

Response to the Users' Community

~Recent Achievements and Future Prospects~

Toshinori Yabuuchi



SACLA Users' Meeting 2019
August 28-29, 2019@SACLA

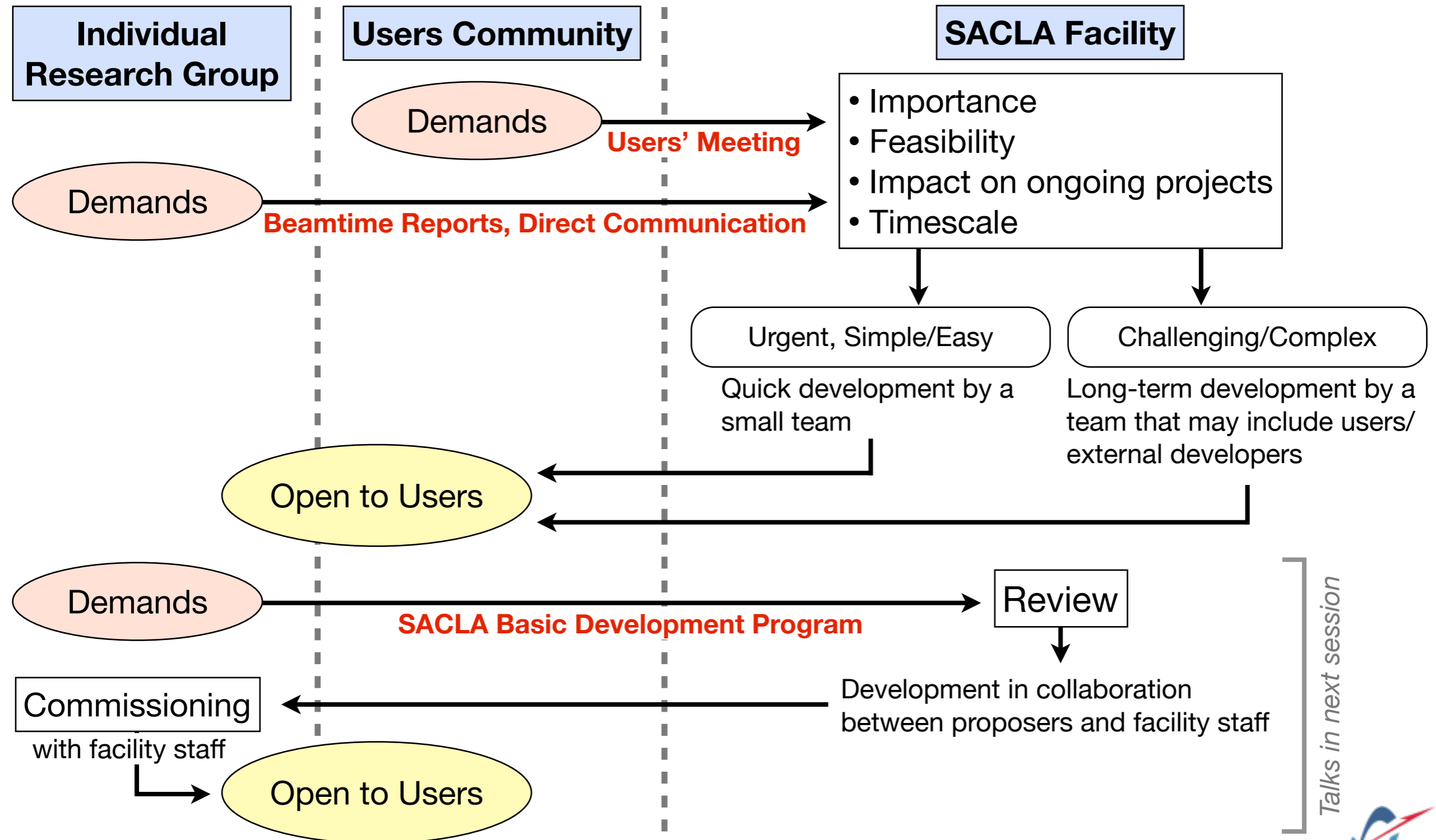
Feedback from users' community is essential to improve research capabilities at SACLA

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- Multiple channels have been established to gather demands from users:
 - SACLA Users' Meeting (annually, incl. potential users)
 - Beamtime Report (after beamtime)
 - SACLA Basic Development Program (from late 2018)
 - Post Beamtime Briefing, Direct Communication in Person
- Many improvements have been achieved in recent years as responses to requests/comments from users. Further improvements are planned.
- As always, comments are very much appreciated not only on scientific topics but also on effective ways to provide individual thoughts to the SACLA facility through the users' community.

Users' Meeting is one of the best opportunity to exchange thoughts between the users' community and the facility.

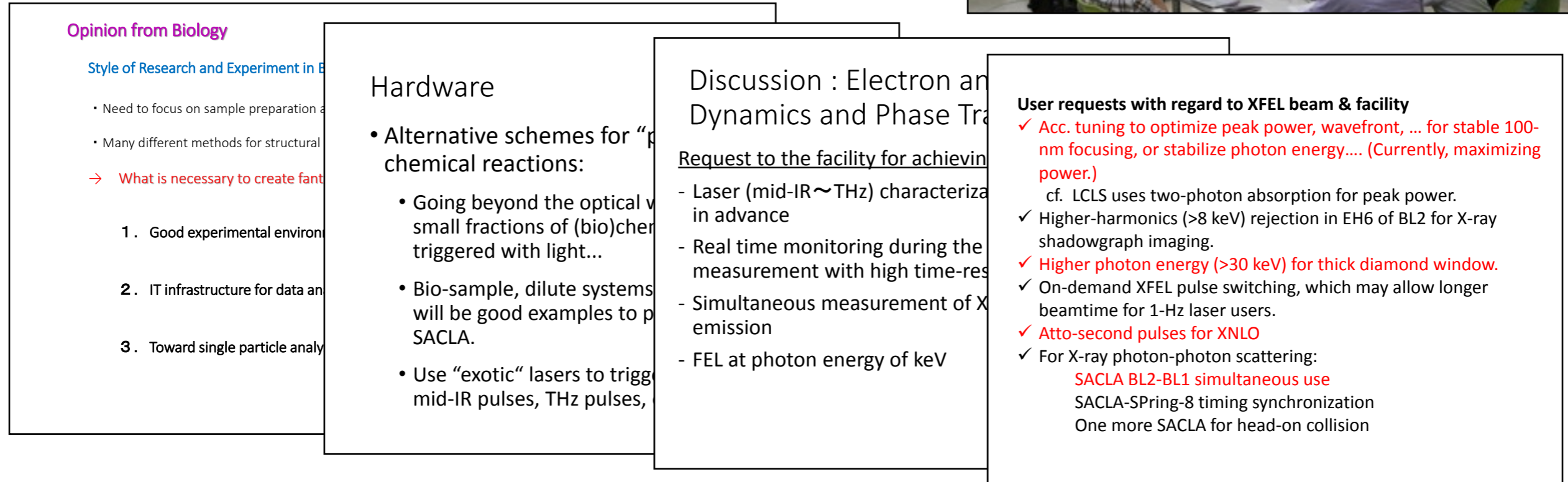
Flexible procedures are available at SACLA to fulfill users' demand in a timely manner

Example in case of hardware/software developments



Thankfully, much valuable feedback was provided in the last Users' Meeting

- Requests from each scientific area have been discussed in the breakout sessions and summarized during the Users' Meeting 2018 (**UM2018**).
 - Biology
 - Ultrafast Chemistry/AMO
 - Material Science
 - Science in Extreme States (XQO&HEDS)

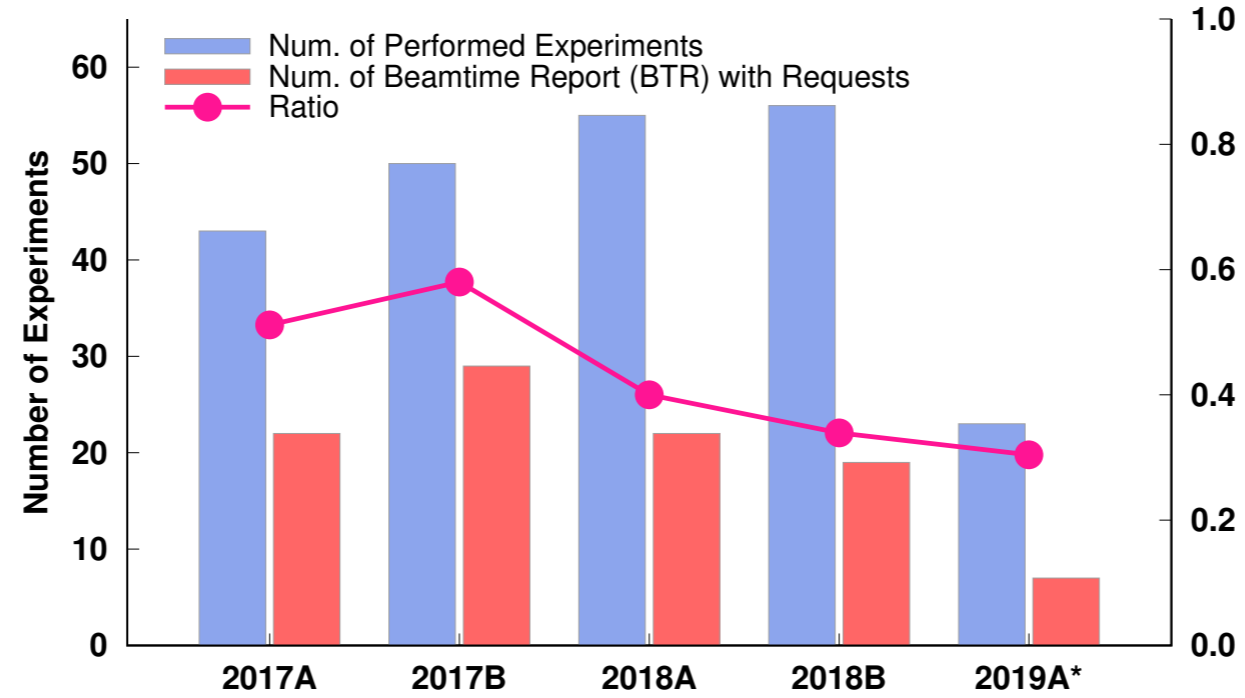


Summary slides can be found on the webpage: <http://xfel.riken.jp/usersmeeting2018/program.html>

Beamtime Reports (BTR) submitted after experiments are also important to gather users' voice

SACLA User Information

- SACLA Guide
 - Programs/Call for Proposals
 - For Prospective Users
 - Proposal Application
 - Arrival/Experiment
 - After Experiment
 - Proposal System and Fees
 - List of Proposals
- SP8/SACLA Guest House
 - SPring-8 Guest House
- Search
 - Publications Entry (Login Required)
 - Publications Search
 - Beamtime Report (Request / Answer) Search**
 - Experiment Summary Report Search
- Quick Links
 - BL Information



>30% of PIs provided specific requests or suggestions to the facility

*2019A data is only shown for the 1st half of the term.

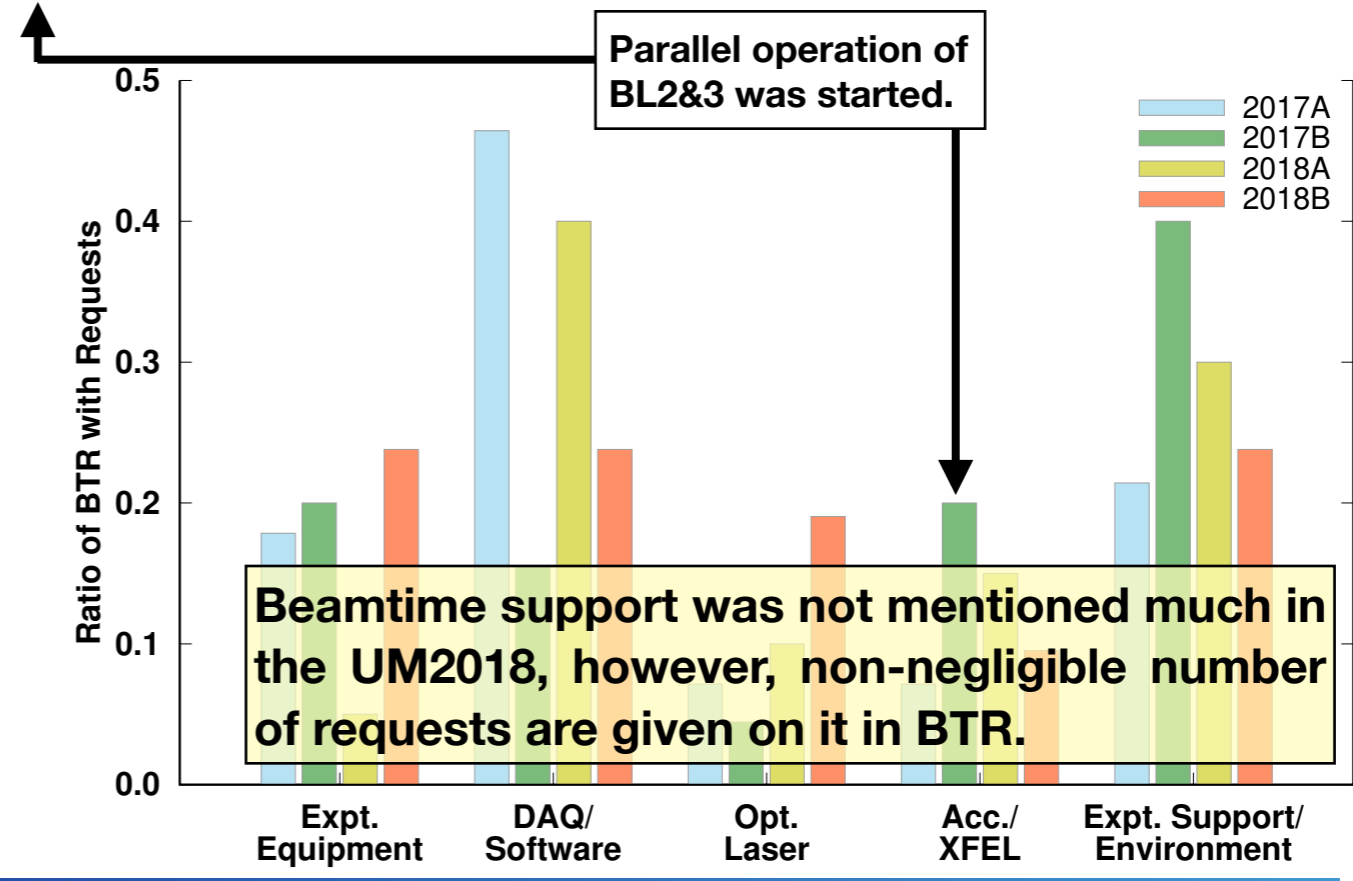
Search Condition

Research Term: 2018A, Cycle: [], Facility: SACLA, Beamline: [], PX Allocated Beamline: [], Keyw: []

Results per Page: 25, Search

Results: 1 - 22 of 22

Research Term	Beamline	Request to the Spring-
2018A	BL2	OSの種類によらず無線LAN (SP8-STAFF)の
2018A	BL1	ターゲット制御のために駆動プログラムを準
2018A	BL3	特にはないが、前回は非常に良いXFEL条件で
2018A	BL3	The ability to filter data in the online data
2018A	BL3	今回は、XFELが比較的安定しており、パルス
2018A	BL2	It would be very helpful to have a second
2018A	BL3	Preparation is key for successful XFEL exp



Parallel operation of BL2&3 was started.

Beamtime support was not mentioned much in the UM2018, however, non-negligible number of requests are given on it in BTR.

<http://sacla.xfel.jp/>

*Comments are not included in the breakdown if they are not directly relates to experiments.



Response to Requests on BL Equipment (Hardware)

✔ “Real time” monitoring of arrival timing at BL1 (UM AMO)

- Timing monitor and its online analysis software are available at BL1 for user experiments since 2018.

✔ User-friendly and automated systems for SFX experiments (UM Bio)

- An automated positioning system is developed for a sample injector.
- An auto-control system for HPLC and He-gas flow in addition to the injector is under development for user experiments.

✔ Improvements/developments of equipment for user experiments (BTR)

- The facility is continuously working to improve available equipment or develop a new one as responses to users' requests in BTR.

Completed primary development and released for users

Under development or partially released for users

Not yet started

Response to Requests on DAQ and Softwares

- ① **Establish policy for big data storage/handling on HPC (UM Biology)**
 - SACLA is now preparing a draft of the policy on the data storage (such as storage term, larger storage space for temporal use, etc.).

- ② **Information about HPC systems and useful tools for data analysis (BTR)**
 - Sets of application programming interface (API) have been released to support the program development.
 - As a response to a large number of requests or questions about the API in last years, the SACLA HPC Portal[†] has been released with a series of examples useful to develop a program for data analysis.
 - In response to a users' request, a "hands-on session" about the data analysis is held in this users' meeting for the first time.

[†]SACLA HPC Portal is at <http://xhpcfep.hpc.spring8.or.jp> (VPN connection is required)

Response to Requests on Optical Lasers

☑ **“Exotic” lasers for alternative pumping** (UM Chem/AMO, Material)

- Since 2018B, laser light of **mid-IR wavelengths (up to $\sim 6 \mu\text{m}$)** has been **provided for user experiments**. (Poster #6: Dr. Owada)
- Capability to use THz pulses for pump is under preparation for user experiments in 2019B.
- Development of a “sub-10 fs” laser system is not on the current schedule. **SACLA Basic Development Program** might be a good option to start the “sub-10 fs” laser development.

○ **Limited resource of laser scientists for high-power laser systems** (UM HEDS)

- Domestic or international **collaborations to develop reliable systems of high-power femtosecond laser** for EH6 are very welcomed.

Response to Requests on Accelerators/XFEL

☑ **Self-seeded FEL** (UM Chem/AMO)

- Self-seeded FEL has been provided for user experiments from 2019A.
- Details are presented in a poster (#3: Dr. Inoue) in this meeting.

☑ **Energy scan of seeded FEL for XANES (<50 eV)** (UM Chem/AMO)

- Energy scan has been tested >50 eV with undulators' adjustments.
- “Fly scan” is also feasible for +/- 5 eV at a fixed undulators' condition.

☑ **Shorten preparation time for seeded FEL** (UM Chem/AMO)

- It still takes ~8 h to provide a seeded FEL with the best performance.
- A “quick-tuning” method is almost established to reach about half of the maximum spectral brightness in ~3 h.

○ **Development of attosecond pulses capabilities** (UM Chem/AMO, XQO)

- Future perspectives of attosecond XFEL at SACLA will be discussed in the breakout session (Session 1) in this meeting as well as its scientific case.

Response to Requests on Accelerators/XFEL (cont.)

- ④ **Accelerator tuning method to optimize FEL for users' demand, particularly for stabilizing 100 nm focusing or photon energy (UM XQO)**
 - The accelerator had been controlled with monitoring of the pulse energy.
 - It is **under development to use various monitors in beamlines**, such as the inline spectrometer, to optimize the operating parameters of accelerator.
- ④ **On-demand XFEL pulse switching between BL2 and BL3 (UM HEDS)**
 - “On-demand” pulse delivery (i.e. deliver an FEL pulse when requested to a specific beamline) will not be realized.
 - Instead, “non-equal” switching is planned particularly for beamtimes using high-power lasers with low-repetition rate.
 - Test operation of the accelerator will start in 2020. Developments are still needed on beamline and DAQ systems.
- **More intense beam for single molecule imaging (UM Bio)**
 - Specific work for this topic has not been started yet. It is still one of the biggest challenges.

Response to Requests on Support/Environment

☑ Supportive service of data collection for SFX (UM Bio)

- A large area detector from [Rayonix](#) can be used seamlessly on the [SACLA DAQ system](#) in collaboration with Dr. Yamamoto's group (RIKEN).
- User's manuals have been prepared for the use of the sample injector system and other equipment by Dr. Iwata's group (Kyoto Univ./RIKEN).

☑ Warm temperature in experimental hutch (EH3) (BTR)

- The heat from the large area detector increases the temperature in EH.
- Examinations are ongoing to minimize the temperature increase both for sample protection and optical laser stabilization.

☑ Sharing latest facility capabilities with users (UM Material)

- The SACLA [beamline information on the webpage[†]](#) is updated to provide the most up-to-date capabilities.
- A modern system will be introduced internally to update the information regularly.

[†]for example at <http://xfel.riken.jp/eng/users/bml02-11.html>

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Thank you for your participation. Enjoy the meeting!



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Presented on behalf of SACLA team