



1st PF-ISAC 3 & 4 April 2007



# 1st Photon Factory International Science Advisory Committee Meeting

6.5GeV  
PF-AR

2.5 GeV PF



# ISAC Agenda

Tuesday April 3 <sup>rd</sup> 2007		
9:00-9:10	Introduction and charge to the committee	Shimomura& Hodgson
9:10-9:30	Photon Factory update	Wakatsuki
9:30-11:10	<p>Response to the PF External Review held in March 2006</p> <p>The new group structure</p> <p>New schemes for communication with user community and the PF Users Organization (15 min discussion)</p> <p>Report on the preparation process of the strategic plan (15 min discussion)</p> <p>Organization of ISAC subcommittees and the next ISAC sometime later in FY2007 (10 min discussion)</p>	Wakatsuki
11:10-11:30	Coffee break	
11:30-12:30	BL strategy and the new beam lines (PF-BL17A, BL3A, BL16A, PF-AR NW14A, NW10A, a pharma BL) and consolidation of BLs (30 min discussion)	Nomura
12:30-13:30	Lunch	

# ISAC Agenda

Tuesday, April 3, 2007		
13:30-15:00	Science topics 100-picosecond resolved X-ray studies at the beam line NW14A Symmetry breaking and interatomic resonant Auger decay in molecular inner-shell photoionization Structural Study of Orbital-Ordered Manganite Thin Films Structural basis for knock-in-lock dynamics of RNA polymerization	S. Adachi  A. Yagishita  Y. Wakabayashi  Osamu Nureki, Titec
15:00-15:20	Coffee break	
15:20-16:20	ERL project (including 20 min discussion)	Kawata & Kasuga
16:20-17:00	Discussion with PF directorate <closed session>	
17:00-18:00	Executive session <closed session>	
19:00	Dinner	

Wednesday April 4 <sup>th</sup> 2007		
9:00-10:00	Executive session <closed session>	
10:00-10:30	Summary discussion	



# Photon Factory Update

# SR facilities around the world

Australian S

Shanghai S

Thai S

Hefei

Beijing

Singapore LS

APS

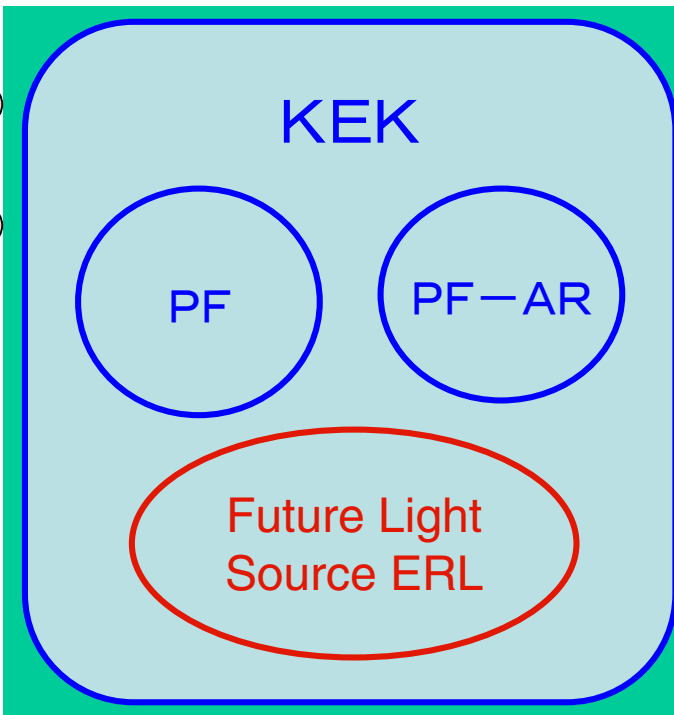
CHESS → ERL

SSRL(SPEAR3)

ALS

NSLS → NSLS-II

Canadian LS



SPring8

Round Table Discussion of SR facilities, MEXT, SR Office, March 7, 2007

SUBARU

UVSOR

HISOR

Ritsumeikan

Saga LS

ESRF

Doris → Petra III

Diamond

Soleil

SLS

Alba

SRS → 4GLS

Elettra

BESSY

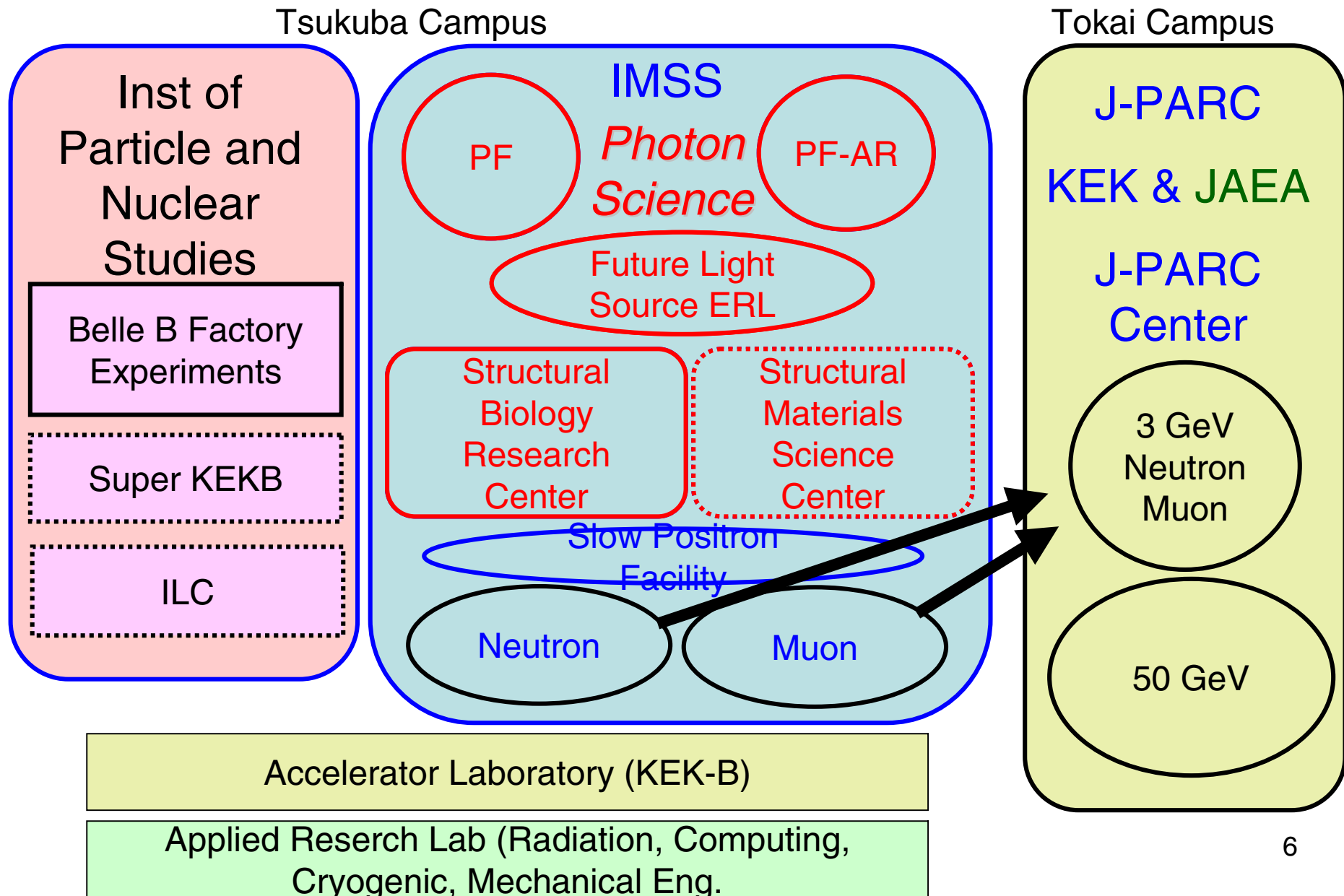
MAX-LAB

LCLS

European X-FEL

RIKEN X-FEL

# Photon Factory in the context of KEK





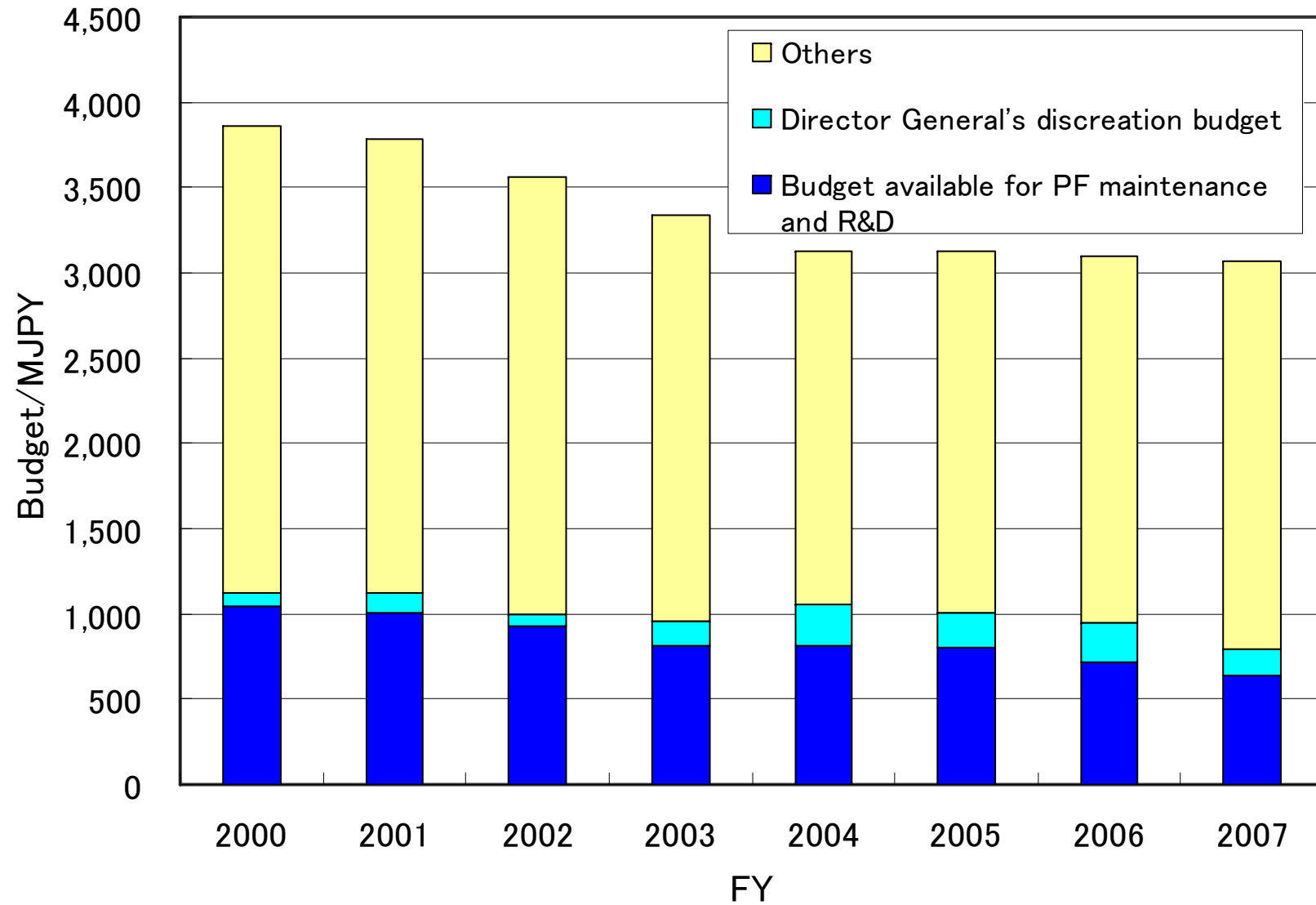
# BUT. . .

- The KEK budget from the MEXT decreases by 1% every year.
- The construction and operation budget of J-PARC is shared between KEK and JAEA. Hence the pressure to decrease other KEK budget.
- The budget for operation and upgrading of PF and PF-AR becomes far tighter every year.

## Need for new strategies

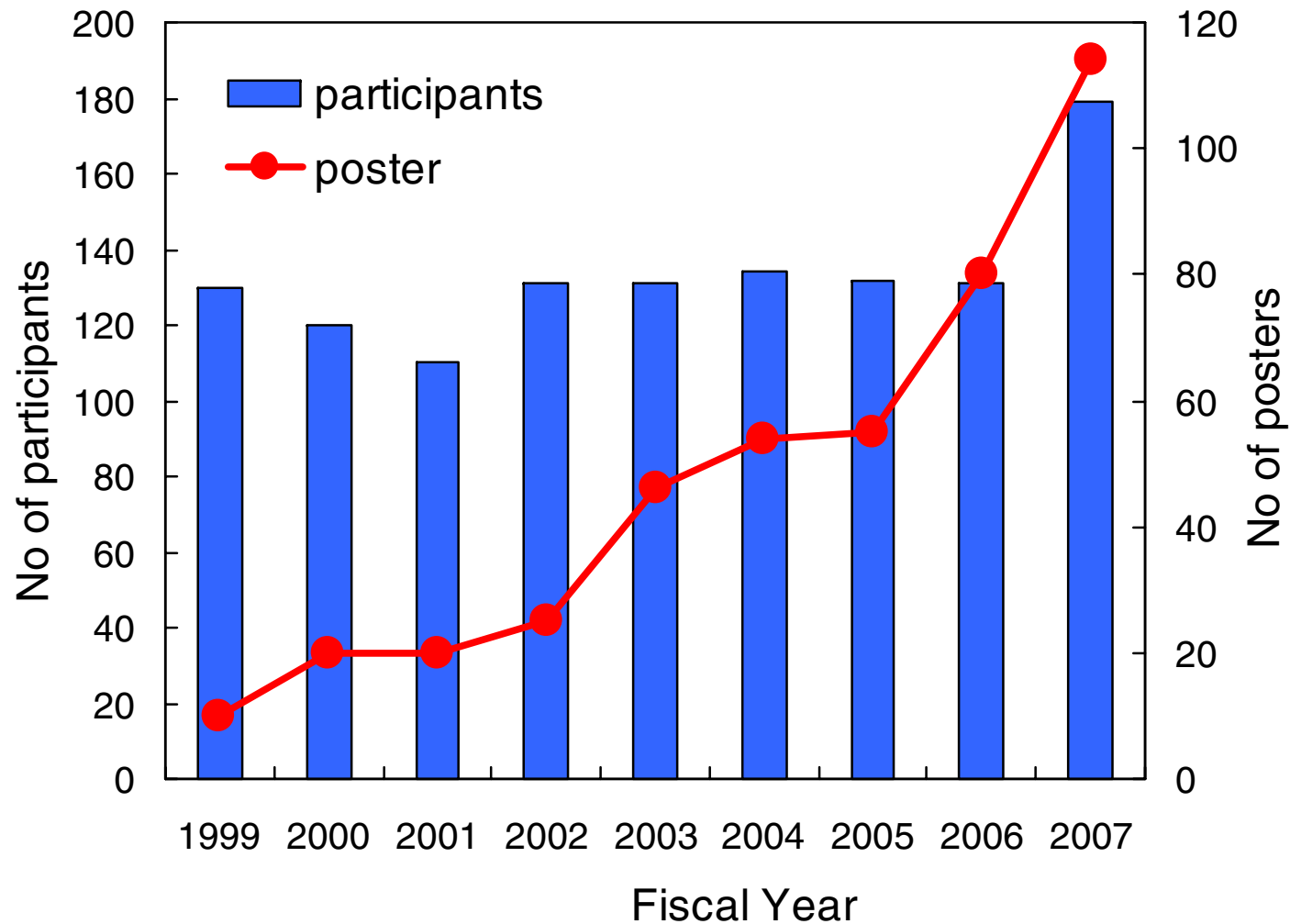
- Establishing a new group structure
- Securing external funding
- Consolidation of BLs to decrease number of stations
- New scheme for converting public BLs to PRT(CAT)
- Use of the BLs for graduate education in collaboration with nearby universities
- New project for the next SR light source: ERL

# Budget

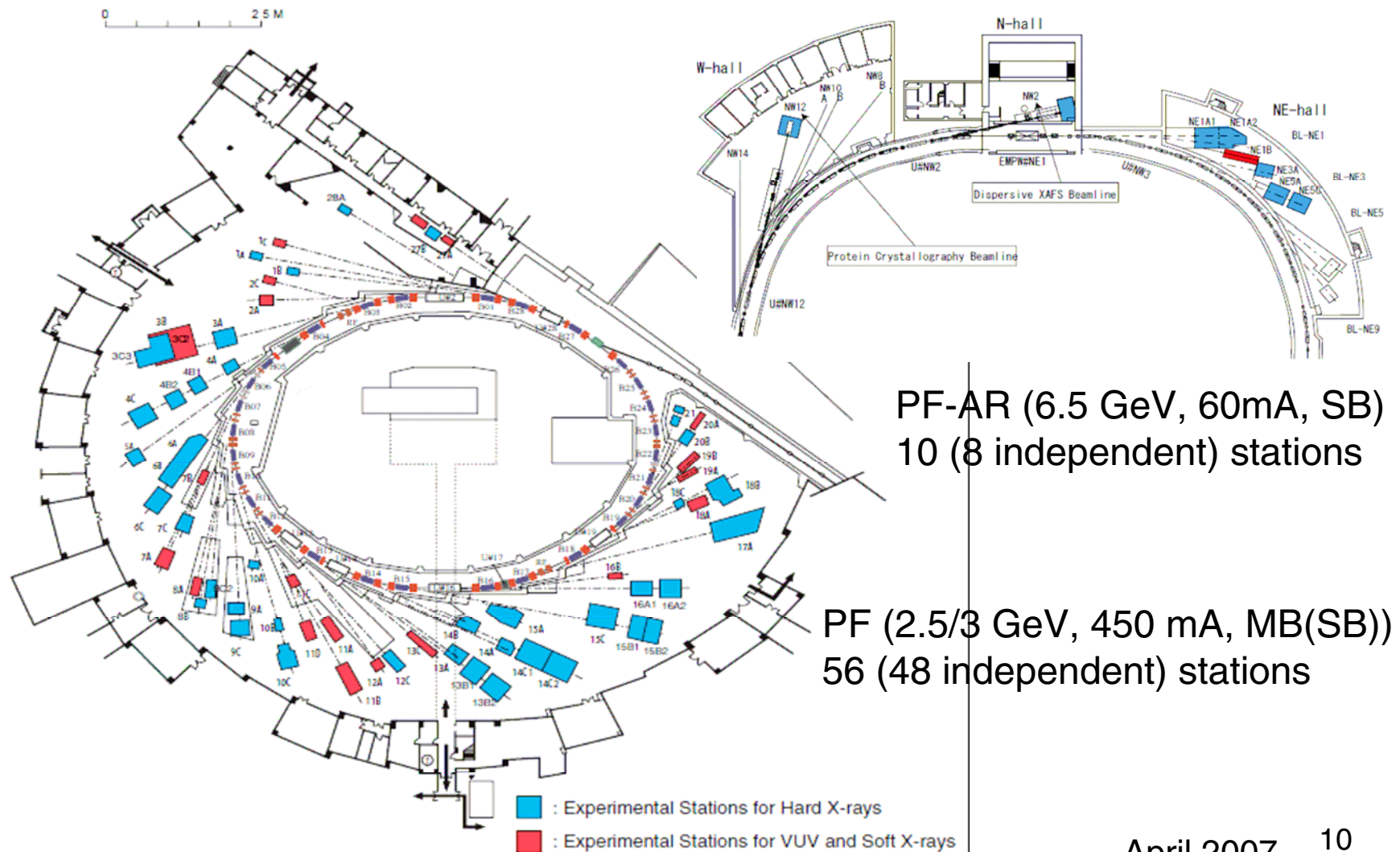




# Number of Participants of PF Symposia



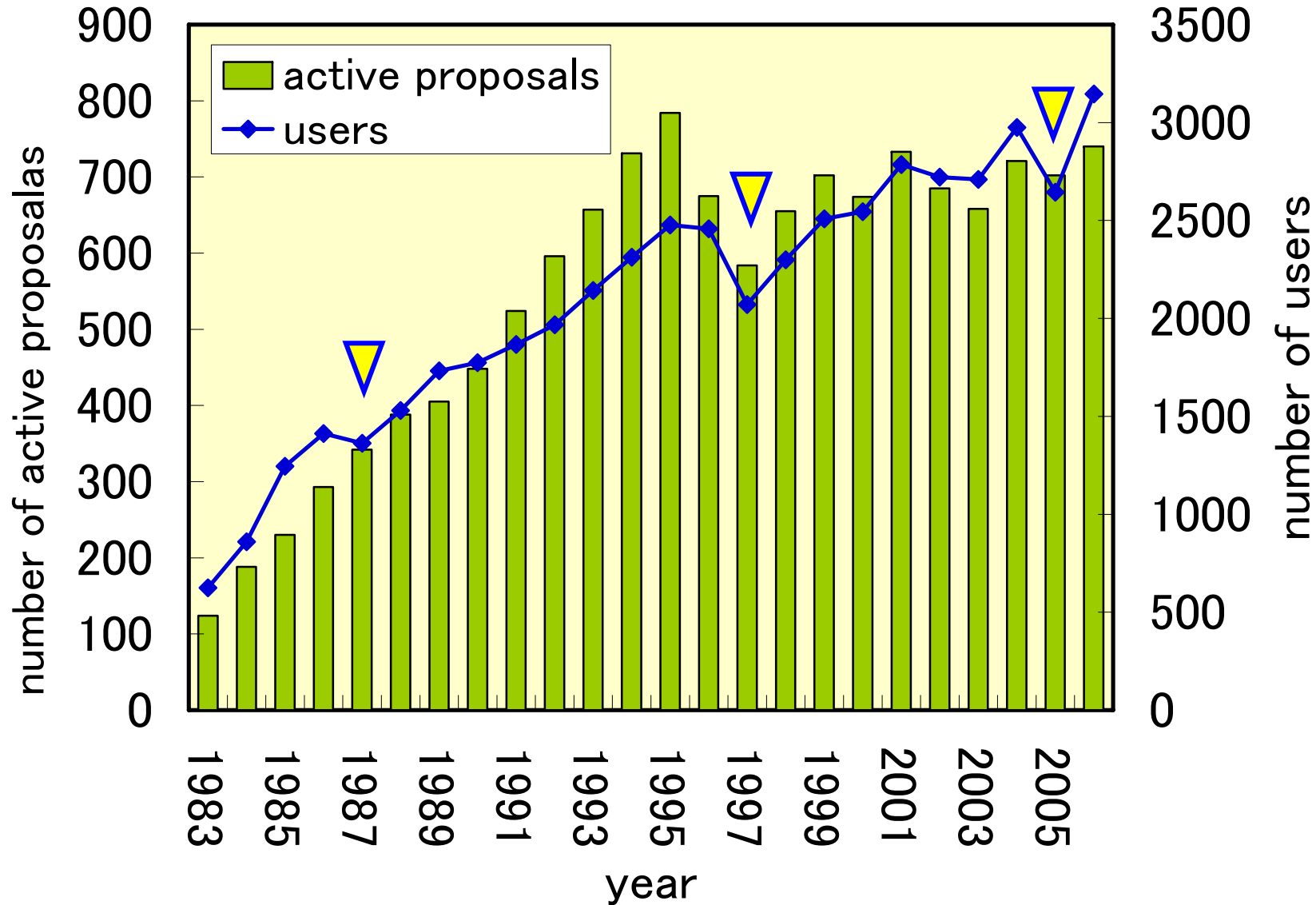
# Plan view of experimental halls



PF-AR (6.5 GeV, 60mA, SB)  
10 (8 independent) stations

PF (2.5/3 GeV, 450 mA, MB(SB))  
56 (48 independent) stations

# Number of active proposals and number of registered users



# Chronic problem of staff shortage

## Number of Stations

		PF	PF-AR
X	U	2	4
	MPW	4	2
	B/VW	29	3
VSX	U	8	1
	B	13	0

29 BL,  
66 (56 independent)  
stations

	Light Source Division	Exp Division
Researchers	20	39
Technicians	11	10
MES	5	7
Total	36	56

MES: Mitsubishi Electric System & Service Co. Ltd.

- 740 active proposals
- 3150 registered users
- Nearly no vacant BL

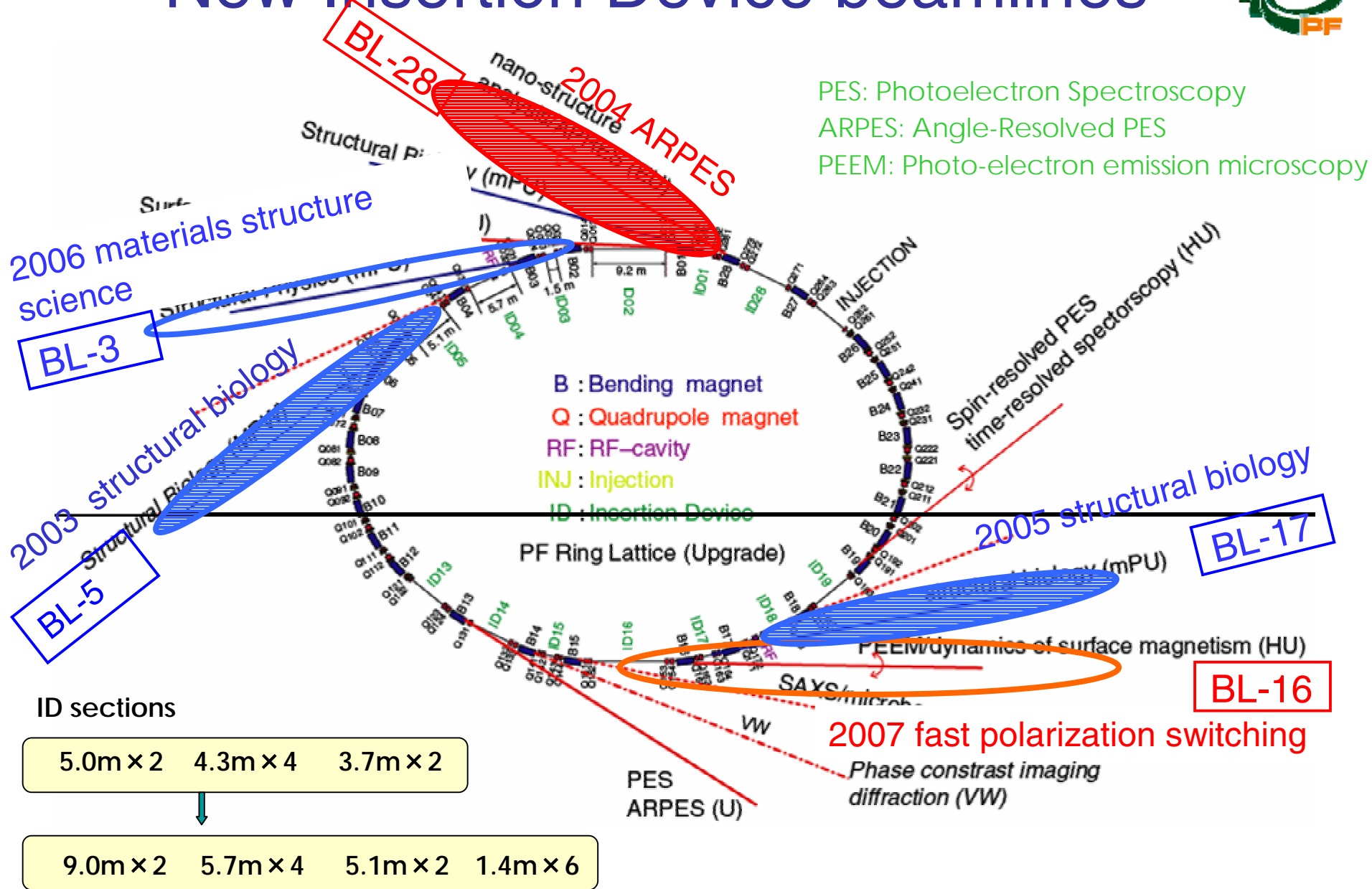
# Renewal of Beamlines

VSX-ID/X-ID /Bend

FY	commissioned	decommissioned
2002	<u>NW12A</u>	
2003	<u>BL-5A</u>	BL-28A, 28B
2004	BL-28A	BL-17A, 17B, 17C, 18B
2005	<u>BL-17A</u> , 18B, <u>NW14A</u> , <u>NW10A</u>	BL-12B, 10B, 6B, 6C
2006	<u>BL-28B</u> , 3A, 6C	BL-16A, 3A, 3C1, 3C2
2007	BL-16A	BL-16B
2008	<u>NE3A</u>	NE3A
	( <u>BL-1A</u> , BL-13, NE1)	(BL-1C, 13A, 13B1, 13B2, 13C, NE1A1, NE1A2, NE1B...)

Underlined: completely funded by or augmented by external funding

# New Insertion Device beamlines



# Machine developments/Improvements in FY2006

## PF (2.5GeV)

- A short gap undulator(#3) was installed.
- A series of experimental studies for “Top-up” has been executed.
- A kicker for a longitudinal bunch-by-bunch feedback system was installed.
- The RF power source was partly renewed.

## PF-AR (6.5GeV)

- An undulator with new magnet arrangement for polarization control was successfully tested.
- An in-vacuum undulator was installed on NW14.
- The power supply for the B magnets was renewed.



# PF 2.5 GeV Top-Up Operation Project

**KEK Linac supplies four rings.**

**KEKB 8GeV  $e^-$  / 3.5GeV  $e^+$**

**Continuous injection mode (CIM)**

**PF 2.5GeV  $e^-$  / PF-AR 3GeV  $e^-$  (ramp to 6.5GeV)**

**(1-2 injections/day) (2 injections/day)**

## **Top-up**

### **Phase 1**

- **Fast switching from CIM of KEKB to PF injection mode has been already realized**

### **Phase 2 (from '08 autumn)**

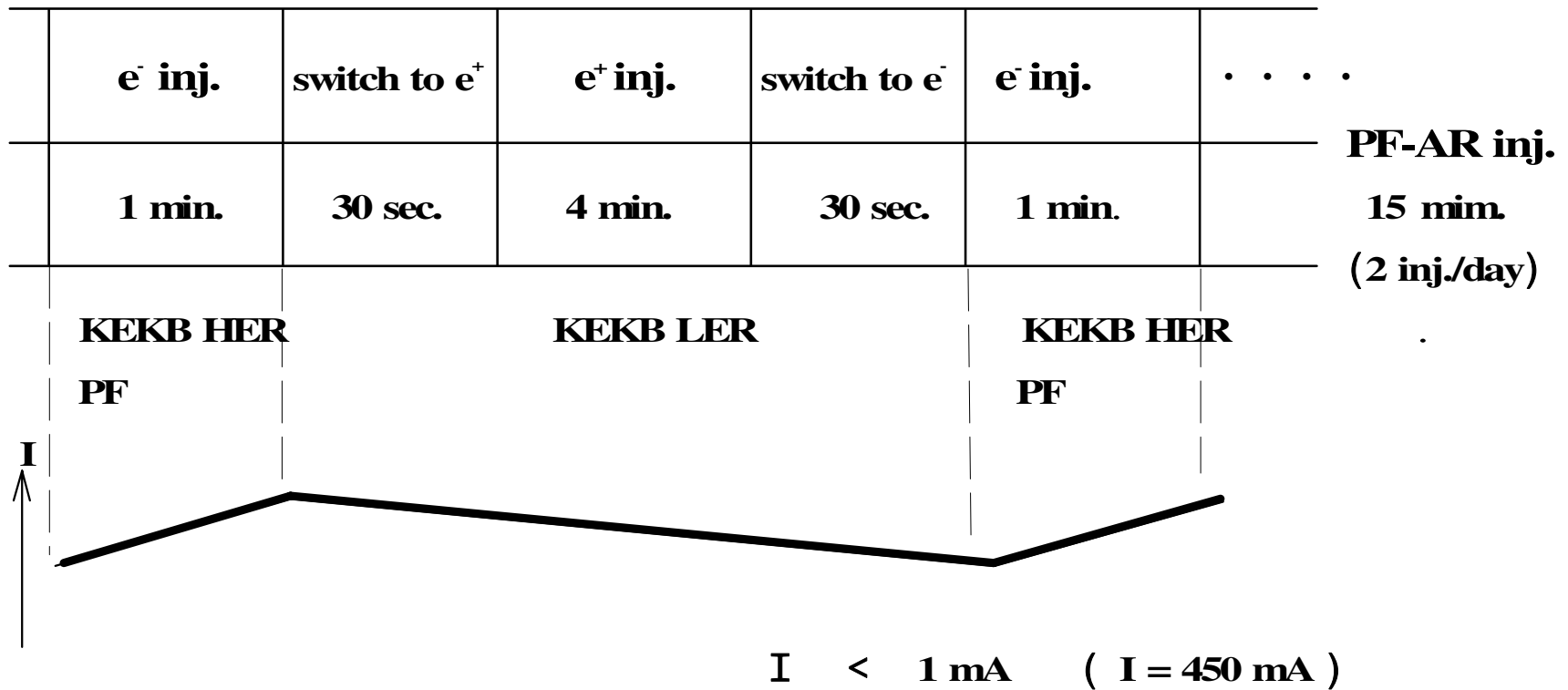
- **Acceleration of beams with different energies in the Linac (under test)**
- **High speed switching magnet**

### **Phase 3 (dates to be decided)**

- **Simultaneous acceleration of  $e^+/e^-$  beams with different energies**

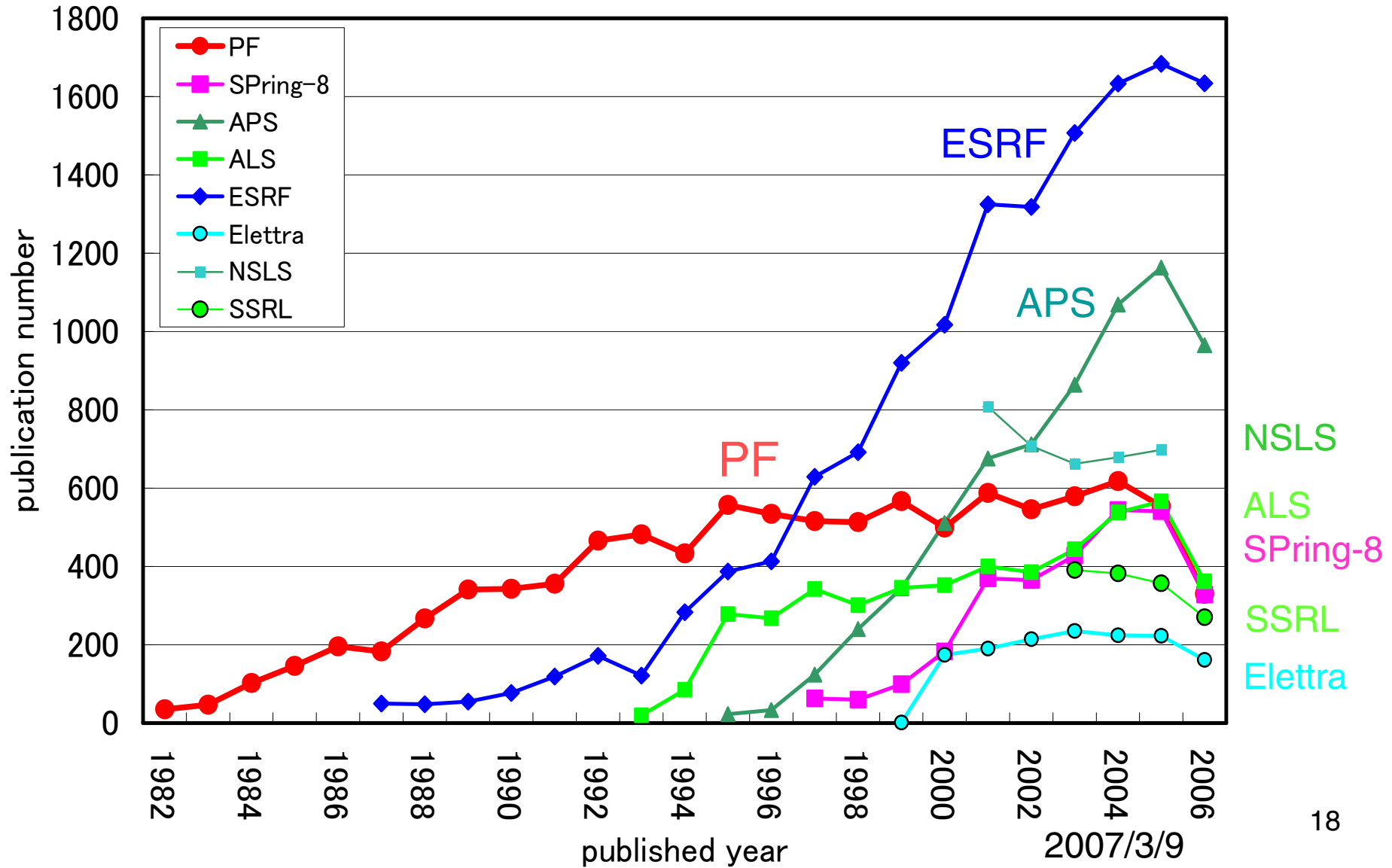
# Top-up (Phase 2)

## Phase 2



# Summary of BL activity

## Publications



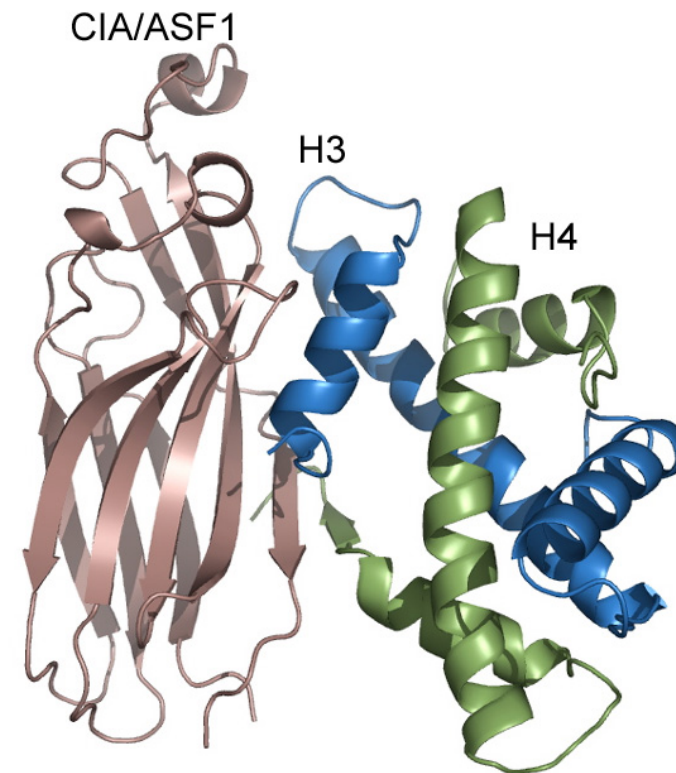
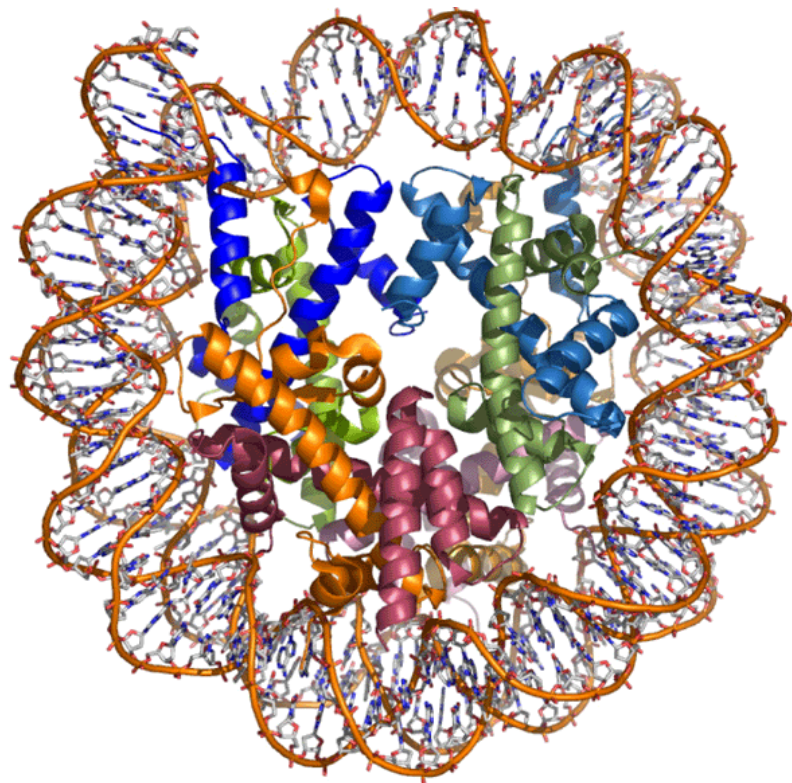
LETTERS

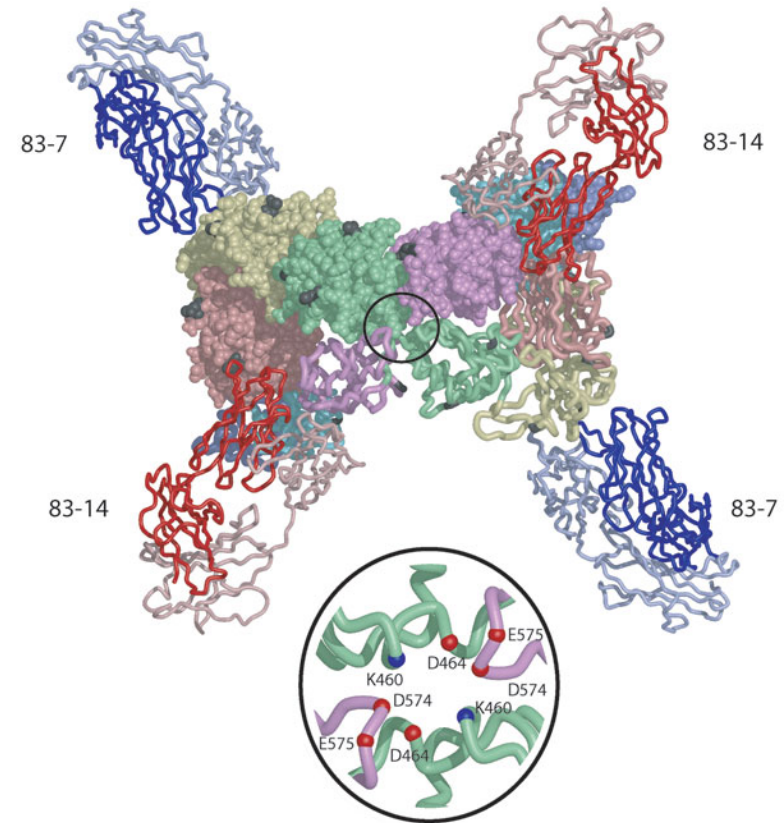
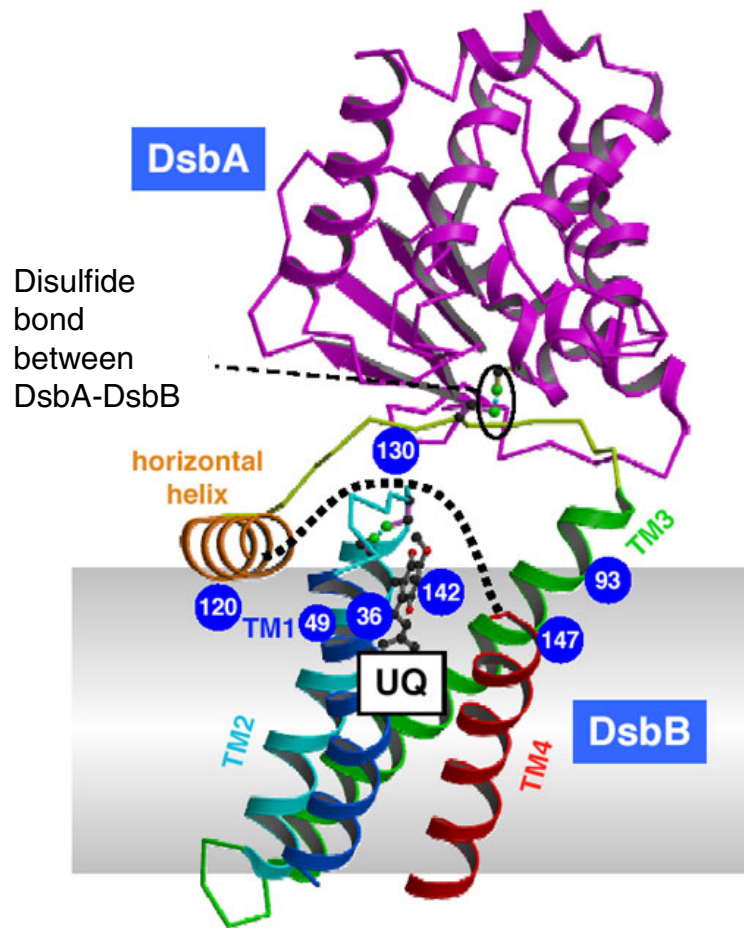
Toshiya Senda, Ryo Natsume of AIST (Tokyo) &  
Masami Horokoshi, Inst of Molecular and  
Cellular Biosciences, Univ of Tokyo

Used PF-AR NW12A

## Structure and function of the histone chaperone CIA/ASF1 complexed with histones H3 and H4

Ryo Natsume<sup>1\*</sup>, Masamitsu Eitoku<sup>2\*</sup>, Yusuke Akai<sup>1</sup>, Norihiko Sano<sup>2</sup>, Masami Horikoshi<sup>2,3</sup> & Toshiya Senda<sup>4</sup>

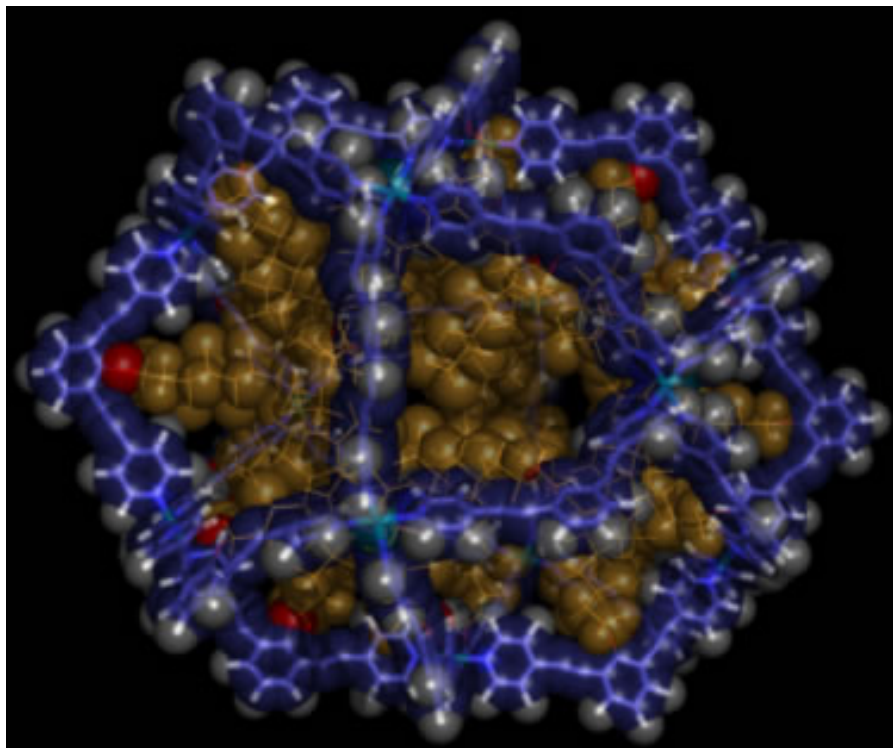




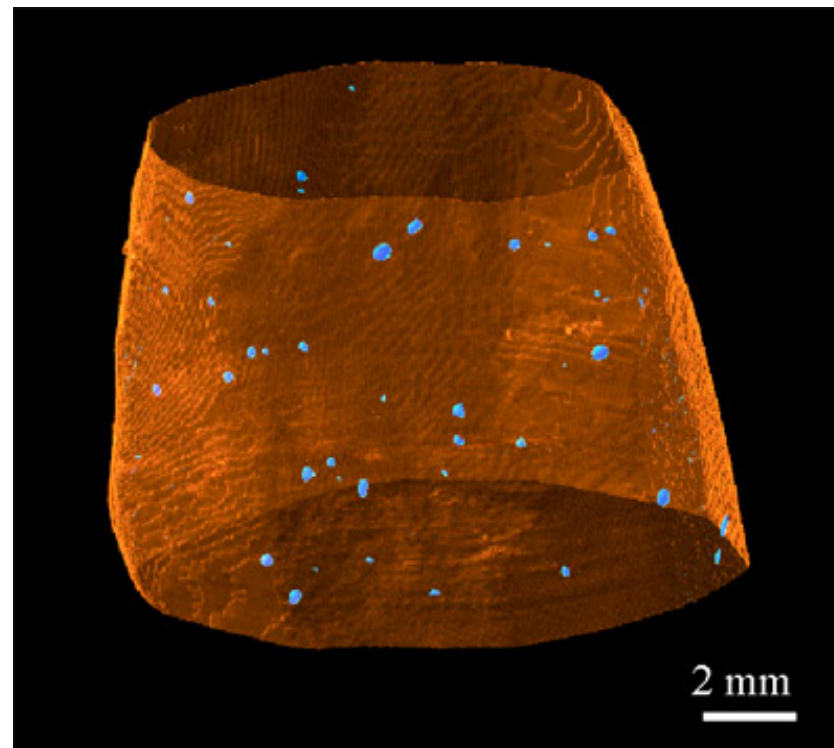
**Crystal structure of the DsbB-DsbA complex reveals a mechanism of disulfide bond generation., K. Inaba, *et al.*, K. Ito (Kyoto U.), *Cell*, vol. 127, 789-801, Nov 17, 2006**

**Insulin receptor ectodomain structure, McKern *et al.* (CSIRO, Australia), *Nature* 443, 218-221, Sep 14, 2006**



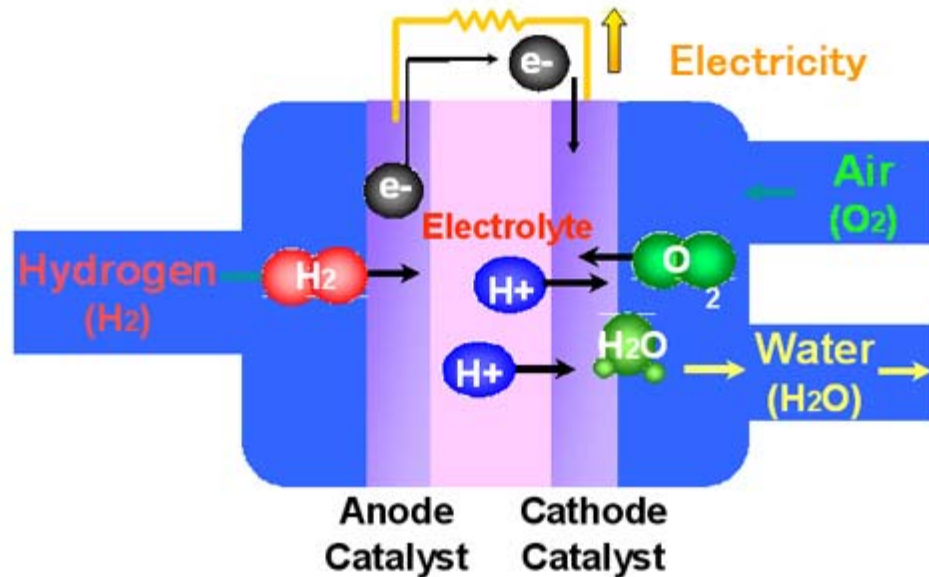


**Fluorous Nanodroplets  
Structurally Confined in and  
Organopalladium Sphere., S.  
Sato, *et al.*, *Science*, 313,  
1273-1276, Sep. 5, 2006.**



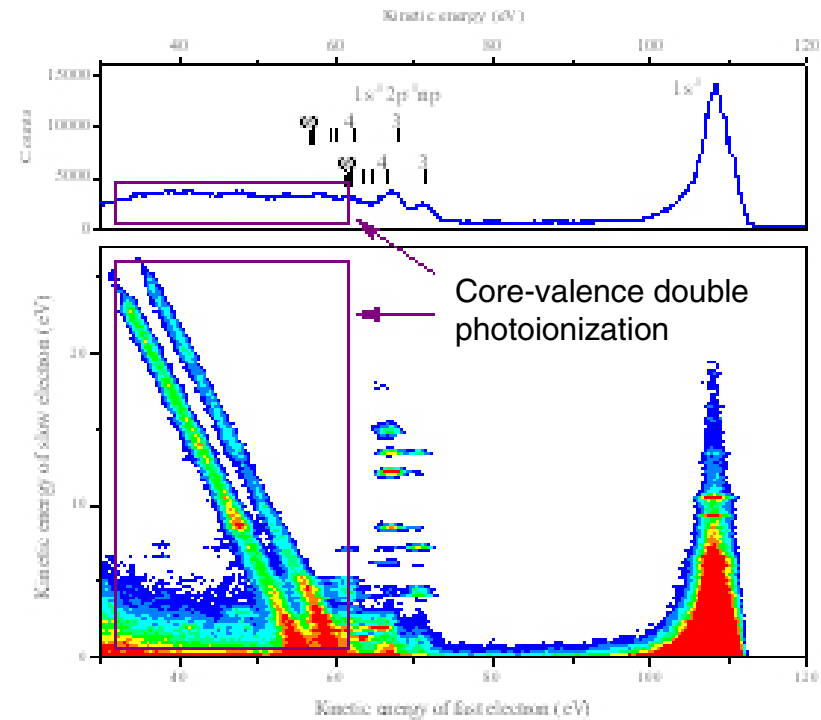
**Observation of Low-  
Temperature Object by Phase-  
Contrast X-Ray Imaging:  
Nondestructive Imaging of Air  
Clathrate Hydrates at 233 K,. S.  
Takeya, et al., *Rev. Sci. Instrum.*,  
77, 053705, Jul. 25, 2006.**

## Fuel Cell Principle



Theoretical Efficiency  $\Delta G/\Delta H = 83\%$ (Hydrogen)

The First In-Situ Time-Resolved Observation of the Structure and Reaction Kinetics on the Cathode Surfaces in a Pt/C Fuel Cell, Mizuki Toda, *et al.* (Univ of Tokyo), *Angew. Chem. Int. Ed.*, to be published, Mar 23, 2007



Experimental Investigation of Core-Valence Double Photoionization., Y.

Hikosaka, *et al.*, *PRL*, 97, 053003, Aug 25, 2006.

Xe 4d<sup>-2</sup> core-core double photoionization, Y. Hikosaka, *et al.*, *PRL*, accepted. (PF, K. Ito Group)





# Response to the PF External Review held in March 2006

## Executive Summary of the PF External Review March 2006

### The 2.5 GeV and 6.5 GeV Storage Rings

The Committee observes great success in the incremental upgrade program of the PF 2.5 GeV ring. This upgrade makes PF fully competitive with other intermediate energy 3rd generation light sources in the world in many research fields.

The Committee suggests that **a reasonable number of beam lines for a facility of the scale and scope of the PF might be around 30-40 and there could be around 5-10 selected areas of excellence.** The structural biology model has proven to be a very successful and exemplary approach.

#### **Response:**

**Introduction of a new group system and BL consolidation/construction**

## Executive Summary of the PF External Review March 2006

### The 2.5 GeV and 6.5 GeV Storage Rings

While the Committee acknowledges the quality of science done at the PF-AR, including structural biology and the international interest in new possibilities in time-resolved experiments, **we urge the PF management to consider of the value of further expanding this investment *relative to* developing new ID beam lines on the 2.5 GeV ring, allocation of resources to the ERL prototype development and in the broader context of SR facilities in Japan.**

#### Responses:

- **Emphasis on the unique capabilities of the PF-AR running always in the single-bunch mode: NW14A is attracting many users from abroad.**
  - **Refurbishment of PF-AR North-East Building, in part, to solve the hybrid problems.**
- ⇒ **Wish to continue operation of PF-AR as long as possible (to overlap with the first phase of ERL operation).**

# Executive Summary of the PF External Review March 2006

## Role of Photon Factory in Japanese SR Community

The decision by the University of Tokyo not to build a new 3rd generation VUV/soft x-ray facility has given PF the opportunity and responsibility to take the lead in further developing this important research field in Japan – additional resources should be sought for this effort so as not to compromise the x-ray program or the R&D on the ERL

### Responses:

- Formation of the Electronic Properties Group
- Use of medium and long straight sections: BL2, BL13, BL16, BL28
- Solving the hybrid use of BLs (MPW vs undulator, optics and experimental setups) by consolidation of BLs
- Establishing stronger and more extensive collaboration with user groups (eg. SR Initiatives of the University of Tokyo)

## Executive Summary of the PF External Review March 2006

A balanced strategic plan thus needs to be prepared and implemented that builds on the staff at PF and the world class groups in the region. Given the severe funding constraints, the relatively large investment in operations of the **PF-AR should be critically reviewed and compared with other options (e.g. SPring-8)**. A resource re-allocation could be one strategy to make urgently needed human and financial resources available for the ERL prototype R&D and/or additional state-of-the-art ID beam lines on the 2.5 GeV ring.

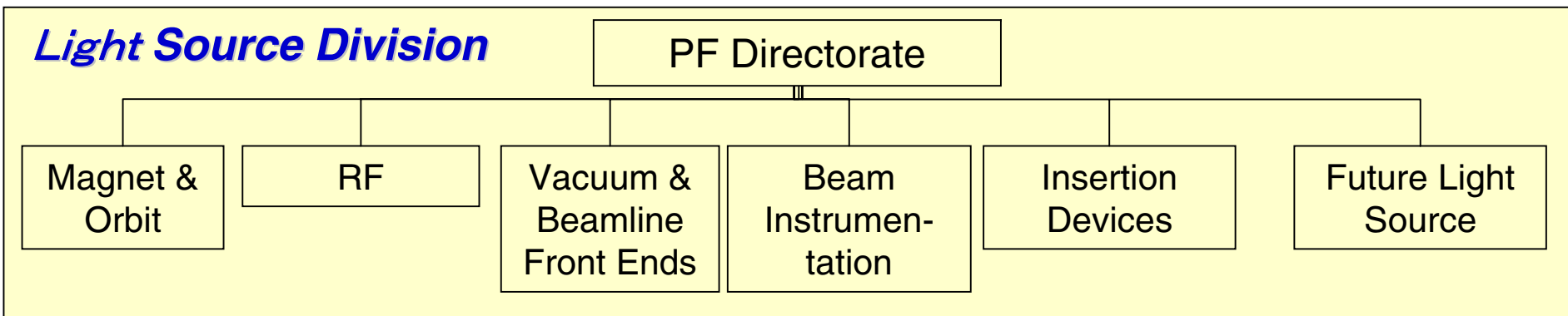
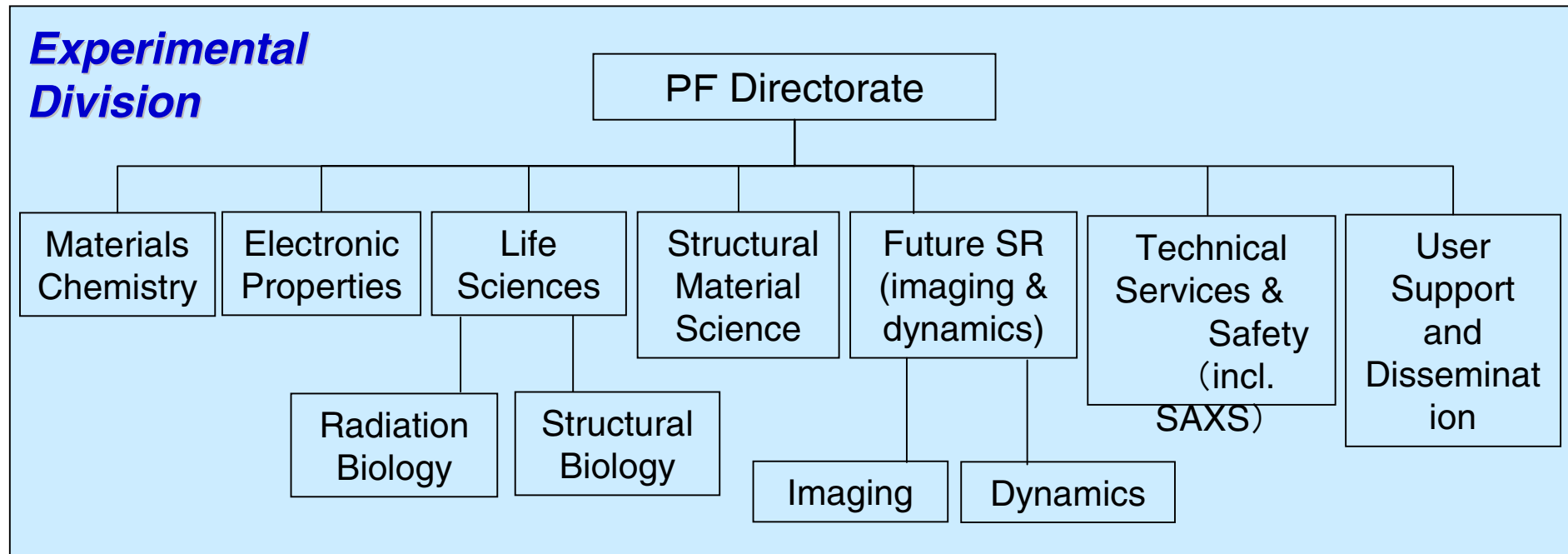
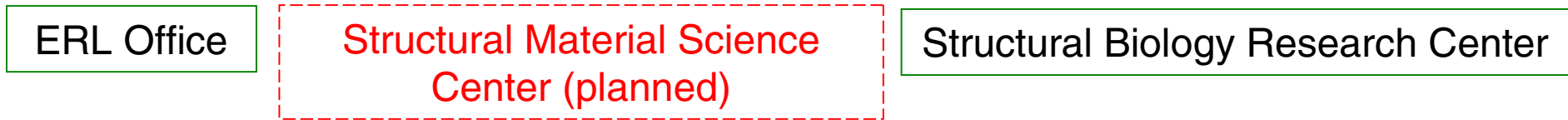
### Responses:

- **Wish to continue operation of PF-AR and limited range of BL reconstruction paying attention to cost performance**
- **Transferring activities from PF-AR to other facilities including 2.5 GeV PF ring, SPring-8 after serious evaluation of scientific outlook of the relevant scientific areas**
- **Top-up operation of the 2.5 GeV PF ring (late 2008)**
- **Finish preparing the action plan**



## The new group structure

# Photon Factory New Group Structure (April 2007)





# PF Members as of April 1, 2007: Permanent Staff

	Electric Properties	Structural Material Science	Chemistry	Life Sciences	Future Light Source (Imaging & Dynamics)	Cutting Edge Technologies, Infrastructure and Safety (Frontier)	User Operation & Dissemination	Total
Professors	○Nasu, ○Yagishita	○Sawa	○Iida, Nomura	Wakatsuki	○Kawata		Matsushita	8
Assoc. Professors	Azuma, Koide, Mase, Ono, (Ito, Iwazumi, Amemiya)	(S. Adachi)	Inada	○Kato, (Kobayashi)	S. Adachi, (Kishimoto)		○Ito, Kishimoto, Iwazumi, Amemiya ○Kobayashi	12
Lecturers					Hirano			1
Institutional Lecturers		H. Adachi		Hiraki, Igarashi	Hyodo, Zhang			5
Assist. Professors	(Kitajima), Iwano, J. Adachi, Kubota	Kikegawa, Wakabayashi, Nakao		Matsugaki, Kawasaki, Yamada, (Usami)	(Sugiyama & Iwano)		Kitajima, Sugiyama Usami	12
Engineers & Technicians							Koyama, Kosuge, Mori, Nigorikawa, Toyoshima, Kikuchi, Sato, Okamoto, Saito, Uchida	10
No. of faculty members	9	5	3	7	5		6	38
No. of part time	4	1	0	2	3		0	10
No. of technical staff							10	10
Lecturer	Slow Positron Kurihara							
	Lattice	RF	Vacuum & Front Ends	Beam Instrumentation	Insertion Device	Future Light Source	Total	
Professors		○Izawa	○Maezawa	○Mitsuhashi	○Yamamoto	○Kasuga	5	
Assoc. Professors	○Kobayashi	Sakanaka	Honda	Park			4	
Lecturers							0	
Institutional Lecturers			Tanimoto	Haga	Tsuchiya		3	
Assist. Professors	Harada, Miyajima	Umemori	Miyauchi	Obina	Sasaki		6	
Technical Staff	Ueda, Nagahashi	Takahashi	Uchiyama, Nogami,	Mishina, Sato, Tadano	Shioya		10	
No. of faculty staff	3	3	4	4	3	1	18	
Part time							0	
No. of technical staff	2	1	3	4	1	0	11	
								<b>30</b>



## New schemes for communication with user community and the PF Users Organization

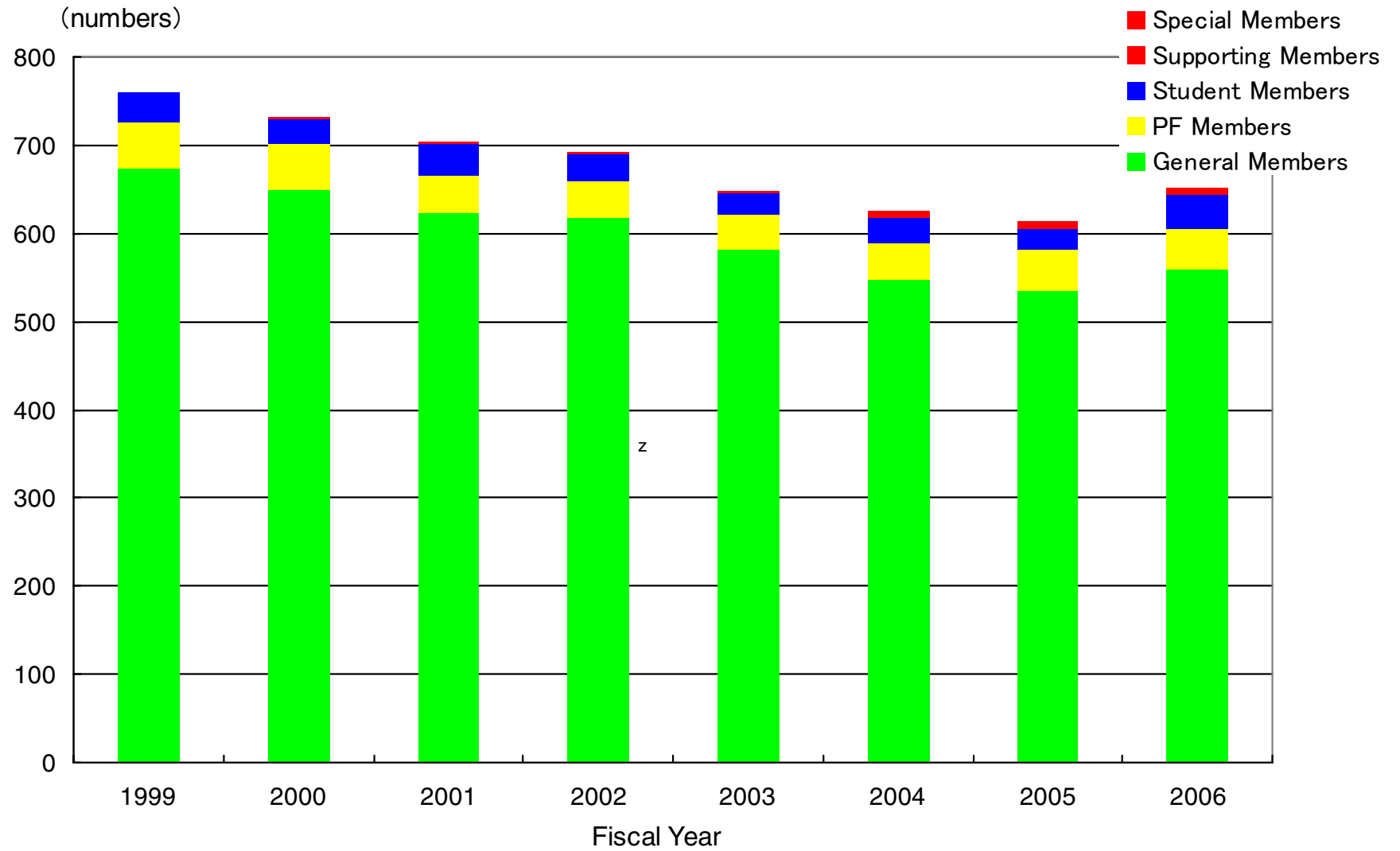
## 21 User Groups of PF Users Organization

	Group	No. of members
1	XAFS	125
2	Small Angle X-ray Scattering of Enzymes	14
3	Protein Crystallography	26
4	Small Angle X-ray scattering	28
5	Radiation Biology	16
6	Powder Diffraction	14
7	High Pressure Science	43
8	Material Structure Science	45
9	Compton Scattering	9
10	Surface Chemistry	33

	Group	No. of members
12	Solid State Spectroscopy II	5
13	Atomic & Molecular Physics	31
14	X-ray Fluorescence Analysis	To be renewed
15	Quantum Nano Spectroscopy	40
16	Nuclear resonance scattering	9
17	Phase Imaging	24
18	Slow Positron	17
19	Medical Applications	26
20	X-ray Reflectivity	Cease/reorganize
21	Soft X-ray Emission Spectroscopy	17

568 out of 652 PF UO members belong to the User Groups

# PF UO registered users





# Report on the preparation process of the strategic plan

## Key factors for BL construction and consolidation

1. Construction and enhancement of beam lines taking advantage of the longer and new straight sections
2. Optimization of BLs by resolving the hybrid use of insertion devices, optics and experimental setups
3. Seeking external funding to build new BLs in collaboration with user groups
4. Consolidation and/or closure of BLs whose activities are best exploited in other SR facilities.
5. Consolidation of BLs with lower activities and/or demands
6. New scheme for converting public BLs to PRT(CAT)
7. Use of BLs for graduate education of nearby universities

## Six stages to discuss the strategic plan

1. SR Strategy Working Group (reports to the IMSS Director)
2. Corresponding Internal Committee within the PF to prepare proposals to the SR Strategy WG
3. Projects XYZ: proposals of new BL projects from the PF staff
4. Proposals from external user groups through PF Users Organization and its User Groups
5. PF International Science Advisory Committee (ISAC)
6. IMSS Management Committee (Un-ei Kaigi)

# Institute of Material Structure Science

## Strategic Planning Working Groups

### *Background*

Photon Factory: Need to discuss and refine Photon Factory's strategic plan following the International External Review held March 2006, and new proposals for new BLs/stations such as Univ. of Tokyo SR Initiatives and Target Protein Project of the MEXT.

J-PARC: Timely advice on beam line planning and construction, and principle of operation, proposal review committee etc..

### *Mission*

Discuss and endorse strategies and priorities of projects specific to PF or J-PARC and future directions of the IMSS

Reports to the Director of the IMSS

Results are discussed in the IMSS Management Committee (Un-ei Kaigi)  
Members are selected from the IMSS Management Committee  
and the PF management team.

Committee meetings are open to the IMSS staff as observers.



## *IMSS Strategy Working Groups*

### Synchrotron Radiation Strategy Working Group

Mission: Advice on the science programs of the PF and the PF-AR including beam line construction, consolidation and refurbishment

Members: Asakura (Hokkaido), Amemiya (Univ of Tokyo), Oshima (Univ of Tokyo), Kosugi (UV-SOR), Sakata (Nagoya Univ), Takata (SPring8), Tsukihara (Osaka Univ), Murakami (Tohoku Univ), Miki (Kyoto), and PF directorate (Wakatsuki, Kasuga, Nomura, Kawata)

### J-PARC Strategy Working Group

Mission: Advice on the neutron and muon science and the operation of J-PARC MLF (Materials and Life Science Facilities)

Members: Arai (JAEA), Torikai, Nishida, Fukunaga, Yoshizawa, and from IMSS, Ikeda, Nishiyama and Kamiyama

# SR Strategy WG Internal Committee

- Formed according to IMSS director's request
- Mission: discuss the PF Directorate's proposal, improve/modify and propose a refined proposal to the SR Strategy WG

## *In the interim*

- One-year tenure synchronized with the SR Strategy WG
- Chair: Hiroshi Kawata
- Original Committee members: H. Kawata, M. Nomura, T. Kasuga, H. Maezawa, A. Atsuo, T. Matsushita, A. Yagishita, K. Ito, K. Kobayashi & S. Wakatsuki (PF staff members of the previous PAC- Committee for Research Planning)
- Additions: K. Mase, K. Ono, H. Sawa, T. Iwazumi, S. Shinichi, S. Yamamoto to include younger generation and cover wider areas of expertise.
- August 31, 2006 it was expanded to all the professors and associate professors of the PF

## *From April 1, 2006*

- Under the new group structure, the SRSWG Internal Committee will be replaced by the group leader meeting chaired by PF director, S. Wakatsuki.

# SR Strategic Planning WG: Internal Meetings

## **1<sup>st</sup> Meeting, Tue, July 24, 2006**

Attendees: Wakatsuki, Nomura, Matsushita, Iida, Kasuga, Maezawa, Yagishita, Sawa, Ito, Mase, Ono, Iwazumi, Shinichi Adachi, Kawata

**Hearing and discussion on the pharma beam line**

## **2<sup>nd</sup> Meeting, Thu, August 31**

Attendees: Wakatsuki, Nomura, Matsushita, Iida, Kasuga, Maezawa, Yagishita, Sawa, Ito, Mase, Ono, Iwazumi, Shinichi Adachi, Yamamoto, Kawata

**Discussion on the general concept of Projects XYZ**

## **3<sup>rd</sup> Meeting, Tue, September 12**

Attendees: Professors and Associate Professors

**Discussion on the concept and procedures for building new beamlines and consolidation of existing beam lines**

## **4<sup>th</sup> Meeting, Thu, September 21**

Attendees: Professors and Associate Professors

Proposers: Seto (Kyoto Univ), Kobayashi (Hyogo Prefecture Univ), Yamada

**Hearing and discussion on the Mossbauer activities and the pharma beam line proposal**

## **5<sup>th</sup> Meeting, Fri, September 22**

Attendees: Professors and Associate Professors

Proposers: Mase, Hyodo, Ono, Nomura & Kosuge

## **6<sup>th</sup> Meeting, Fri, September 29**

Attendees: Professors and Associate Professors

Proposers: Kishimoto, Shinichi Adachi, Inada, Kobayashi, Yagishita, Matsugaki

**Discussion on proposals for Projects XYZ**

# Projects XYZ

Solicit proposals from the PF staff as high priority projects, such as refurbishment of existing BL or station, light source development R&D, to be completed within 3 years from FY 2007 with the aim of obtaining significant external funding. Budget from PF will be on the order of US\$ 100,000 which can be regarded as matching fund.

- Proposer(s) must be PF staff
- Proposals should include
  - importance and urgency of the science and/or R&D,
  - detail of the project,
  - Yearly plan and milestones
- Budget request to PF (ca. or above US\$80,000 total)
- Strategy for acquiring external funding
- Work plan of each participating staff
- Commitment/collaboration of external users
- Proposal due: June 11, 2006

## Projects XYZ: First round closed on June 11, 2006

	Title	Proposers
1	Soft X-ray Spectroscopy of Organic Thin Layers on BL13	K. Mase
2	Refurbishment of BL14C for imaging techniques and a new station for high pressure application	K. Hyodo & T. Kikegawa
3	Refurbishment of PF-AR NE1A2 for clinical applications	K. Hyodo, H. Sugiyama & M. Ando
4	Further development of AR-NE3 SR Mossbauer spectroscopy beamline	S. Kishimoto & Z.-W. Zhang
5	Development and application of sub pico-second X-ray pulses using PF beam transfer section	T. Mitsuhashi & S. Adachi
6	Combined SR techniques for analyses of mesoscopic systems	Y. Inada, M. Nomura, H. Kawata, A. Iida, S. Yamamoto, T. Iwazumi, & Y. Kitajima
7	Time resolved XAFS for studies on reaction mechanisms	Y. Inada & M. Nomura
8	Refurbishment program of XAFS beam lines, Part I	M. Nomura
9	Improvement of the XAFS beam lines Part II: fluorescence XAS system	M. Nomura
10	STARS (Simple Transmission and Retrieval System) for beam line control	T. Kosuge, K. Nigorikawa, Y. Saito
11	Upgrading BL-28 undulator and development of photo electron spectroscopy with laser synchronization	K. Ono
12	X-ray nano imaging using soft X-ray PEEM	K. Ono
13	X-ray micro beam development for investigation of radiation induced cell response	K. Kobayashi
14	Atomic and molecular science of multi electron processes of atomic	Y. Azuma & K. Ito
15	Microfocus protein crystallography beam line	N. Igarashi et al.
16	Upgrade of SAXS beam line BL15	H. Okuda, K. Wakabayashi, Y. Amemiya, & S. Ueno (external proposal)
17	Upgrade of soft X-ray undulator beam line BL-2	A. Yagishita

Prioritization and implementation to the action plan being discussed.

# Learning from examples

How we proceeded with the proposal of the Astellas Pharma BL and the future actions and implications.

## Summary

**Proposed ports: either PF BL13 or PF-AR NE3.**

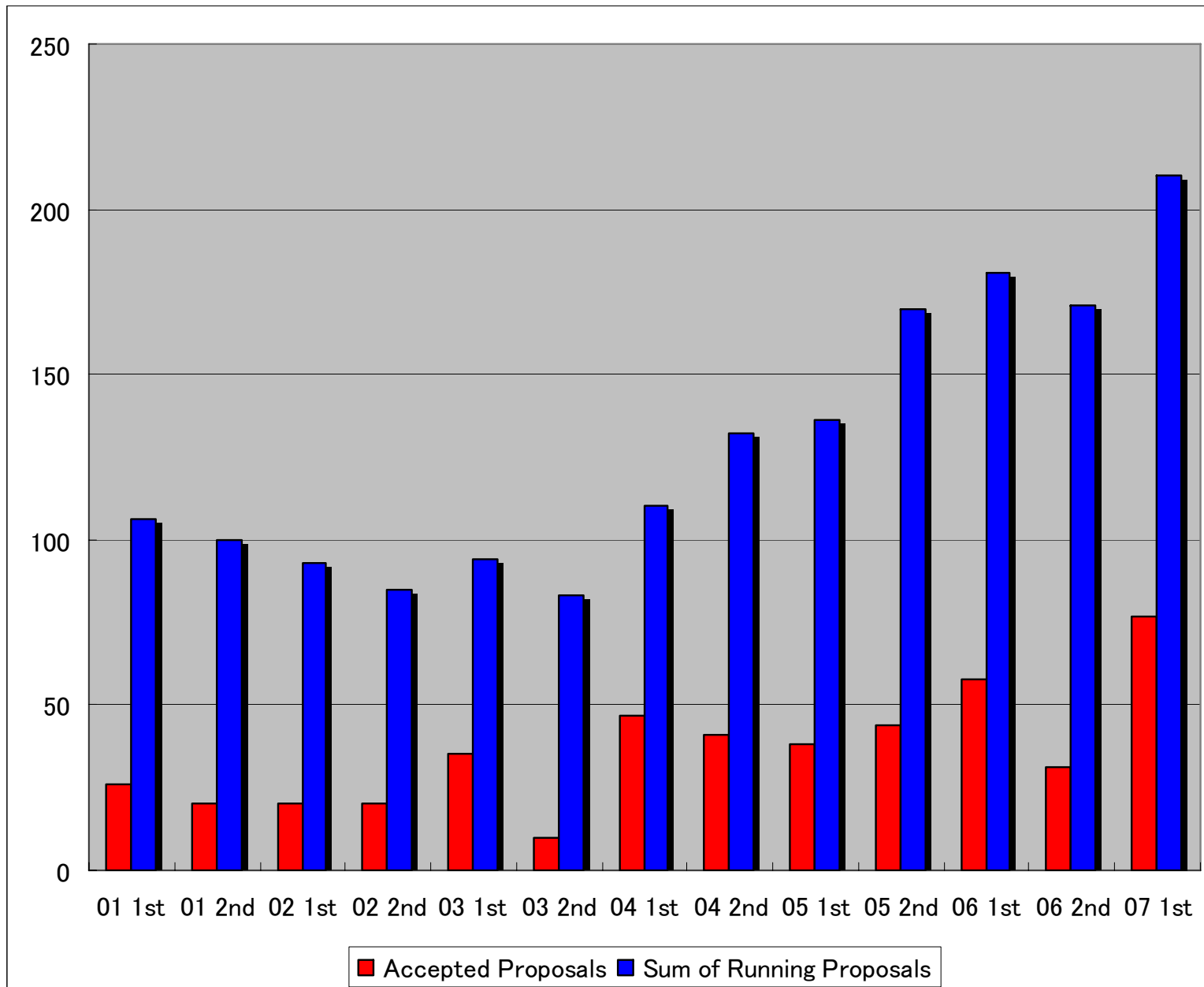
**Discussion in the SR Strategy WG internal committee**

- Whether PF should accept such a proposal.
- Future prospects of the two BLs including hearing
- Wishes and proposals of users potentially affected by construction of the Pharma BL: Compton, Moessbauer, high pressure, surface chemistry etc.

The proposal to build it on NE3 endorsed by the 1<sup>st</sup> SR Strategy WG.

## Learning from examples, continued

Statistics of experimental proposals on protein crystallography beam lines at PF



# Industrial Use and Collaborations between KEK and Industry (~8% of beamtime)

## MX BLs at Photon Factory

Astellas Pharma.  
Beam Line AR-NE3 (to be completed by March 2009)

Tsukuba Structural Biology Consortium for Industrial Applications (since April 1, 2006)

Company ①

Company ②

Company ③

Pharmaceutical Consortium for Protein Structure Analysis (PCProt), Japan Pharmaceutical Manufacturers Association (JPMA)

BL32B2 at SPring8

Ajinomoto Co., Inc

Astellas Pharma Inc.

Eizai Co. Ltd.

KYOWA HAKKO KOGYO Co., LTD.

DAIICHI SANKYO Co Ltd.

CHUGAI PHARMACEUTICAL Co., Ltd.

BANYU PHARMACEUTICAL Co., Ltd.

Mitsubishi Chemical Corporation

New members<sup>45</sup>



## **Discussion processes of the SR Strategy WG internal meetings concerning construction of the Astellas Pharma BL**

### **Conclusions of the 1<sup>st</sup> SR Strategy WG internal meeting**

- 1) The PF should make efforts in accepting the offer of the Pharma beam line as part of the long term strategy of PF to attract external funding.
- 2) It is important to dedicate medium- and long- straight sections of the PF 2.5 GeV ring for VUV/SX activities.
- 3) Continue the discussion on the proposal of building the pharma beam line for the case that it is to be built on NE3.

### **<Problems>**

- 1) A mechanism for proposers to rebut the decision of the committee should be in place.
- 2) If the beam line concerned with the consolidation is mainly driven by external users, the PF should pay particular attention to hearing their opinions and counter proposals.

### **2<sup>nd</sup> SR Strategy WG internal meeting**

Heard the scientific activities of Mossbauer spectroscopy on the current NE3 station.  
Re-discussed the site selection of the Pharma BL with the relevant PF staff.

## The 4<sup>th</sup> SR Strategy Committee Internal meeting

### Hearing of the proposals by

Seto (Kyoto Univ), Kobayashi (Hyogo Prefecture Univ)

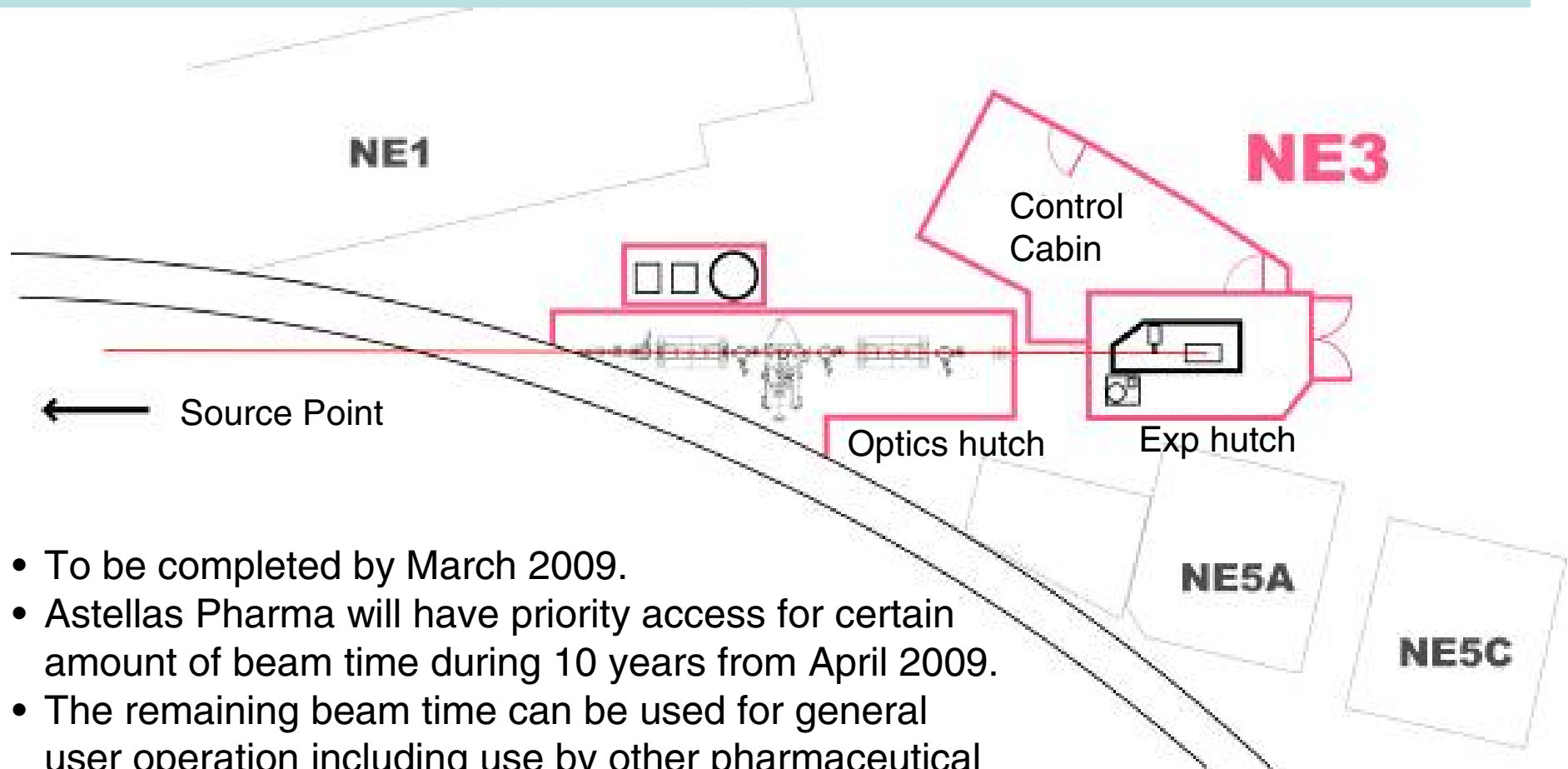
Yamada (PF, Structural Biology)

### And discussion on the Mossbauer activities and the pharma beam line proposal

### Conclusions:

- 1) Following the recommendation of the PF-External Review in March last year that PF should play a pivotal role in leading the sciences in the VUV/SX region, PF's strategy should be to keep BL13 as a dedicated undulator beam line for soft matter thin layer applications.
- 2) NE3 presents as the best port for the proposed pharma beam line.
- 3) Consolidation of the Mossbauer spectroscopy of NE3 and high pressure activities on BL13 to build a new station on NE1 should be evaluated. Also, the possibility of performing Mossbauer experiments on NW2 should be kept open.
- 4) Kishimoto's proposal to the Projects XYZ should be reevaluated in a revised form incorporating relocation/merger to NE1.

# Astellas Pharma Beam Line: PF-AR NE3



- To be completed by March 2009.
- Astellas Pharma will have priority access for certain amount of beam time during 10 years from April 2009.
- The remaining beam time can be used for general user operation including use by other pharmaceutical companies.
- Press release on October 26, 2006. Featured in Nikkei, Nikkei Industrial, Daily Industry, Joho, NHK (online)

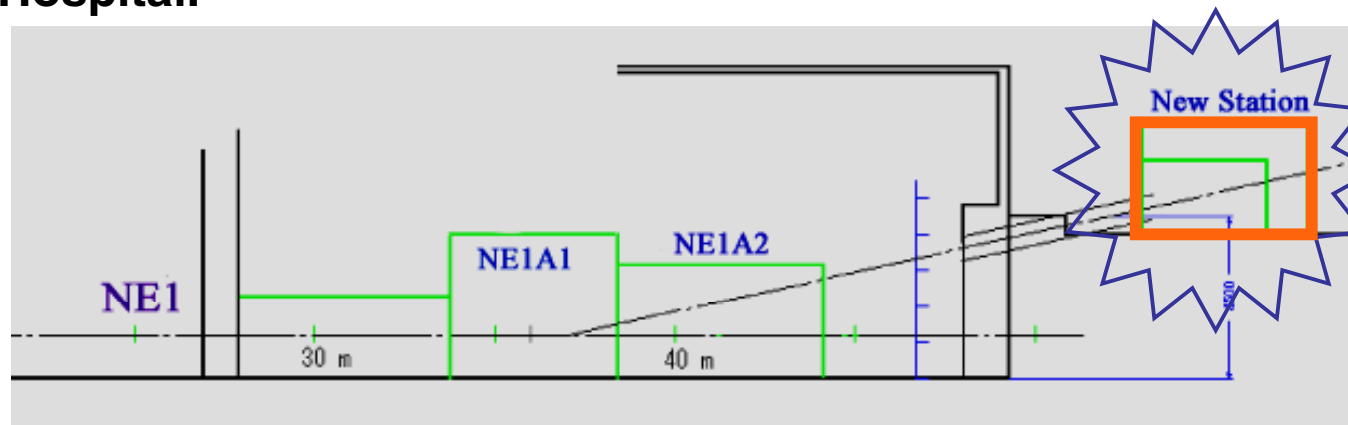
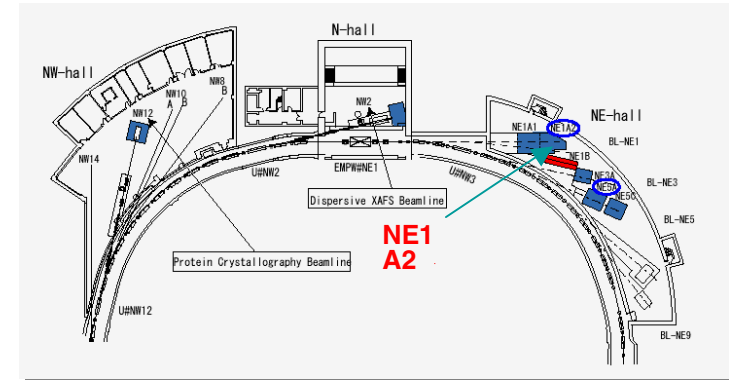
## Future directions of the Scientific Activities of NE1 (under discussion)

### *NE1A redevelopment*

- **PF-AR NE1A1 had played a pioneering role in Compton scattering science** and transfer of the NE1A1 activities to BL08W of SPring-8 for further development will best serve the community (We have had discussions with the Compton UG)
- **XMCD activities on NE1B will be transferred to the new BL16A** with an Apple-II type undulator (to be expanded to a fast switching twin undulators)
- **Medical applications (coronary angiography) on NE1A2** using the underground hutch for patients will reach the end of its program in about one year. Further development in the area of medical applications will be better suited if the station is extended to the ground level where patients access is much easier and there will be no conflict of beam time with the rest of the AR stations. The extension plan depends on initiatives of University of Tsukuba Hospital.

## Future Possibilities of Medical Applications at PF-AR NE1A2 To be lead by University of Tsukuba Hospital

Medical applications (coronary angiography) on NE1A2 using the underground hutch for patients will reach the end of its program in about one year. Further development in the area of medical applications will be better suited if the station is extended to the ground level where patients access is much easier and there will be no conflict of beam time with the rest of the AR stations. The extension plan depends on initiatives of University of Tsukuba Hospital.



Future plan for PF-AR NE1A2 above-ground station

## Future directions of the Scientific Activities of BL13 (under discussion)

*BL13 to be dedicated to surface chemistry using undulator, potential to become one component of PF VUV-SX flagship*

- **BL13A high pressure earth science research** (30 ~40 keV) using diamond anvil cell (DAC) with laser heating will be moved to NE1A. **Moessbauer spectroscopy** on electronic/spin-state studies of Fe which will be transferred from NE3 and merged with the DAC activities.
- **BL13B1 and BL13B2 XAFS activities** will be absorbed into the other PF and PF-AR beam lines.
- These will solve the hybrid problem of the current BL13 insertion device by dedicating it to **surface chemistry applications on BL13C in the undulator mode only.**

*As a net result, the whole process will decrease the number of stations by 4.*

# User-Group Operated Beam Lines

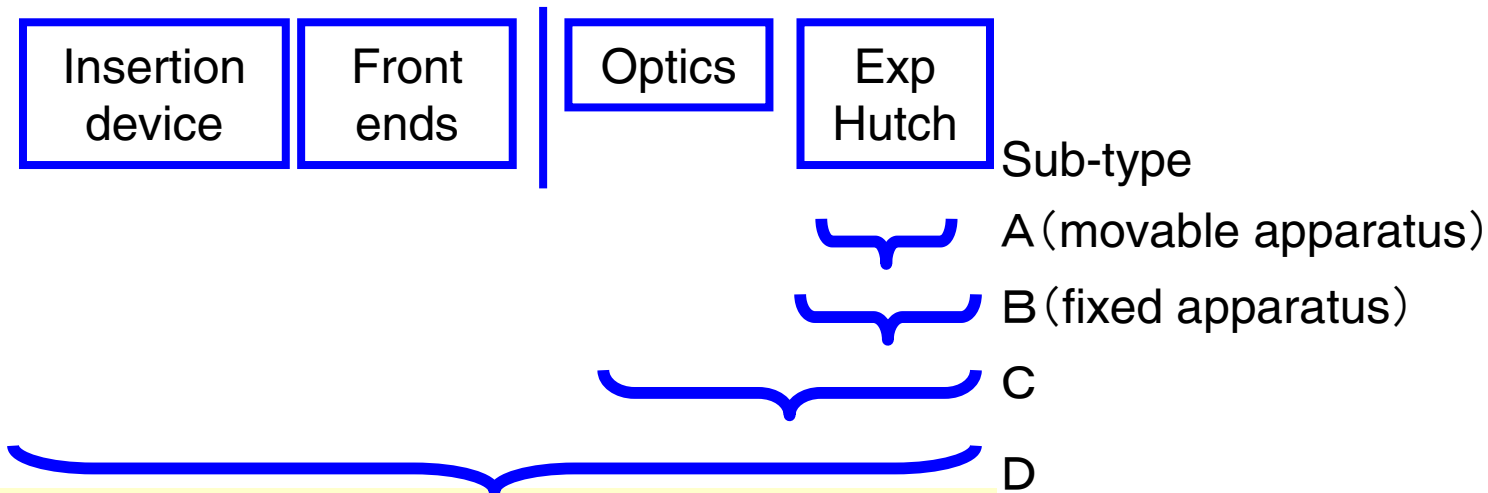
Station	Working Group	PI	Host UG of the PF UO	Corresponding PF staff
BL-10C	SAXS of Enzymes WG	S. Nojima (Titec)	SAXS of Enzymes	K. Kobayashi
BL-13C	Soft X-ray CGM spectrometer WG	H. Shimada (AIST)		K. Mase
BL-15A	SAXS WG	H. Okuda (Kyoto U)	SAXS	R. Kato
BL-14C2/ AR-NE5C	High Temp High Pressure WG	K. Kusaba (Tohoku U)	High Pressure Science	T. Kikegawa
BL-4B2	Powder Diffraction WG	T. Ida (Nagoya I. T.)	Powder Diffraction	A. Nakao
BL-6C	Material Physics WG	S. Sasaki (Titec)		H. Sawa

\* Interested users volunteer forming WGs to participate not only in the maintenance of the hardware but also in help and education of new users.

\* The PF provides budget for maintenance of the stations and travel support for the WG members for maintenance of the User-Group operated stations. Members of the WG can apply for privileged beam time as the PF staff.

# New Comprehensive System for PRT/CAT BLs (to be refined and discussed!)

Type	Construction cost paid by	Maintenance cost covered by	Personnel responsible
I	PF	PF	User group(s)
II	PF	User group(s)	User group(s)
III	User group(s)	PF	User group(s)
IV	User group(s)	User group(s)	User group(s)



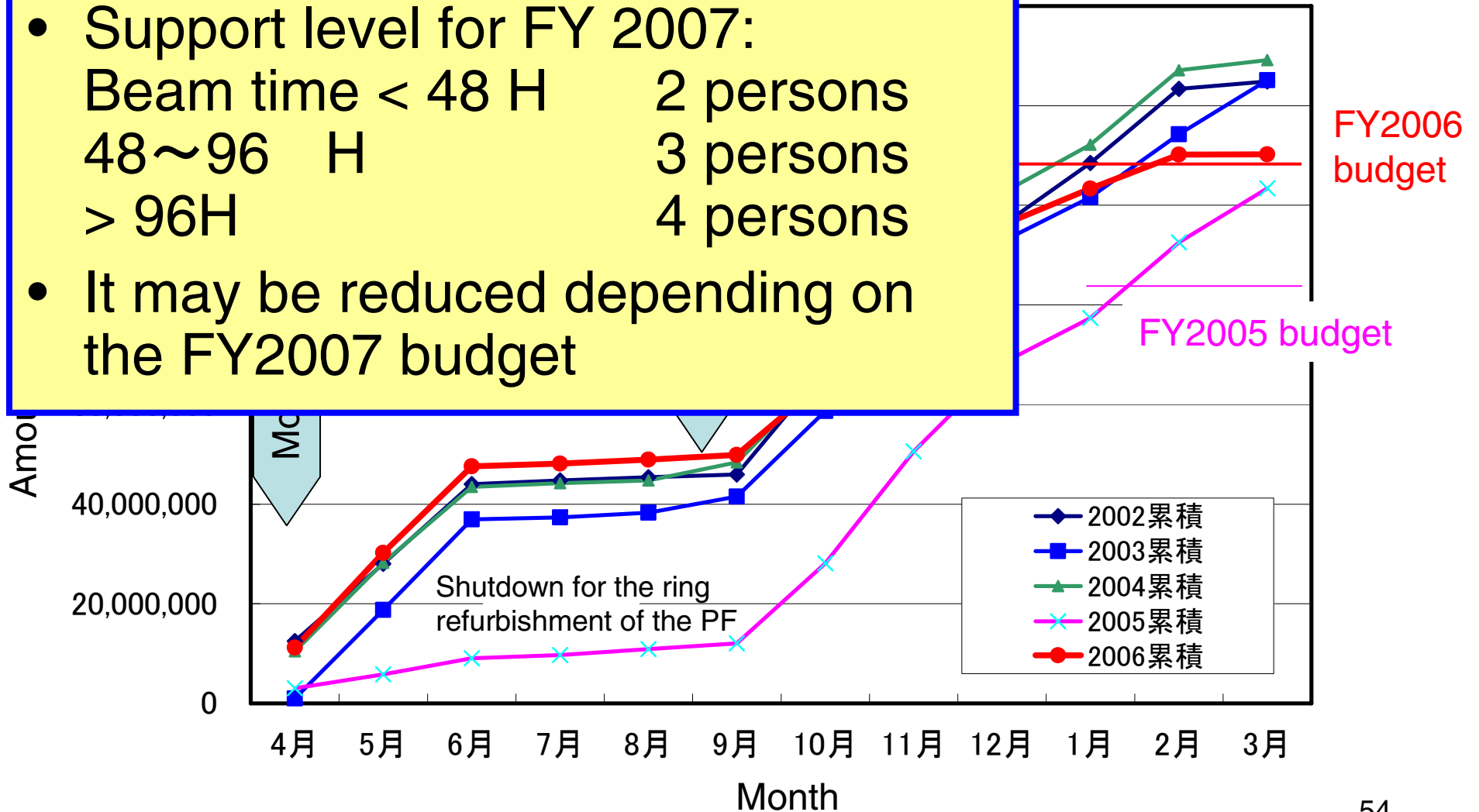
Question: Who will bear the cost and human resources after the completion of the project?



# Travel support for PF users

Profile of travel support

- Support level for FY 2007:  
 Beam time < 48 H      2 persons  
 48~96 H                    3 persons  
 > 96H                        4 persons
- It may be reduced depending on the FY2007 budget



# Proposals from outside institutes to construct BLs

- SRRO, Univ. of Tokyo  
*surface/interface, XMCD*
- Saha Institute of Nuclear Physics (India)  
*crystal/powder diffraction, XAFS, diffuse scat.*
- Catalysis Research Center, Hokkaido Univ.  
*XAFS, IR etc. dedicated for catalysis research*
- Discussion with Ibaraki Prefecture (local government) on industrial use of the PF & PF-AR

# Post Protein3000 Project (2007-2011)

## Targets:

Medical  
importance/relevance

Food and  
environment

Fundamental  
Biology

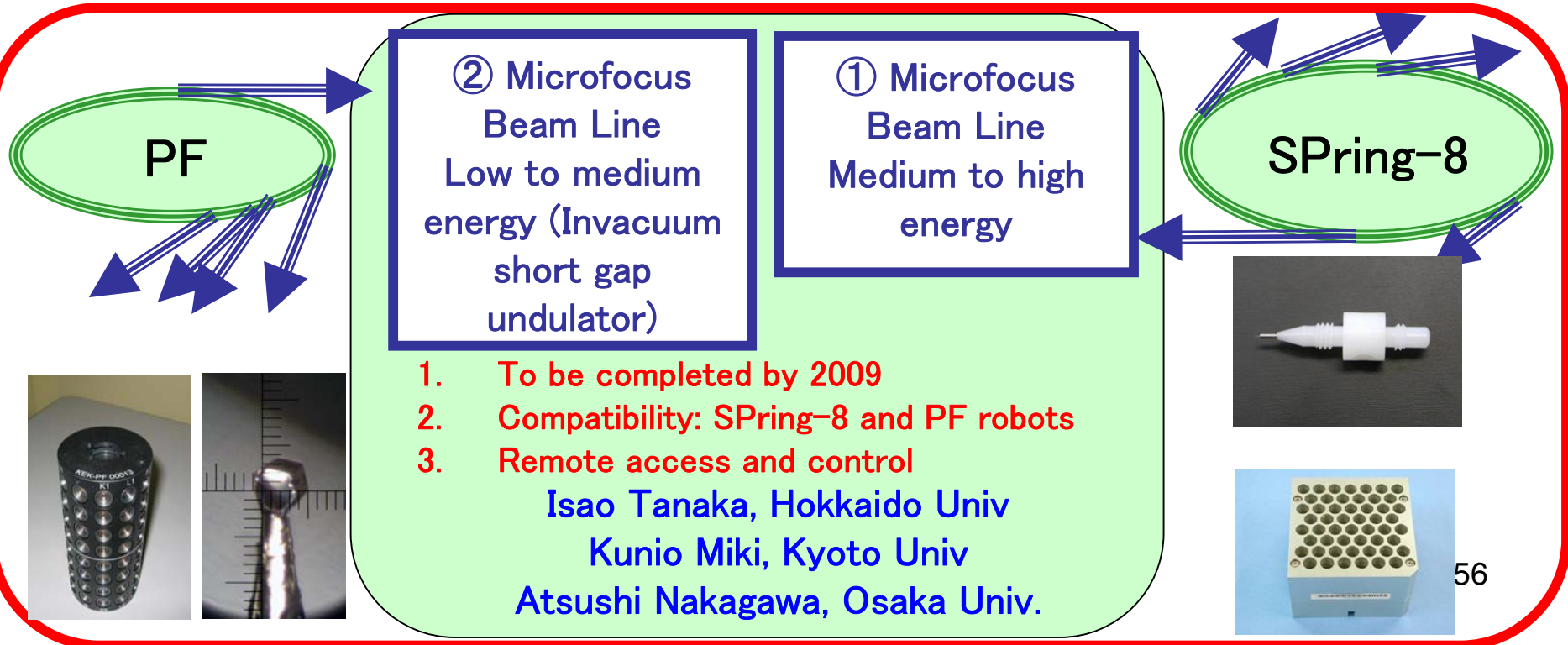
Protein  
Production

Structural  
Analysis (**X-ray**,  
NMR, EM)

Functional  
Control (Chem.  
Library)

Informatics

Joint Proposal (FY2006) by SPring-8 and PF: New Beam Lines



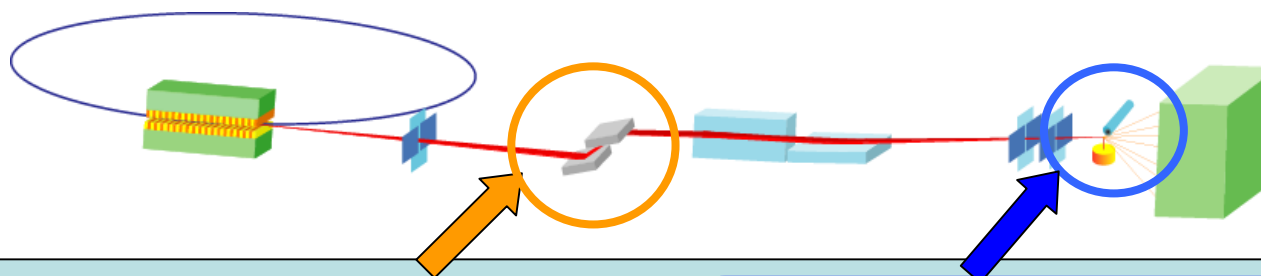
To be proposed to “Target Protein Research Project Program”  
 FY2007-FY2011, but BL construction complete by March 2010

SPring-8  
 (Harima)

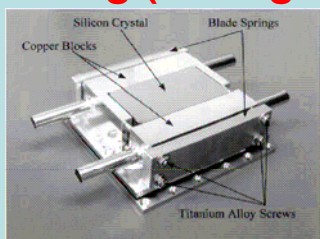


Kick-off in FY2006: “SR X-ray Protein  
 Crystallography Techniques for difficult targets”

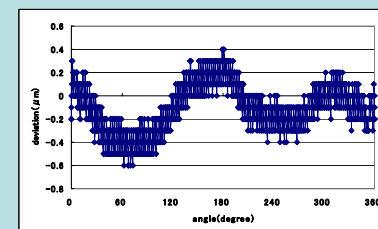
Photon Factory  
 (Tsukuba)



High precision monochromators for  
 micro beam using cryogenic  
 cooling (SPring-8)



Development of super precision (sub  
 micron) diffractometer for micro  
 crystals (PF)



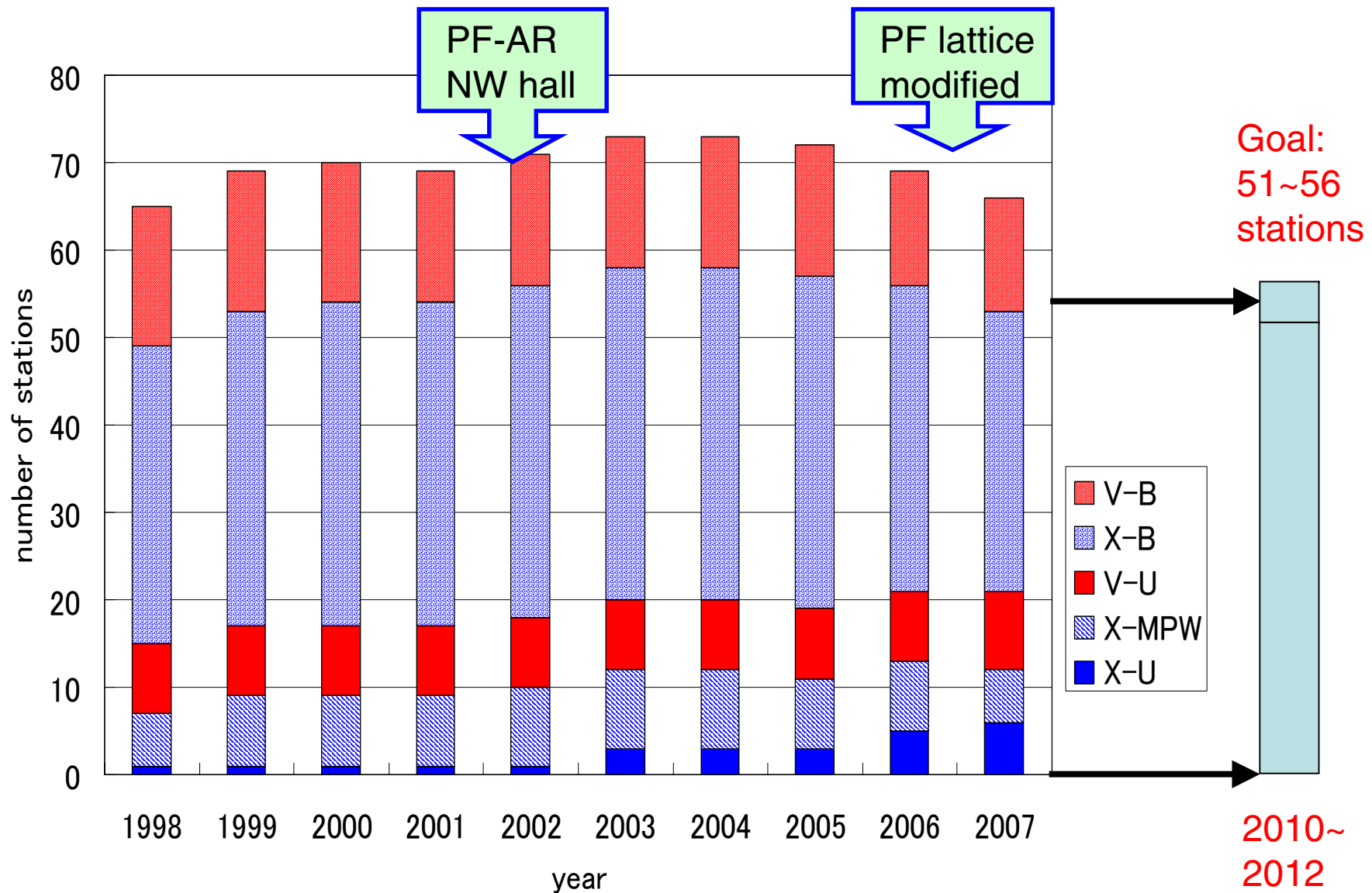
Projects in  
 FY 2006

Remote access and control  
 Mail-in and remote data collection  
 (Hokkaido Univ, Kyoto Univ, & Osaka Univ)

# Goals of BL upgrade and consolidation (to be discussed!)

- Solving hybrid use of insertion device (eg. BL13) by dedicating the insertion device to one mode of operation.
  - Timely construction of two remaining short gap undulator beam lines (BL1 and BL15) as well as transfer/consolidation/close-down of beam lines affected by the new undulator BLs.
  - Closing down BLs with low activities or with few user groups.
  - Convert BLs with less demands but nevertheless producing good quality science or those with unique capabilities to
    - PRT (CAT) beam lines
    - Specialized beam line catered for graduate education
    - Possibility of funding: JSPS's "Attractive Graduate Education" Initiative
- while keeping in mind the cost for running such BLs.
- As a result of the BL construction and consolidation, we aim to decrease the number of stations by 10 to 15 in 3~5 years, i.e. 51 to 56 stations from the current total of 66 stations and concurrently operational stations 53.

# Number of experimental stations



These numbers include (currently 14) stations operated by external users.

# Beamlines

number of stations

		PF	PF-AR
X	U	2	4
	MPW	4	2
	B/VW	29	3
VSX	U	8	1
	B	13	0

29 BL,  
66 (56 independent)  
stations

Stations with external support

		PF	PF-AR
X	U	<i>0</i>	<i>1+0</i>
	MPW	<i>0</i>	<i>0</i>
	B/VW	<i>2+4</i>	<i>0+1</i>
VSX	U	<i>2+1</i>	<i>0</i>
	B	<i>3+0</i>	<i>0</i>

funded by external groups  
(AIST, ASRP, Univ. of Tokyo,  
JST)

supported by external groups  
*8+6 = 14*



## Organization of ISAC subcommittees and the next ISAC sometime later in FY2007



# Organization of ISAC subcommittees and the next ISAC sometime later in FY2007

- 2 year period
- Question: Is there a need to add a few more members for continuation?

Earnest Fontes – Cornell High Energy Synchrotron Source

Hidetoshi Fukuyama – Tokyo University of Science

Keith Hodgson – Stanford University, Chair of the Committee

Hiromichi Kamitsubo – Riken Wako Institute/Saga Light Source

Gerhard Materlik – Diamond Light Source

Toshiaki Ohta – Ritsumeikan University

Volker Saile – University of Karlsruhe

Hiroyoshi Suematsu – Riken Harima Institute

Kunio Miki – Kyoto University (replacing Prof. T. Tsukihara)

Ingolf Lindau – SSRL (replacing Dr. Neville Smith, ALS)

# Planning for ISAC Subcommittees (to be discussed)

- Evaluate and give advice on beam lines, science outputs by users and by the PF staff, corresponding parts in the PF strategic plan.
- The subcommittees report to the International Science Advisory Committee.
- Each subcommittee consists of 3 to 5 experienced scientists. Ideally each member of the ISAC will belong to one subcommittee.
- Each subcommittee will meet for one or one & half days including a facility tour, and be coupled with the main ISAC.
- For the first time, it may be better that all the subcommittees will meet just before the next ISAC, later this year, prior to the second ISAC. **Question is how much time we need to have between the subcommittees and ISAC.**
- Proposals of the subcommittee topics
  - Electronic properties (solid state, gas and molecular physics, surface & theory)
  - Structural material science
  - Chemistry (particularly XAFS, X-ray fluorescence analysis )
  - Life sciences (structural biology and radiation biology)
  - Medical sciences (including angiography & tech. developments for imaging)
  - Machines