2</td>
<td>5 7</td>
</tr>
</tbody>
</table>

- **BL23SU** JAEA Actinide Science (Japan Atomic Energy Agency)
- **BL24XU** Hyogo ID (Hyogo Prefecture)
- **BL25SU** Soft X-ray Spectroscopy of Solid
- **BL26B1** RIKEN Structural Genomics I
- **BL26B2** RIKEN Structural Genomics II
- **BL27SU** Soft X-ray Photochemistry
- **BL28XU** RISING (Kyoto University)
- **BL28B2** White Beam X-ray Diffraction
- **BL29XU** RIKEN Coherent X-ray Optics
- **BL31LEp** Laser-Electron Photon II (Research Center for Nuclear Physics, Osaka University)
- **BL32XU** RIKEN Targeted Proteins
- **BL32B2** RIKEN
- **BL33XU** TOYOTA (TOYOTA Central R&D Labs., Inc.)
- **BL33LEp** Laser-Electron Photon (Research Center for Nuclear Physics, Osaka University)
- **BL35XU** High Resolution Inelastic Scattering
- **BL36XU** Catalytic Reaction Dynamics for Fuel Cells (The University of Electro-Communications)
- **BL37XU** Trace Element Analysis
- **BL38B1** Structural Biology III
- **BL38B2** Accelerator Beam Diagnosis
- **BL39XU** Magnetic Materials
- **BL40XU** High Flux
- **BL40B2** Structural Biology II
- **BL41XU** Structural Biology I
- **BL41R** Infrared Materials Science
- **BL43LXU** RIKEN Quantum NanoDynamics
- **BL44XU** Macromolecular Assemblies (Institute for Protein Research, Osaka University)
- **BL44B2** RIKEN Materials Science
- **BL45XU** RIKEN Structural Biology I
- **BL46XU** Engineering Science Research III
- **BL47XU** HAXPES-µCT
- **JAEA Quantum Structural Science** (Japan Atomic Energy Agency)
- **BL22XU** Medical and Imaging I
- **BL20B2** Medical and Imaging II
- **BL20XU**
- **BL19B2** Engineering Science Research I
- **BL19LXU** RIKEN SR Physics
- **BL17SU** RIKEN Coherent Soft X-ray Spectroscopy
- **BL16B2** SUNBEAM BM
- **BL16XU** SUNBEAM ID (SUNBEAM Consortium)
- **WEBRAM** BL15XU (WEBRAM Consortium)
- **BL14B2** (National Institute for Materials Science)
- **BL13XU** Engineering Science Research II
- **BL12B2** JAEA Materials Science
- **BL12XU** (Japan Atomic Energy Agency)
- **BL11XU** Surface and Interface Structures
- **BL10XU** High Pressure Research
- **BL09XU** Nuclear Resonant Scattering
- **BL08B2** Hyogo BM (Hyogo Prefecture)
- **BL08W** High Energy Inelastic Scattering
- **BL07LSU** University-of-Tokyo Synchrotron Radiation Outstation (The University of Tokyo)
- **BL05SS** Accelerator Beam Diagnosis
- **BL04B2** High Energy X-ray Diffraction
- **BL04XU** High Temperature and High Pressure Research
- **BL03XU** Advanced Softmaterial (Advanced Softmaterial Beamline Consortium)
- **BL02B2** Powder Diffraction
- **BL02B1** Single Crystal Structure Analysis
- **XAFS** BL01B1
## SPring-8 Beamlines

### Newly Operational FY2012

<table>
<thead>
<tr>
<th>Type</th>
<th>BL Name/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Beamline</td>
<td>● Research &amp; Development Initiative for Scientific Innovation of New Generation Batteries Beamline (RISING)  &lt;br&gt;  Kyoto University</td>
</tr>
<tr>
<td></td>
<td>● Catalytic Reaction Dynamics for Fuel Cells Beamline  &lt;br&gt;  The University of Electro-Communications</td>
</tr>
</tbody>
</table>

### Under Construction or Commissioning

<table>
<thead>
<tr>
<th>Type</th>
<th>BL Name/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Beamline</td>
<td>○ Laser-Electron Photon II Beamline  &lt;br&gt;  Research Center for Nuclear Physics, Osaka University</td>
</tr>
<tr>
<td>RIKEN Beamline</td>
<td>◇ BL32B2</td>
</tr>
</tbody>
</table>

### Newly Operational FY2012

<table>
<thead>
<tr>
<th>Type</th>
<th>BL Name/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIKEN Beamline</td>
<td>◆ RIKEN Quantum NanoDynamics Beamline</td>
</tr>
</tbody>
</table>
A new XAFS beamline (BL36XU) for catalytic reaction dynamics for fuel cells

- **Contract beamline of the Univ. of Electro-Communications (UEC)**
  Supported by New Energy and Industrial Technology Development Organization (NEDO), Japan

- **Target of the project**
  Development of catalysts for the next generation polymer electrolyte fuel cells (PEFCs)

- **Target of BL36XU**
  Clarification of reaction and degradation process of electrode catalysts of PEFCs under real working conditions by time- and spatially resolved XAFS method.

---

**Schematic of PEFC**

- **PEFC stack**
  - Anode
  - Electrolyte Membrane
  - Cathode
  - Residual H₂
  - H₂O

**Residential co-generation system**

**Fuel Cell Vehicles**
SPring-8 Annual Operation Cost
SPRING-8 Annual Operation Cost (Government Budget)

<Million JPY>

Including Facilities : Accelerator, Public beamlines and Other equipments
Not Including Facilities : RIKEN beamlines and Contract beamlines

FY


10,132 10,071 9,958 9,867 9,785 9,712 9,655 9,608 9,565 9,527 9,494 9,465 9,438
Overview of process for user registration and the others at SPring-8 Public BLs
Proposal Procedure at Public Beamlines

- User Registration (all users)
- Proposal Application (two calls/year)

Arrival
- At the SPring-8 Users Office
  - Safety Training
  - Pickup (SPring-8 user card/dosimeter with RFID/stockroom card)
  - Receipt of documents
  - Check-in at the SPring-8 Guest House (2,000 yen/night)

Experiment
- Beamline Inspection Sheet

Departure
- Check-out of the SPring-8 Guest House
  - At the SPring-8 Users Office
    - Return (SPring-8 user card/dosimeter with RFID/Beamline Notes/stockroom card)
    - Confirmation of Consumables List
    - Beamtime Report
    - Beamline Inspection Sheet (Required documents vary depending on the type of proposal)

Reports
- SPring-8 Experiment Summary Report* (within 60 days after the end of the research term)

Publications
- Publication & Registration of Refereed Journal Article or Equivalent (within 3 years from the end of the research term)
- Registration of Other Published Works

Patents

*Not required if your request to change the research type from non-proprietary to proprietary has been approved.
Proposal Review

Referees
- Scientific and technical relevance
- Necessity of SPring-8 as a research tool

JASRI BL Scientists
- Technical feasibility
- Estimation for suitable beamtime

JASRI Safety Office
- Safety of the experiment.

SPring-8 PRC (Proposal Review Committee)
- Comprehensive review
- Beamtime Allocation

Proposal Procedure at Public Beamlines

Registration
- User Registration (all users)

Application
- Proposal Application (two calls/year)

Review
- Review by Proposal Review Committee
  - Notification of Results (by email and by post)

Documents
- Required Documents (vary depending on the type of proposal)
  - Radiation Worker Registration Form
  - Application Form for SPring-8 Facilities
  - List of Samples, Reagents, etc.
  - List of Carry-In Items
  - Change of Project Team Members
  - Information for Consumables

Arrival
- At the SPring-8 Users Office
  - Safety Training
  - Pickup (SPring-8 user card/dosimeter with RFID/stockroom card)
  - Receipt of documents
  - Check-in at the SPring-8 Guest House (2,000 yen/night)

Experiment
- Beamline Inspection Sheet

Departure
- Check-out of the SPring-8 Guest House
  - At the SPring-8 Users Office
    - Return (SPring-8 user card/dosimeter with RFID/beamline Notes/stockroom card)
    - Confirmation of Consumables List
    - Beamtime Report
    - Beamline Inspection Sheet
      (Required documents vary depending on the type of proposal)

Reports
- SPring-8 Experiment Summary Report* (within 60 days after the end of the research term)

Publications
- Publication & Registration of Refereed Journal Article or Equivalent (within 3 years from the end of the research term)
- Registration of Other Published Works

Patents

*Not required if your request to change the research type from non-proprietary to proprietary has been approved.
Project leaders of non-proprietary proposals must submit an experiment summary report online within 60 days after completion of the experiment. Submitted experiment summary reports will be incorporated into the experiment summary report database with search capabilities and made available on the UI site.
Publication & Registration of Refereed Journal Article or Equivalent

Users must publish research results in one of the following three ways and register the published work with the Publications Database within three years from the end of the research term.

① Refereed journal paper incl. refereed proceedings and dissertation (clearly stating the proposal number)
② SPring-8 Research Report
③ Corporate technical journal article (industrial users only)

Publication Database Search:
https://user.spring8.or.jp/uisearch/publication2/

SPring-8 Research Report (Japanese text only)
http://user.spring8.or.jp/resrep/
SPring-8 Utilization Statistics
### Number of Public and Contract BL Conducted Experiments

The numbers of both public and contract BL proposals have been gradually increasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>Public Beamlines</th>
<th>Contract Beamlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>94</td>
<td>7</td>
</tr>
<tr>
<td>1998</td>
<td>234</td>
<td>7</td>
</tr>
<tr>
<td>1999</td>
<td>516</td>
<td>98</td>
</tr>
<tr>
<td>2000</td>
<td>748</td>
<td>188</td>
</tr>
<tr>
<td>2001</td>
<td>962</td>
<td>216</td>
</tr>
<tr>
<td>2002</td>
<td>1,085</td>
<td>252</td>
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<tr>
<td>2003</td>
<td>1,183</td>
<td>318</td>
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<tr>
<td>2004</td>
<td>1,124</td>
<td>307</td>
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<tr>
<td>2005</td>
<td>1,180</td>
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<td>2008</td>
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<td>2010</td>
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<td>618</td>
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<tr>
<td>2011</td>
<td>1,470</td>
<td>628</td>
</tr>
<tr>
<td>2012</td>
<td>1,408</td>
<td>599</td>
</tr>
</tbody>
</table>

The chart above illustrates the number of proposals for both public and contract beamlines from 1997 to 2012. The numbers have shown a steady increase over the years.
Submitted / Approved Proposals of Public Beamlines

The number of proposals submitted in response to each semi annual call for proposals and the number of approved proposals.
# Beamtime Allocation at SPring-8 Public BLs

**Unit:** Shifts (1 Shift = 8 hours)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Requested (all Proposals)</td>
<td>9,264.50</td>
<td>10,089.00</td>
<td>8,944.25</td>
<td>9,067.75</td>
<td>8,055.75</td>
<td>8,659.75</td>
<td>7,853.25</td>
<td>8,578.25</td>
<td>7,134.25</td>
<td>7,862.75</td>
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<tr>
<td>B: Requested (only Submitted Proposals)</td>
<td>6,687.50</td>
<td>5,806.00</td>
<td>5,935.75</td>
<td>6,086.25</td>
<td>5,979.75</td>
<td>6,230.75</td>
<td>5,607.25</td>
<td>6,021.25</td>
<td>5,592.25</td>
<td>6,336.75</td>
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<tr>
<td>C: Available</td>
<td>5,711.00</td>
<td>4,489.50</td>
<td>5,054.00</td>
<td>5,263.75</td>
<td>5,267.75</td>
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<td>5,155.75</td>
<td>5,296.25</td>
<td>5,966.25</td>
</tr>
<tr>
<td>C/A</td>
<td>62%</td>
<td>44%</td>
<td>57%</td>
<td>58%</td>
<td>65%</td>
<td>64%</td>
<td>66%</td>
<td>60%</td>
<td>74%</td>
<td>76%</td>
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<tr>
<td>C/B</td>
<td>85%</td>
<td>77%</td>
<td>85%</td>
<td>86%</td>
<td>88%</td>
<td>89%</td>
<td>93%</td>
<td>86%</td>
<td>95%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Excluding In-house Proposals by JASRI Staff
Statistics of Conducted Experiments and Users

**Number of Cumulative Conducted Researches**

<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Beamlines</th>
<th>Public Beamlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>94</td>
<td>234</td>
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<tr>
<td>1998</td>
<td>516</td>
<td>748</td>
</tr>
<tr>
<td>1999</td>
<td>98</td>
<td>748</td>
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<td>252</td>
<td>1,274</td>
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<td>2004</td>
<td>318</td>
<td>1,520</td>
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<td>2005</td>
<td>307</td>
<td>1,441</td>
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<tr>
<td>2006</td>
<td>333</td>
<td>1,391</td>
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<td>2007</td>
<td>425</td>
<td>1,429</td>
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<td>486</td>
<td>1,470</td>
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<tr>
<td>2009</td>
<td>513</td>
<td>1,408</td>
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<tr>
<td>2010</td>
<td>618</td>
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<td>628</td>
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</tr>
<tr>
<td>2012</td>
<td>599</td>
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</table>

**Number of cumulative Users**

<table>
<thead>
<tr>
<th>Year</th>
<th>Contract Beamlines</th>
<th>Public Beamlines</th>
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<tbody>
<tr>
<td>1997</td>
<td>681</td>
<td>1,252</td>
</tr>
<tr>
<td>1998</td>
<td>894</td>
<td>3,173</td>
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<td>1,414</td>
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<td>2001</td>
<td>2,089</td>
<td>6,754</td>
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<td>7,205</td>
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<td>9,201</td>
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<td>2010</td>
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<td>9,216</td>
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<td>2012</td>
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Years: 1997 to 2012
Number of Conducted Experiments at Public BLs by Affiliation

The yearly number of public BL proposal by affiliation. Industrial use has been on the rise and reached 20% in recent years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Foreign</th>
<th>National/Public Research Institute</th>
<th>University</th>
<th>Industry</th>
<th>Industrial Use (%)</th>
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<td>11</td>
<td>146</td>
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<td>3%</td>
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<tr>
<td>1999</td>
<td>13</td>
<td>164</td>
<td>50</td>
<td>70</td>
<td>2%</td>
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<tr>
<td>2000</td>
<td>31</td>
<td>209</td>
<td>100</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2001</td>
<td>11</td>
<td>215</td>
<td>50</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2002</td>
<td>64</td>
<td>265</td>
<td>115</td>
<td>70</td>
<td>3%</td>
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<td>2003</td>
<td>47</td>
<td>266</td>
<td>139</td>
<td>70</td>
<td>3%</td>
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<tr>
<td>2004</td>
<td>61</td>
<td>224</td>
<td>139</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2005</td>
<td>245</td>
<td>361</td>
<td>245</td>
<td>70</td>
<td>3%</td>
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<tr>
<td>2006</td>
<td>63</td>
<td>293</td>
<td>245</td>
<td>70</td>
<td>3%</td>
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<tr>
<td>2007</td>
<td>91</td>
<td>293</td>
<td>293</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2008</td>
<td>77</td>
<td>293</td>
<td>293</td>
<td>70</td>
<td>3%</td>
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<tr>
<td>2009</td>
<td>94</td>
<td>293</td>
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<tr>
<td>2010</td>
<td>217</td>
<td>293</td>
<td>293</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2011</td>
<td>217</td>
<td>293</td>
<td>293</td>
<td>70</td>
<td>3%</td>
</tr>
<tr>
<td>2012</td>
<td>67</td>
<td>293</td>
<td>293</td>
<td>70</td>
<td>3%</td>
</tr>
</tbody>
</table>

※Affiliation Type
- Foreign: all overseas institutions and corporations
- National/Public Research Institute: independent administrative institutions, collaborative research institutes, public-interest corporations, special government-affiliated corporations
- University: national and other public universities, private universities, technical colleges
- Industry: private enterprises (incl. Japanese arms of overseas enterprises)
Number of Unique Users*

*An individual is counted as 1 user no matter how often the user conducts experiments.
Industrial Applications
Industrial Utilization (Public Beamlines)

- **Strategic-Use Program** (Specific Promotion of New Industrial Users)
- **Trial-Use Program** (Promotion of Industrial Utilization)

**Number of Proposals**

- **Number of Proposals**: 5, 14, 26, 50, 62, 100, 115, 139, 219, 255, 300, 295, 271, 296, 275, 291
- **Percentage**:
  - 1997: 5%
  - 1998: 6%
  - 1999: 7%
  - 2000: 6%
  - 2001: 9%
  - 2002: 10%
  - 2003: 12%
  - 2004: 9%
  - 2005: 10%
  - 2006: 12%
  - 2007: 19%
  - 2008: 20%
  - 2009: 20%
  - 2010: 19%
  - 2011: 21%
  - 2012: 21%

**Trial-Use Program** (Promotion of Industrial Utilization)
Industrial Applications

Electronics
- Films for ULSI
- Semiconductors
- HDD, DVD
- Semiconductor laser

Automobile
- Steel plates
- Construction materials
- Coatings
- Welding
- Tools

Metals & Soft materials
- Tires
- Fibers
- Functional polymer

Energy & Environment
- Li-ion batteries
- Fuel cell
- Exhaust gas catalyst

Life science
- Medicine
- Personal care
- Health care

Material Analysis
- Batteries: fuel cell & Li-ion
- Nuclear power material
- Analysis of contamination elements
- Catalysts for environment

Display
- Fiber
- Tires
- Coatings
User Administration Div.
at SPring-8/SACLA
**User Administration Div. at SPring-8/SACLA**

RIKEN: Research, Own, R&D and Operation Management

JASRI: Operation (a part of SPring-8) and Public Utilization Promotion

<table>
<thead>
<tr>
<th>Div. / Office / Unit</th>
<th>1 Div. Director</th>
<th>1 Manager</th>
<th>1 Deputy manager</th>
<th>11 Staffs</th>
<th>1 Manager</th>
<th>1 Deputy manager</th>
<th>8 Staffs</th>
</tr>
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<tbody>
<tr>
<td>Accelerator Div.</td>
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<td>Controls and Computing Div.</td>
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<td>Light Source and Optics Div.</td>
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<td>Research and Utilization Div.</td>
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</tbody>
</table>

**Function**

- User Administration
- Research Proposal Administration (including Research Proposal Selections)
- Support for User Community
- Research Publication, User Information and User Support System

**Staffing**

User Administration Div.

1 Div. Director

SPring-8/SACLA Users Office

1 Manager 1 Deputy manager 11 Staffs

Library and Information Sec.

1 Manager 1 Deputy manager 8 Staffs
We are very sorry that we cannot participate in this Three-Way Meeting.

Tomoko Makita, Div. Director
Makoto Miyamatsu, Staff of Users Office
Shogo Sugimoto, Manager of Users Office
Takuma Sakagawa, Deputy manager of Users Office
Fumiko Kuwano, Staff of Users Office

Photographed on July 17, 2013
Thank you for your attention.
Reference
Beamlines (BL37XU, BL39XU) upgraded for nano-beam analysis
-Low-carbon Research Network JAPAN, RIKEN Harima Institute-

-High brilliant X-ray beam from SPiring-8 focused down to a nano-scale spot
- The beam stabilized in the nano-level by environments (temperature, vibration, etc.) stabilized
- Several vital equipments installed in FY2010

Dedicated X-ray-shield hutch

Si 111 monochromator

Cryogenic (LN$_2$) cooler for mono.

X-ray focusing mirrors

SPring-8 BL39XU beamline

Distance from the source (m)
Focused X-ray beam performance

Focused beam profile at BL37XU

BL37XU Vertical  FWHM(V) = 100 nm

BL37XU Horizontal  FWHM(H) = 100 nm

100 x 100 nm spot is obtained

Photon flux available in the focused spot

Photon flux (photons/sec) vs. Focusing beam size (nm)

100 nm L&S

Scanning X-ray image of a Siemens test pattern

100 nm L&S

30nm step, 100×100 pix, 0.1 sec/pix, 1.5hr
Outline of BL36XU

**Specifications of XAFS method at BL36XU**
- **Time resolution:**
  - 800 µs *(Quick scanning XAFS)*
  - 100 µs *(Energy dispersive XAFS)*
- **2D spatial resolution:** 100 nm *(Fast scanning microscopic XAFS using KB mirrors)*
- **3D spatial resolution:** 1 µm *(Laminography XAFS)*
- **Energy range:** 4.5 - 35 keV

Research results

● Structural kinetics and time lags of surface events on Pt₃Co/C and Pt/C cathode catalysts in PEFC MEAs for rapid voltage-operating processes by time-resolved XAFS method

● 3D-Visualization of cathode catalyst layer in MEA of PEFC by laminography XAFS


Experimental setup

Fresh MEA

Pt distribution

Pt L₃-XANES

Dispersed area

Aggregated area

Uniform spectra

Pt/C

Pt₃Co/C

0.4 V

1.0 V

1.5 times

3.7 times

0.4 V

1.0 V

0.4 V

1.0 V

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Advanced Softmaterial Beamline (BL03XU)

Mission:
- Development of tactical application of Synchrotron Radiation to the Polymer Science leading to innovative softmaterial designing

Organization Structure
for BL Construction & Administration

FSBL Consortium
(Industry-academic joint consortium)

19 Industrial Members:
- Asahi Kasei Corp.
- Kwansei Gakuin Univ.
- Canon Inc.
- Kuraray Co., Ltd.
- Showa Denko K. K.
- Sumitomo Chemical Co., Ltd.
- Sumitomo Rubber Industries, Ltd.
- Sumitomo Bakelite Co., Ltd.
- Denso Corp.
- Toyobo Co. Ltd.
- Toray Industries, Inc.
- Nitto Denko Corp.
- Bridgestone Corp.
- Mitsui Chemicals, Inc.
- Mitsubishi Chemical Corp.
- Mitsubishi Rayon Co., Ltd.
- The Yokohama Rubber Co., Ltd.
- Teijin Ltd.
- DIC Corp.

Academic Members:
- Researchers of The Univ. of Tokyo, Nagoya Institute of Technology, Kyoto Univ. Kyoto Institute of Technology, The Univ. of Kitakyushu, Kyushu Univ., etc.

Features of Advanced Softmaterial Beamline

SOURCE AND OPTICS
- Source: Standard-type
  - "in-vacuum" planar undulator
- Energy range: 6 keV ~ 35 keV
- Energy resolution (ΔE/E): ~10^{-4}
- Double-crystal monochromator, Si(111)
- KB mirrors
- Expected Beam Size: 240μm x 90μm (H x V)
  - @ ~75m (the 2nd hutch) without mirrors
- Expected Photon Flux: >10^{13} ph/s
  (frontend slit: full open) @ 12keV without mirrors

EXPERIMENTAL STATIONS
- [Hutch 1, Thin-Film Structure Science]
  - GIXD, GISAXS and XR measurement system
  - Time-resolved measurement system for GISWAXS
- [Hutch 2, Dynamic Nano・Meso-Structure Science]
  - SAXS resolution: max. 0.7 μm (1.0 μm).
  - Time-resolved WAXS/SAXS measurement system
  - Microbeam WAXS and SAXS measurement system
  - Industrial experiments with large processing or casting machines
    wide space around a sample: 3 m (l) x 3 m (w) x 4 m (h))
    plug-in sample control system
27m-long undulator
hv: 250 eV ~ 2 keV
Brilliance: $10^{19}$ photons/s/mm²/mrad²/0.1b.w.
Polarization: linear (horizontal, vertical, diagonal)
  helical (right, left)

High-resolution soft X-ray beamline
hv: 250 eV ~ 2 keV
Energy resolution: $E/\Delta E: >10,000$
Beam size: < 10 µm,
Characteristics of the University-of-Tokyo Beamline (BL07LSU)

Four experiment stations for the frontier spectroscopy

**Time-resolved soft x-ray spectroscopy, TR-SX spectroscopy**
- Precise time controls of soft X-ray pulse and ultrashort laser pulse
- High-resolution two-dimensional angle-resolved photoemission spectroscopy at various delay time

**Three-Dimensional Scanning Photoelectron Microscope Station, 3D nano-ESCA**
- Spatial resolution: 50 nm (x,y)
- Depth resolution: 0.1 nm (z)
  (Depth profile technique by MEM)

**Ultra-high resolution soft X-ray emission spectroscopy station, HORNET**
- Energy resolution: $E/\Delta E > 10,000$
- Experimental set-ups for gas, liquid, and solid phases

Free-Port station

for researchers worldwide to bring in their machines and to perform experiments with the high-brilliant soft x-ray beam.