Facility Update

Serguei Molodtsov
Scientific Director, European XFEL

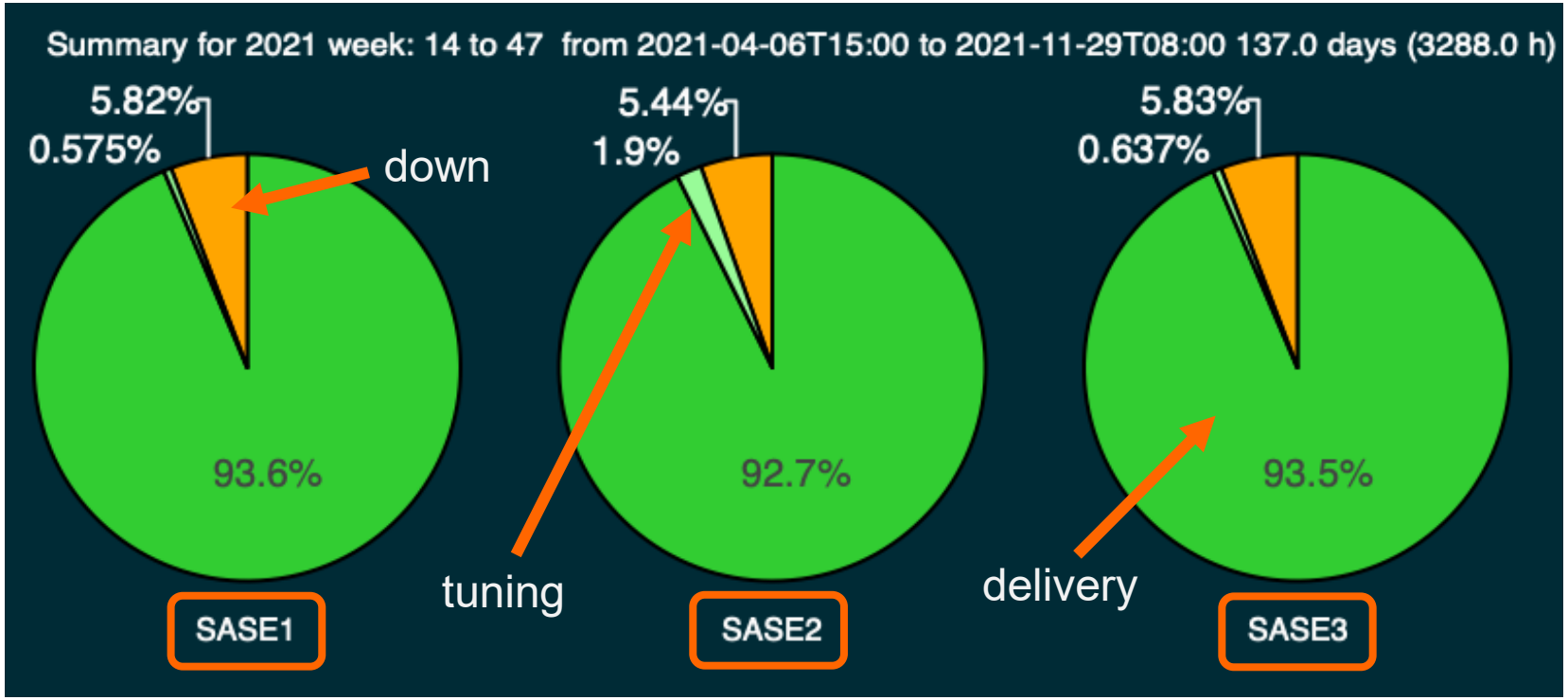
Virtual user information meeting -9th call for proposals
Remote Meeting Schenefeld/Bahrenfeld/Zoom
12 May, 2022

Status of Operation

- COVID-19 impact on operation has been moderate in 2021-2 and 2022
- Many more users are now on site, only few restrictions left
- The users experiments go very well
- Long shutdown postponed to 2025-2

The accelerator ran very well in 2021:
Delivery statistics for Weeks 14–47

The period was chosen because only limited operation was possible until Week 13 due to COVID-19 restrictions.

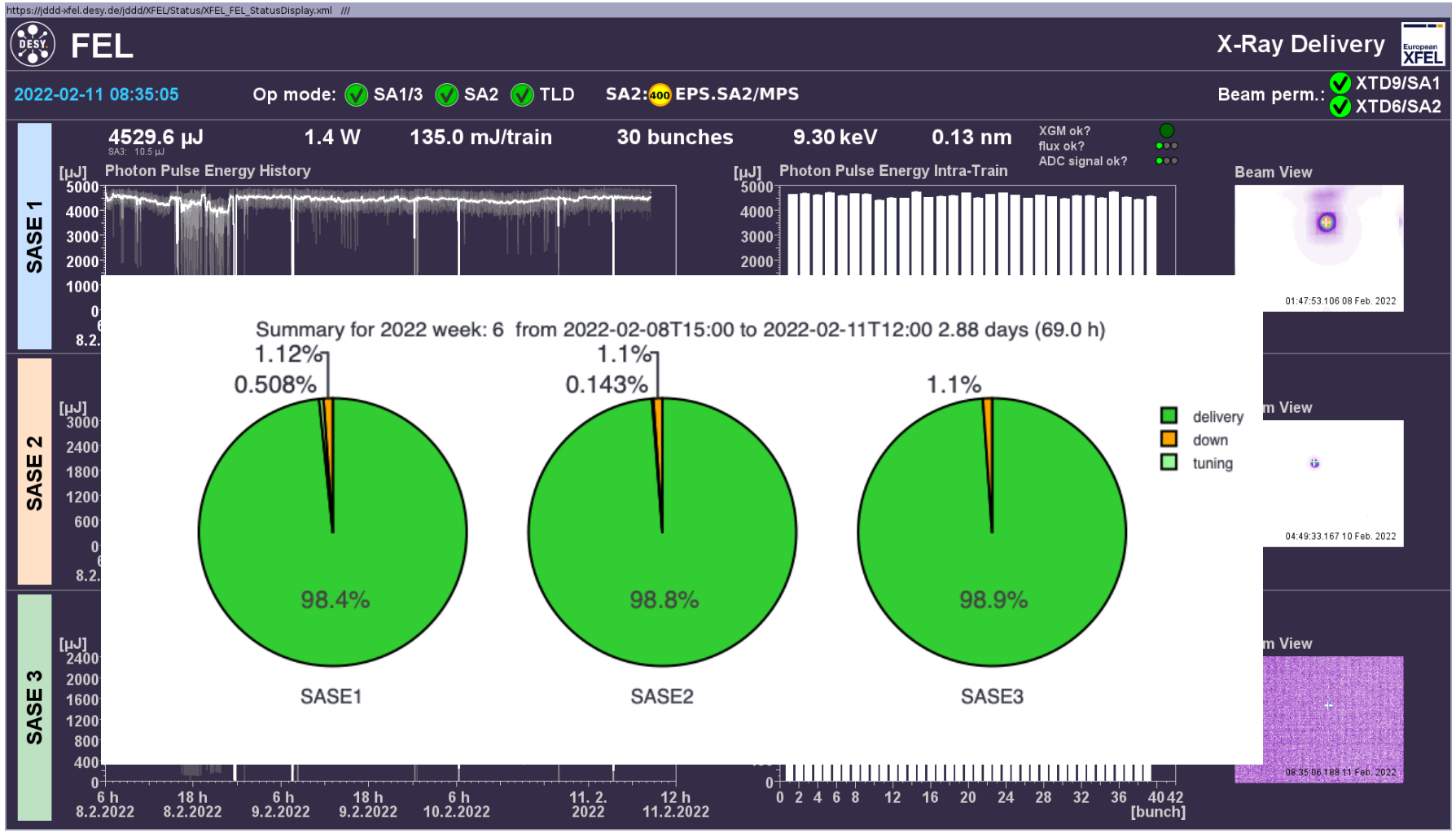


- The statistics are based on data entered by the operation crews.
- The data considers only the SASE delivery times.
- SASE delivery to all beamlines in about 93% of the time.
- SASE2 needs more tuning time compared to SASE1 (more complex electron beamline).

All shown data are accessible via a web application where the time period and beamline can freely be selected.

Courtesy of Matthias Scholz

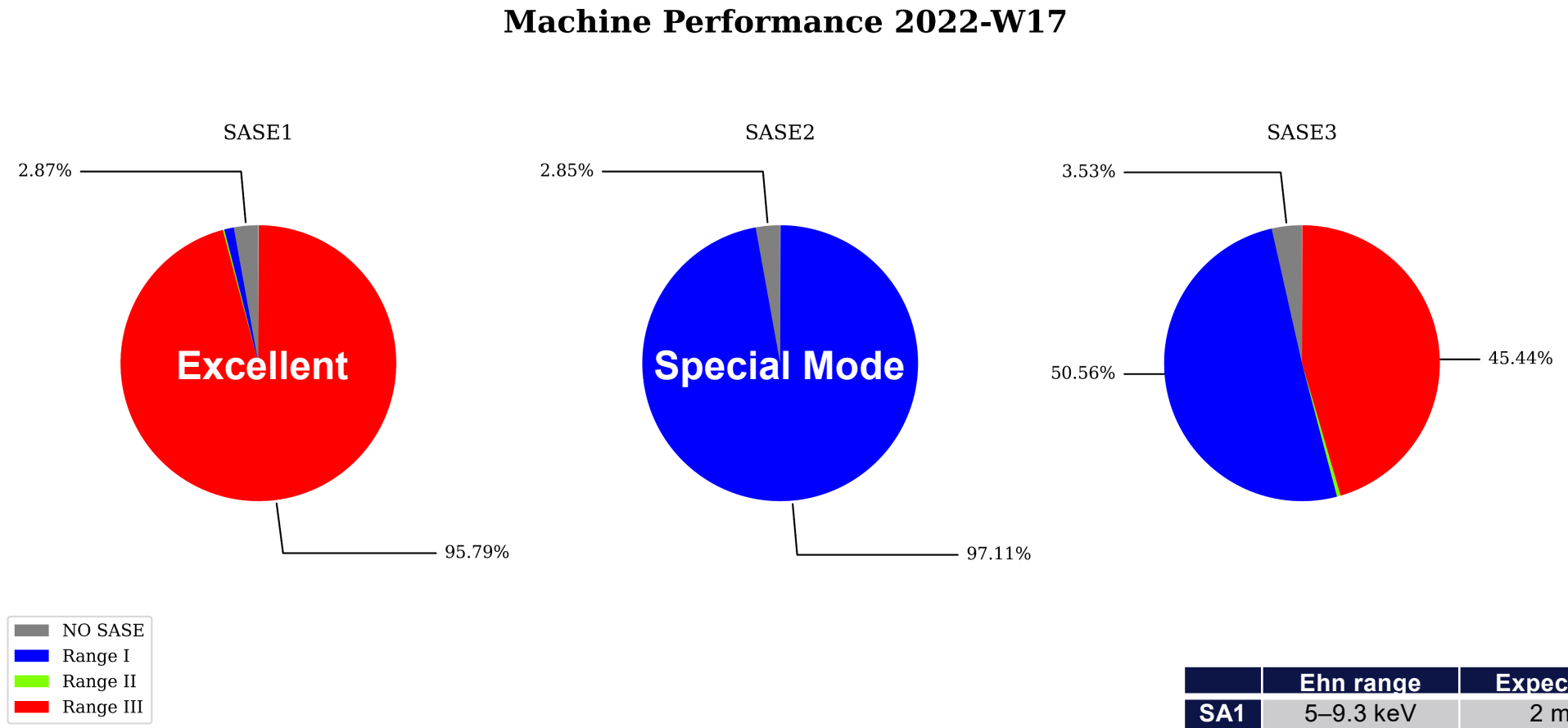
SASE pulse energies during Week 6, 2022 : “The best week ever”



- These plots show the SASE pulse energies from Tue., 6 am, until Fri., 12 noon, in Week 6, 2022.
- We had only 6 interruptions so far that week.
- SASE intensities are very stable over time.
- SASE1 is delivering with the highest intensity ever achieved at this photon energy.
- All beamlines show good performance for all bunches in the bunch train. (Also SASE2, if there are more bunches than at the time of the screenshot.)

Courtesy of Matthias Scholz

Snapshots of recent operations

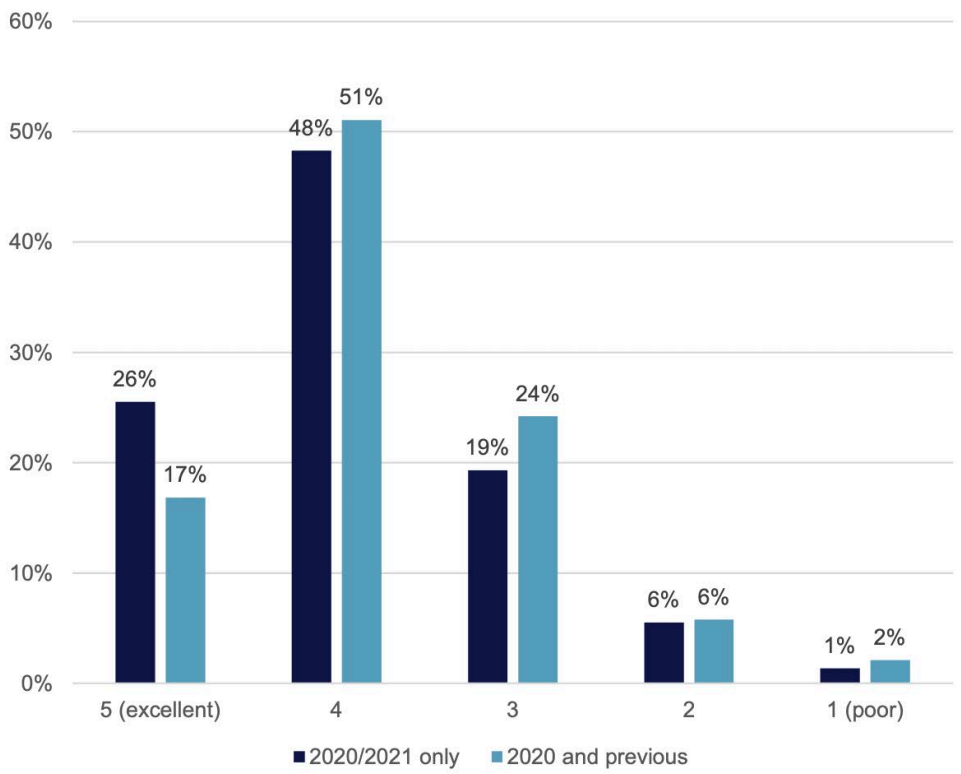


SA1: 5.3 mJ @ 9.3 keV, 6.3 mJ @ 7.5 keV,
SA2: 1.7 mJ SASE @ 11.25keV, up to 850 uJ seeding @ 9 keV ,
SA3: 7-8 mJ @ 750 eV

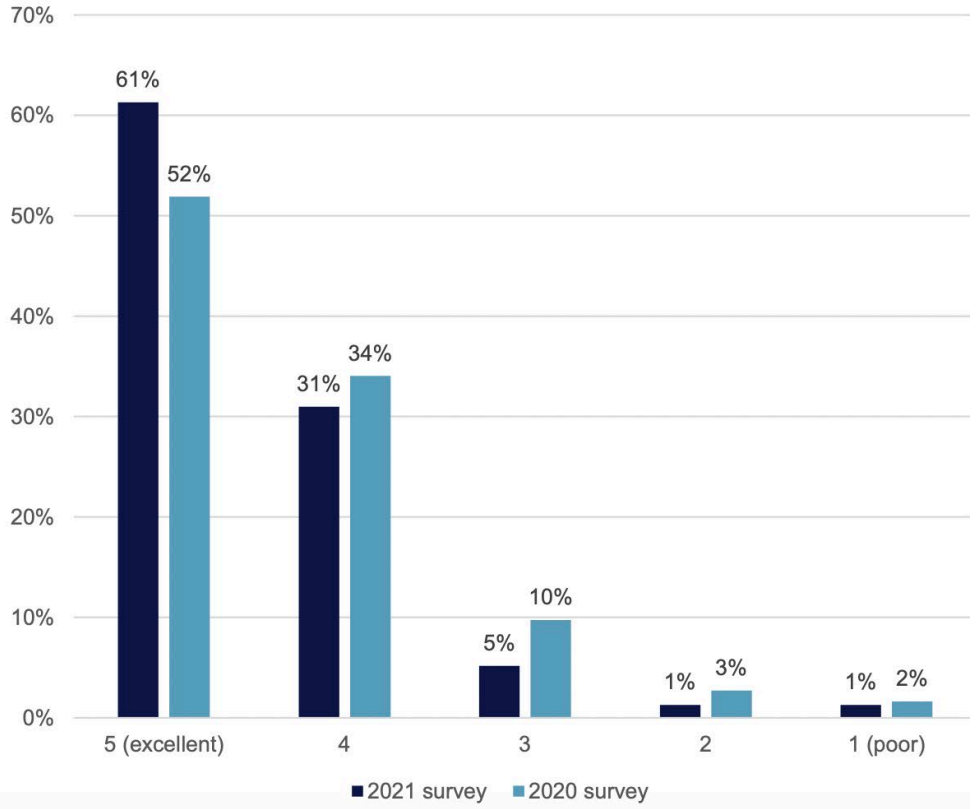
	Ehn range	Expectation range
SA1	5–9.3 keV	2 mJ +/- 20%
	>9.3–14 keV	1 mJ +/- 20%
	>14–20 keV	0.5 mJ +/- 20%
SA2	5.8–9.3 keV	2 mJ +/- 20%
	>9.3-12 keV	1 mJ +/- 20%
	>12–18 keV	0.5 mJ +/- 20%
SA3	0.5–1.5 keV	5 mJ +/- 20%
	>1.5–2.5 keV	2 mJ +/- 20%

User feedback from surveys done by User Organization Executive Committee

How do you rate the **experimental conditions during the beamtime**?



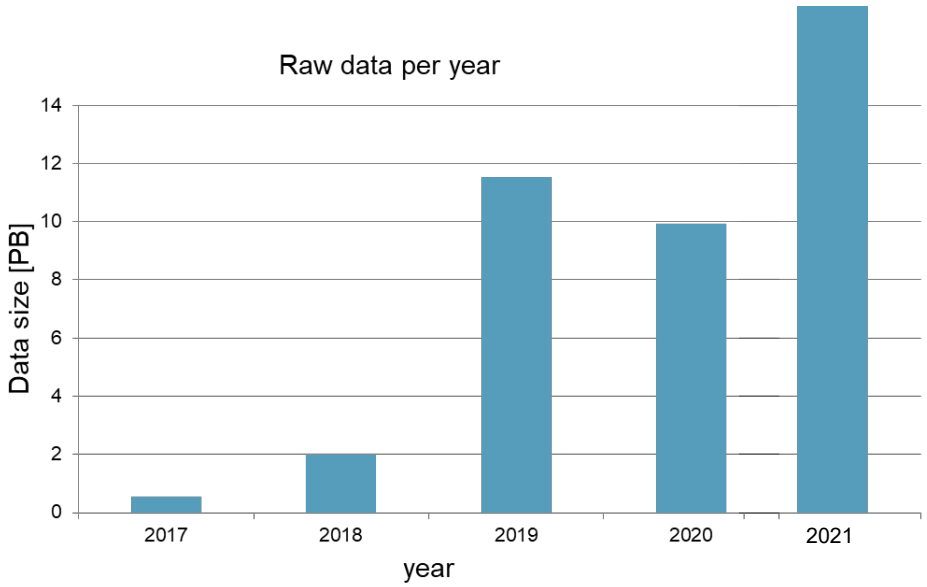
How do you rate the **support received during the experiment**?

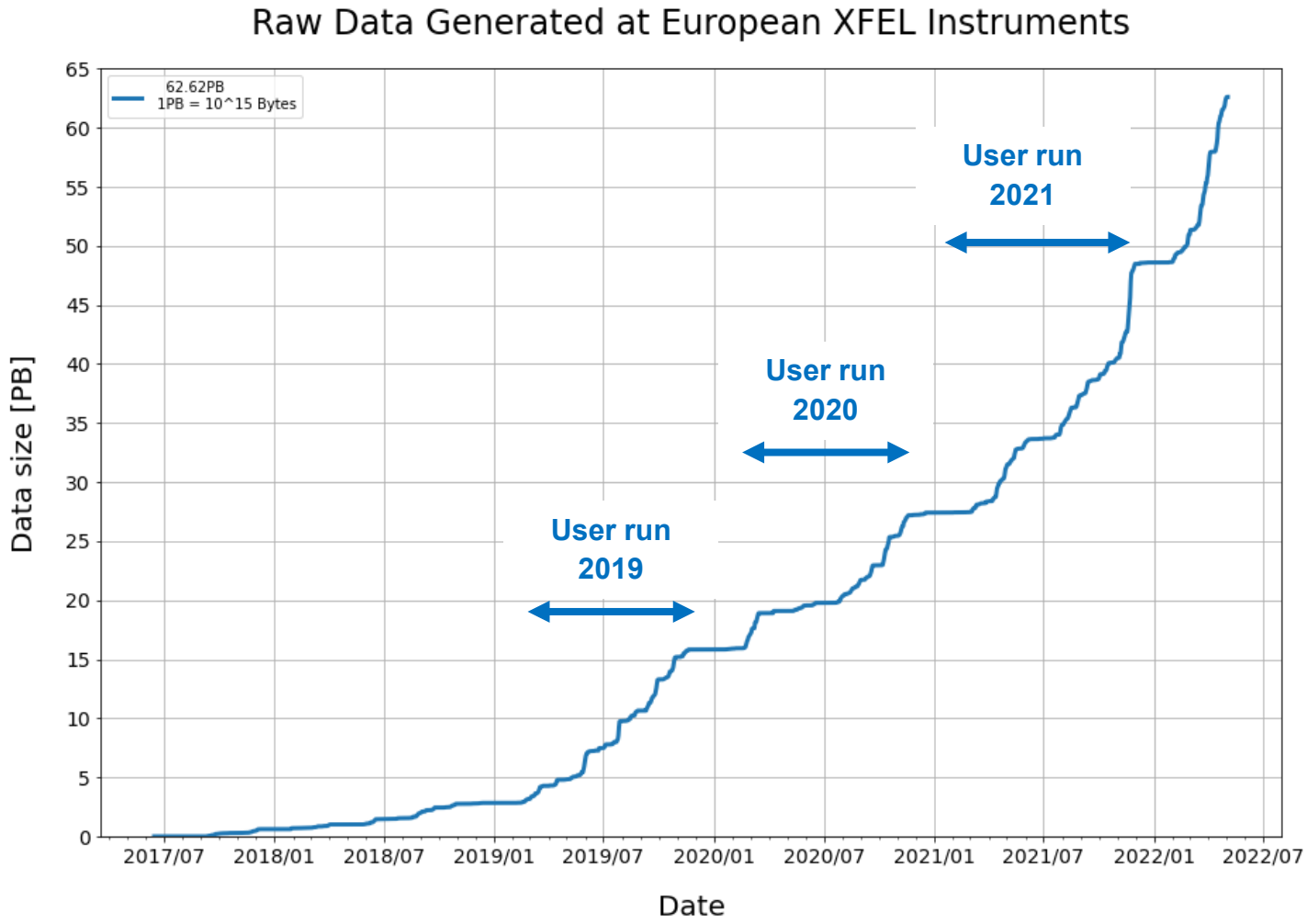


DATA: Significant amount of RAW data accumulated in 2022

Maturing systems: 7 PB in 7 days on 17–23 Nov.

- 62 PB of raw data collected
  Within the plan





Beamtime to Users

Increase in the amount of user experiments / user beamtime

	2018 (FXE/SBP/SCS/ SQS only)	2019	2020	2021	2022-01 (estimate for first ½ year)
Hours	1 356	3 348	1 908	4664	**4 644 h**
No. of proposals	25	60	23	44	**54**

Statistics of submission of proposals for Calls 7 and 8: Beamtime in 2022-1 and 2022-2

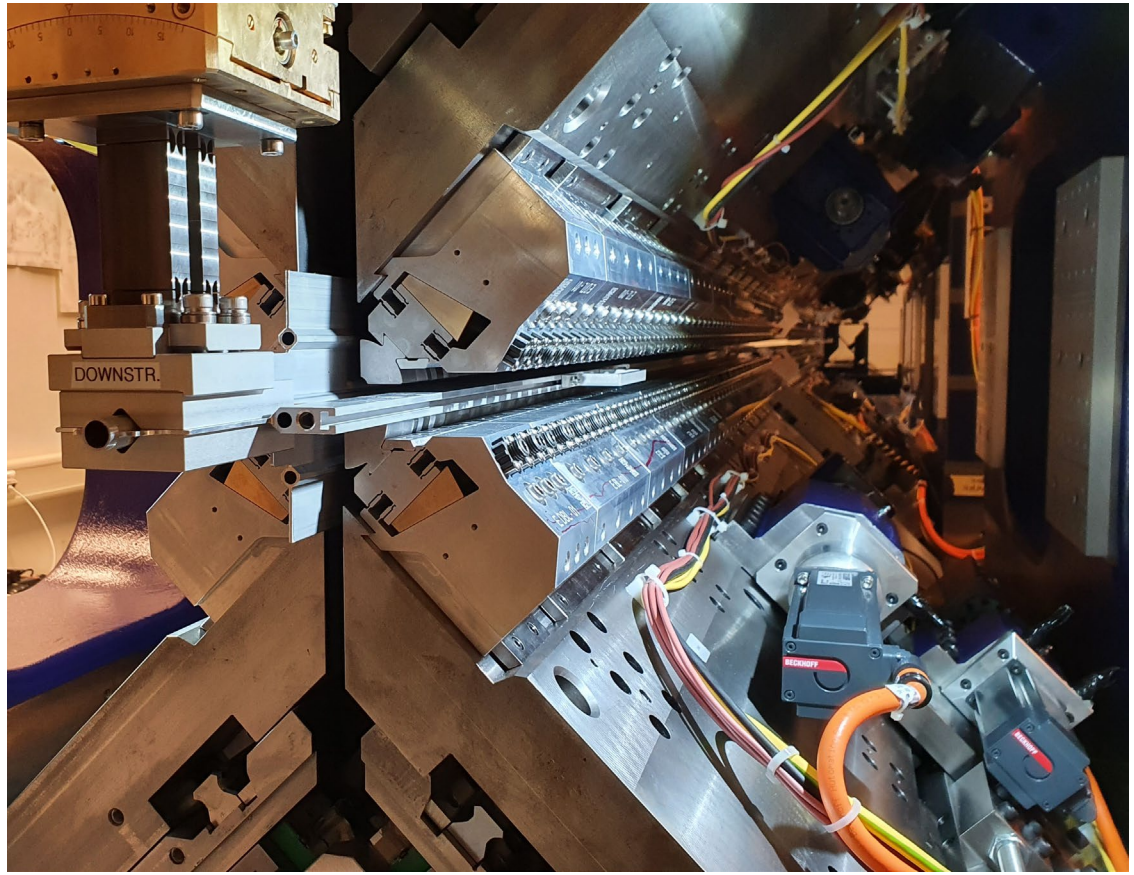
Instruments	Call 7	Call 8
FXE	32	29
SPB/SFX	26	21
SPB/SFX Protein Crystal Screening		7
HED	27	27
MID	33	24
SCS	18	29
SQS	32	30
Total submitted	168	167

- 2022-1: 16 weeks with user programme
  - Very challenging, it will require a fantastic effort by our staff to succeed
  - Corona might still lead to unforeseen difficulties due to sickness among staff
  - We will do our best to run as planned
- 2022-2: 13 weeks of X-ray delivery

New Developments and Capabilities

SASE3: Helical undulator APPLE X installed

- Technical commissioning with the electron beam: First lasing achieved

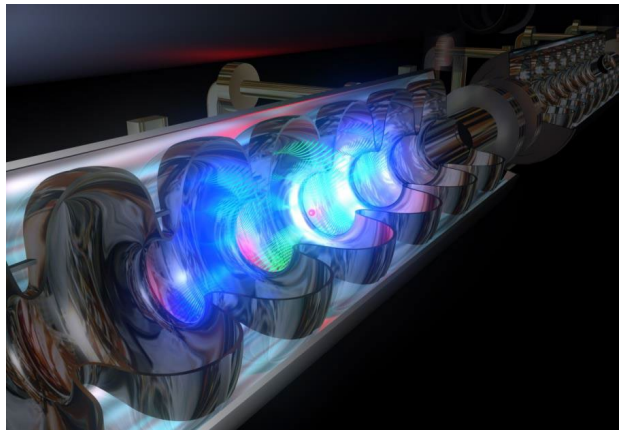


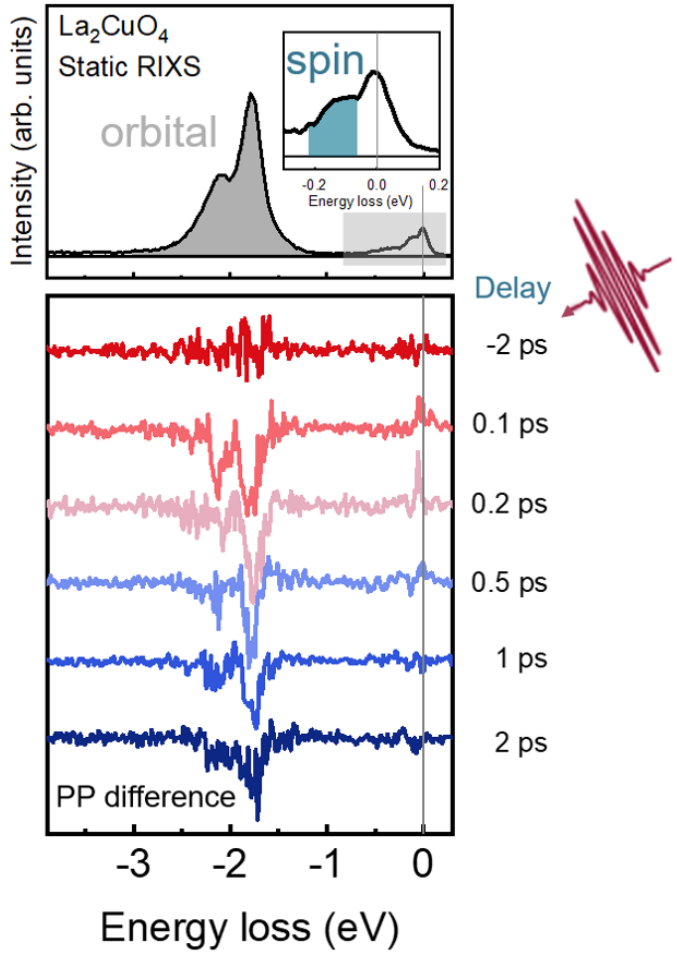
Photos: courtesy of S. Karabekyan

SCS user-assisted commissioning

Spin dynamics in photoexcited antiferromagnetic Mott insulators from high-resolution RIXS

- **La_2CuO_4**: AF insulator, parent compound of LSCO and LBCO High-T_C cuprate superconductors
- tr-RIXS to study photoinduced transient states and phases





Wang, Y., Chen, Y., Jia, C., Moritz, B., & Devereaux, T. P. (2020). *Physical Review B*, *101*(16), 165126.

Events

EuXFEL User's Meeting 2022 and Satellite Meetings

- Plenary meeting on future directions for EuXFEL and scientific highlights from the 6 instruments.
- 8 satellite meetings
- 2 online poster sessions
- 2117 scientists participated
- From over 40 countries

2022 EuXFEL Young Scientist Award

- C. Bacellar (PSI)

SRI2021 Conference

- More than 1160 international participants
- From over 20 countries
- 260 talks (3 keynote)
- 11 plenary talks
- More than 400 posters
- SRI2024 in person in Hamburg

XHO – New office building

- Topping-out ceremony on March 2022
- A modern building with high standards
  - Ceiling cooling through concrete core activation, resulting in visible concrete ceilings with soundproof sails
  - Hallway widenings on all floors for interestingly designed kitchen areas in the hallways, also as meeting places

Thank you for your attention!