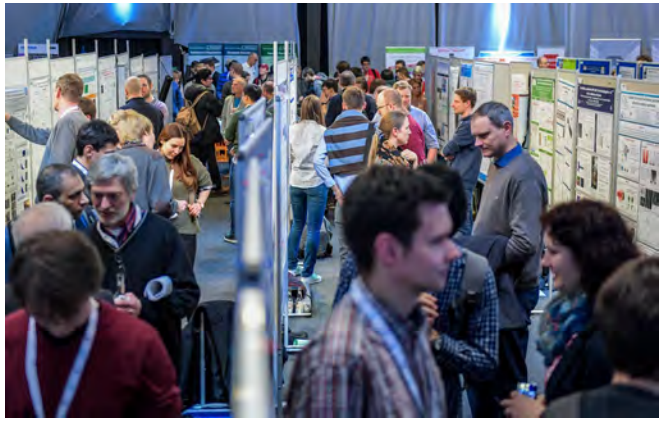
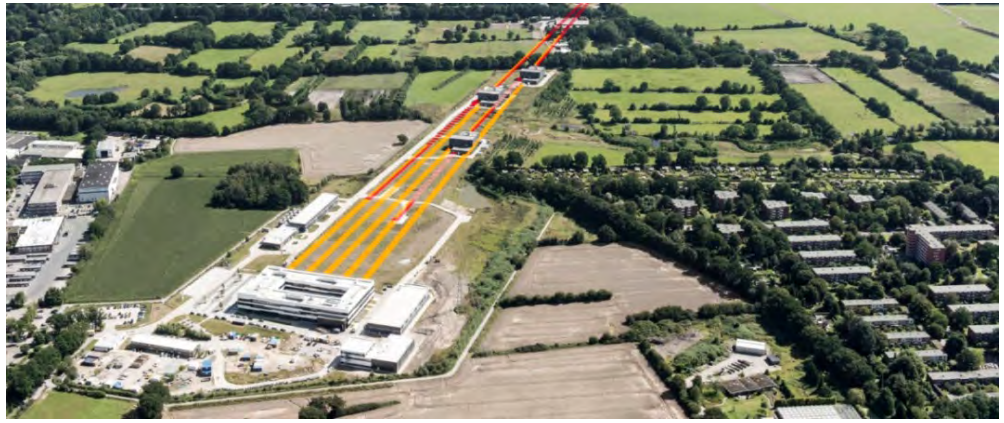
European XFEL Users Meeting 2023

Welcome back in person

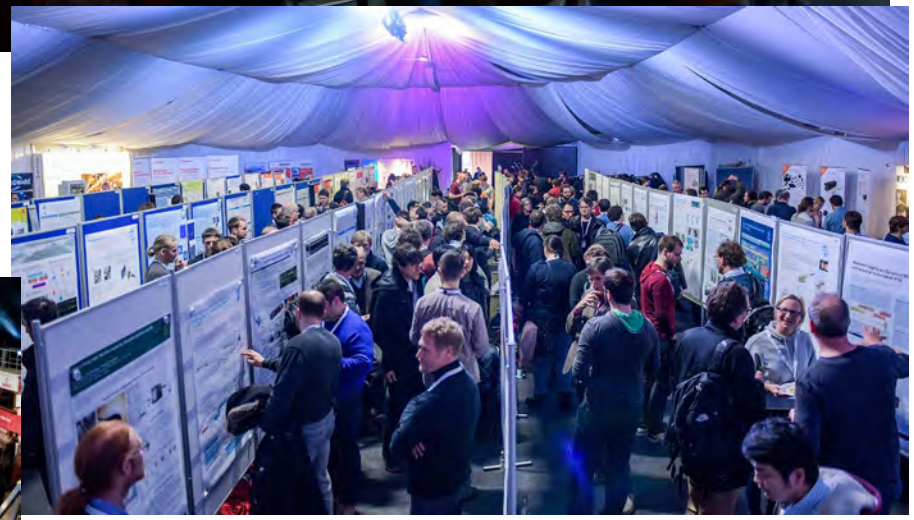
Robert Feidenhans'l
Chairman of the European XFEL Management Board





Overview 2023 Users Meeting

- More than 1100 participants
- More than 300 posters
- Industry exhibition, more than 40 companies
- Excellent scientific results



No Users' Meeting giveaways in 2023???

- The Management Board of European XFEL decided not to buy any giveaways for UM2023
  - Sustainability: 0 waste policy

- Exceptionally, donation of reserved budget to 3 general interest organizations:
  - *Schenefelder Tafel e.V.* (providing food at accessible prices to all in Schenefeld)
  - United Nations Children's Fund / UNICEF Deutschland
  - NABU (*Naturschutzbund Deutschland*) (environment projects, also on the EuXFEL campus area)

Schenefelder Tafel e.V.
Lebensmittel auf den Tisch

unicef

NABU
Hamburg

Pond on campus after renaturation of the Düpenau river flowing through Schenefeld (photo: EuXFEL)

Overview and agenda

- Flash back on the user program 2022
- An outlook on 2023
- An outlook to the future : A glimpse into the strategy for the coming decade.
- External challenges

2022: The first year with close to full user operation

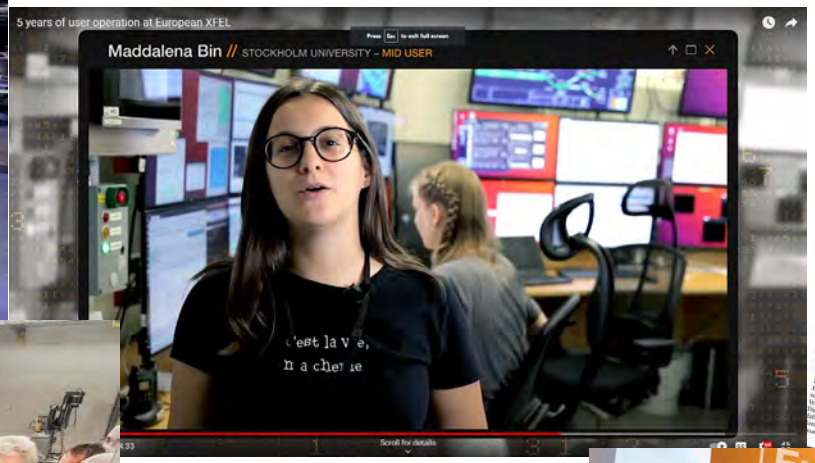
	2018 (FXE/SBP/SCS/ SQS only)	2019	2020	2021	2022
Instrument Hours	1 356	3 348	1 908	4664	**8048**
No. of experiments	25	56	23	44	**95**
User Publications	2	4	15	16	**18**

- 8 048 instrument hours to users in 2022, closer to our mid-term target of 10 500
- Strong increase in number of user experiments (incl screening experiments)
- Slow increase in user publications – delayed by ~2 years?
  - *Stronger focus on user publications in the beamtime review process*

5 years of user operation event on 25 October 2022


Forschung mit weichen Röntgenstrahlen startet

SCHENEFELD. Die Forschungseinrichtung European XFEL in Schenefeld bei Hamburg nimmt heute um 18 Uhr eine neue Forschungsstation namens SXP in Betrieb. SXP steht für Soft X-ray Port, also eine Station mit weicher Röntgenstrahlung. Forschergruppen sollen vom kommenden Jahr an die Mög-

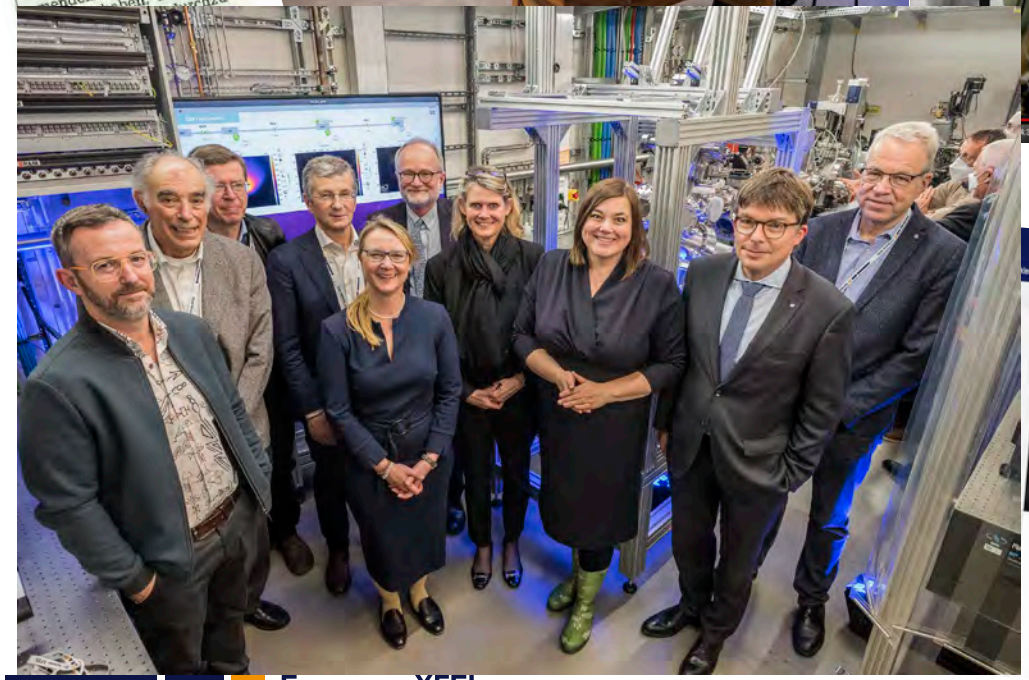



Schenefelder Tageblatt, 27 October 2022

Fünf Jahre Superkamera in Schenefeld

Beim XFEL-Geburtstag wird auch das Verhältnis zu Russland thematisiert

Völlig neue Einblicke für die Wissenschaft

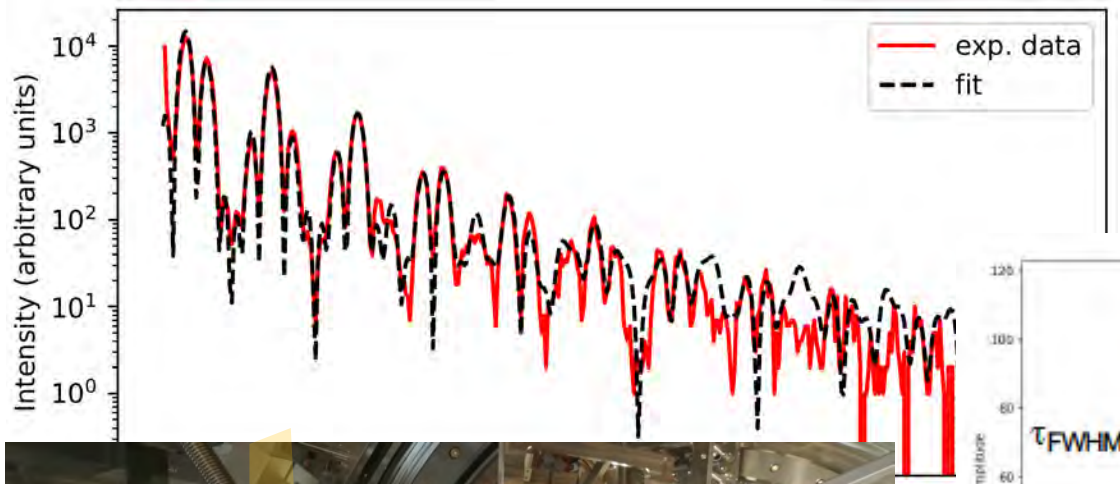


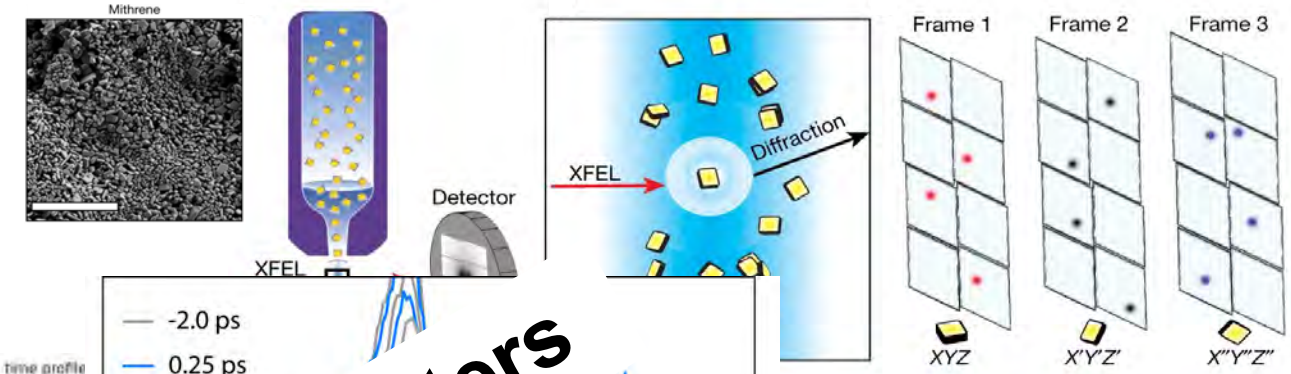
XFEL Schenefeld: Weiche Röntgenstrahlung gegen Klimawandel

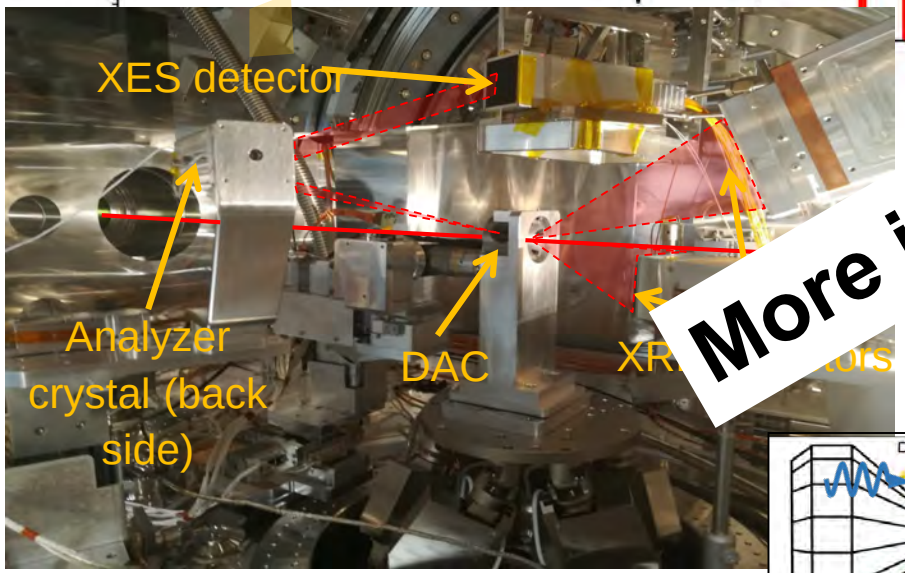
Stand: 25.10.2022 19:23 Uhr

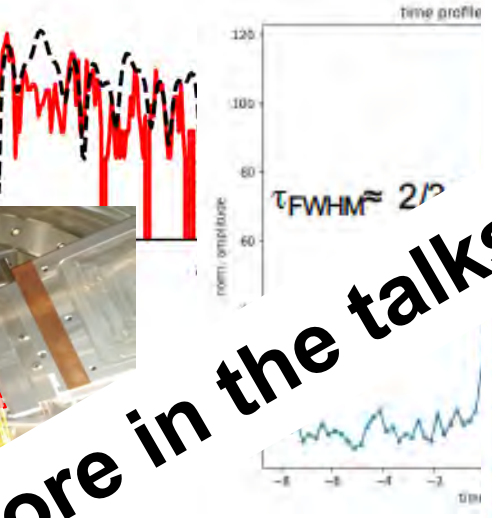
Die Forschungseinrichtung European XFEL in Schenefeld im Kreis Pinneberg hat am Dienstag ihren fünften Geburtstag gefeiert. Pünktlich dazu wurde am Abend eine weitere Forschungsstation in Betrieb genommen.

Many Scientific Highlights in 2022

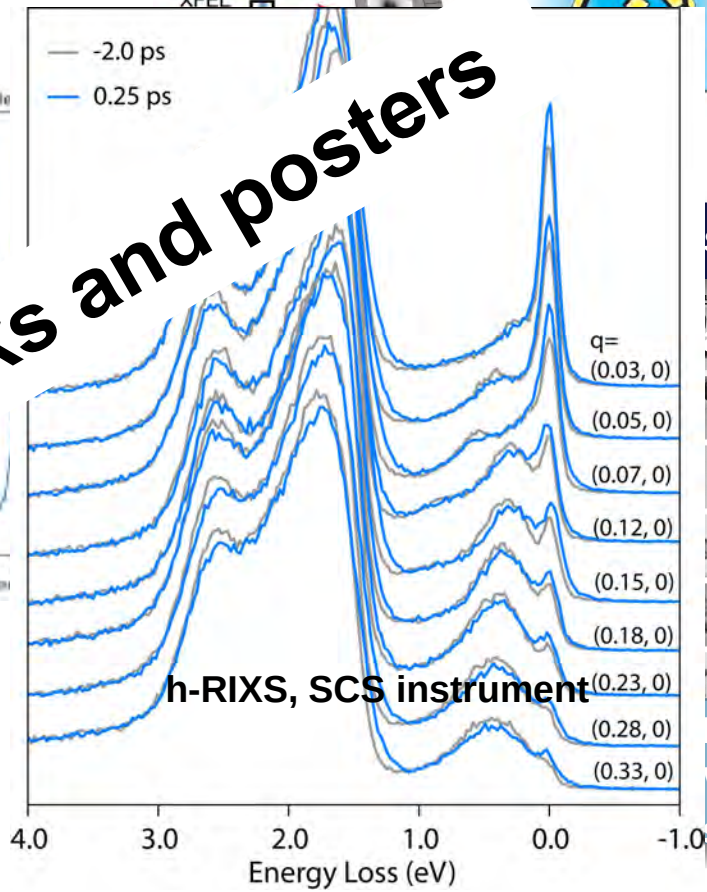




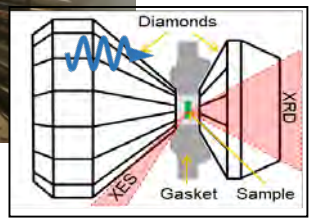




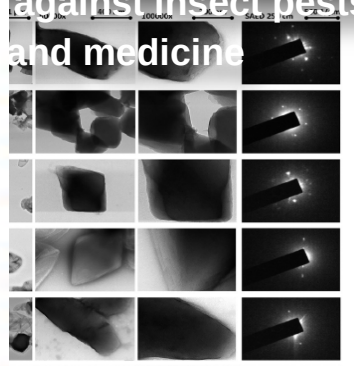
More in the talks and posters



h-RIXS, SCS instrument



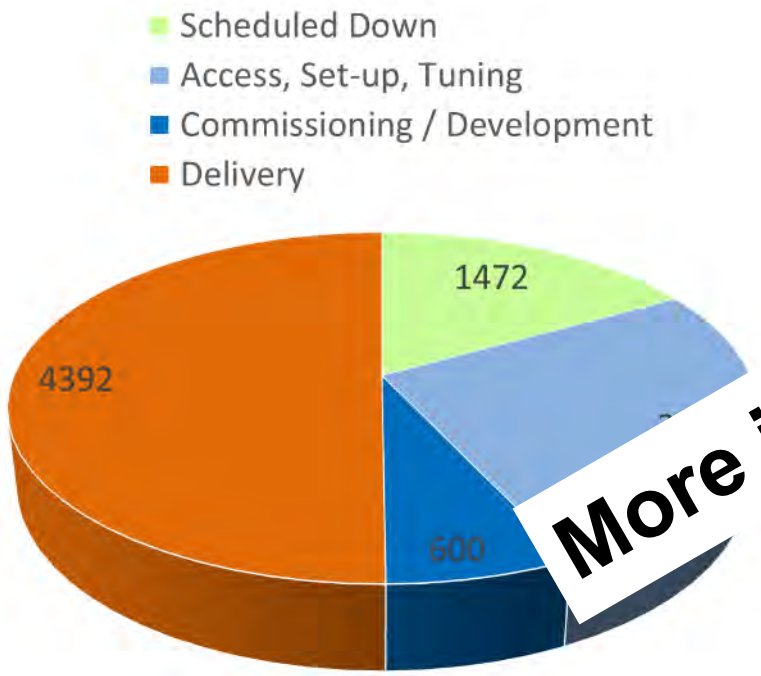
s: the most successful
against insect pests in
and medicine



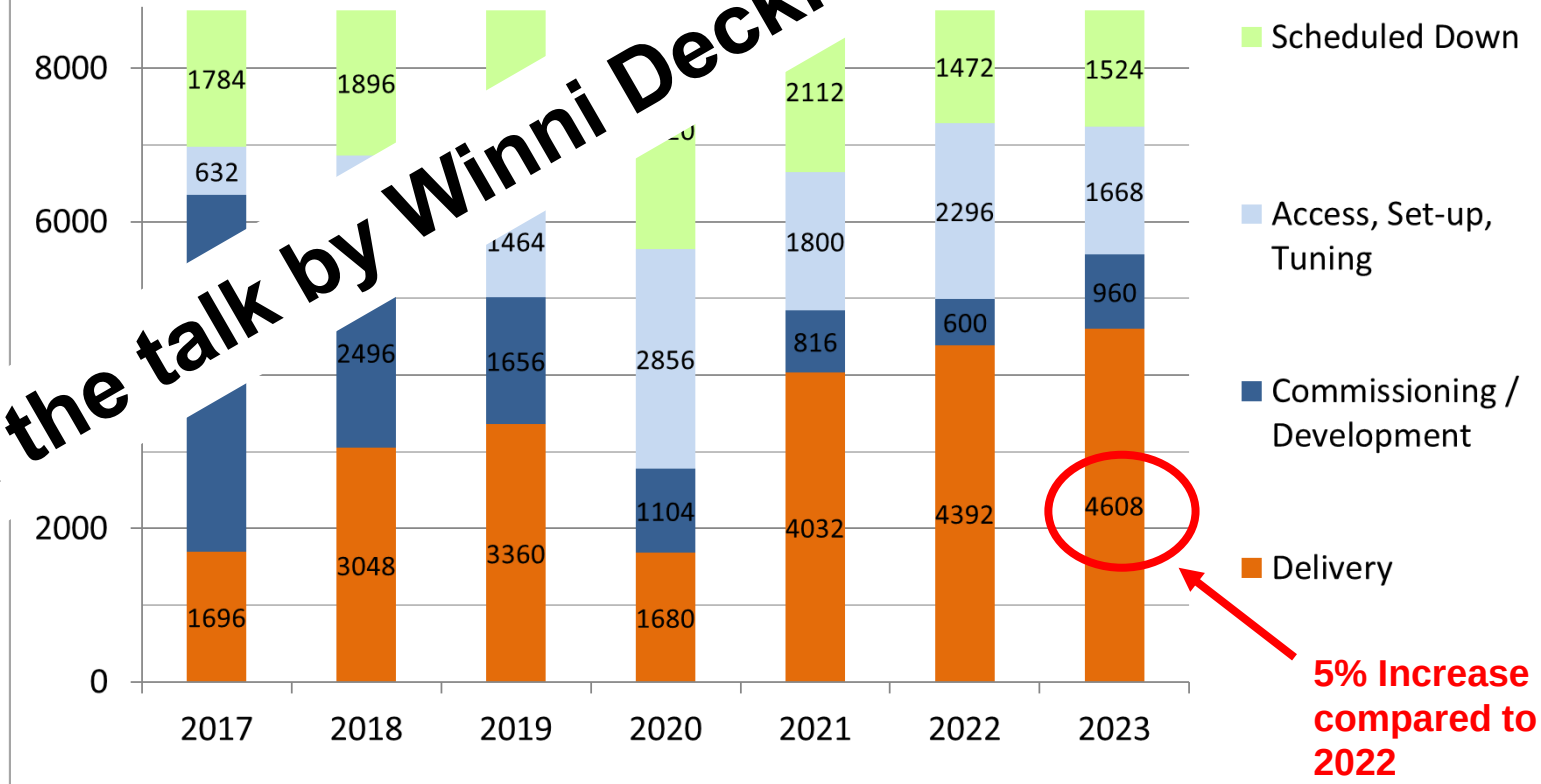
Natural nanocrystals
Very few structures
solved

Accelerator Status:
Over 4 000 hours of scheduled X-ray delivery

Operating hours distribution 2022

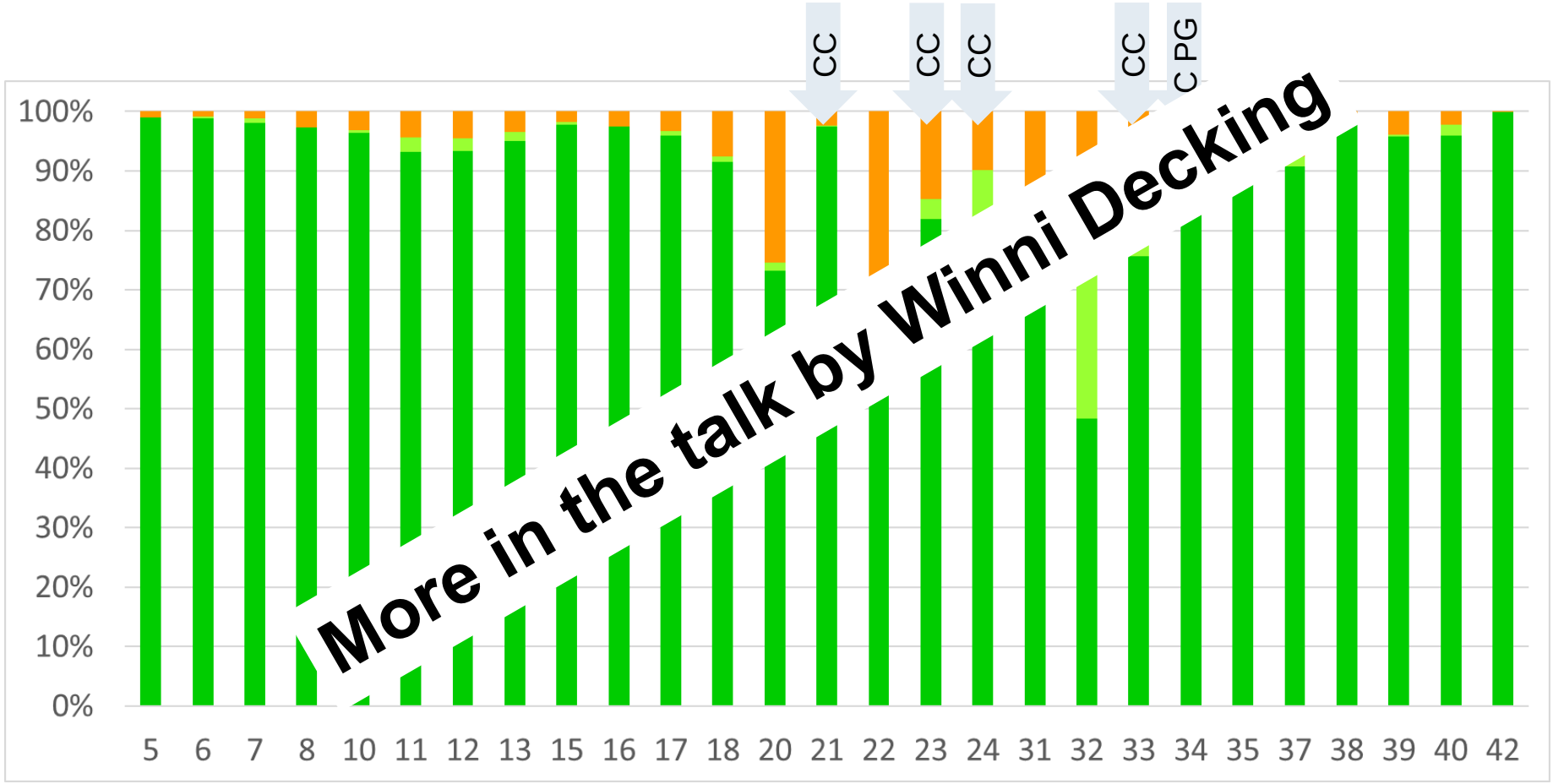


Development since start ... ility

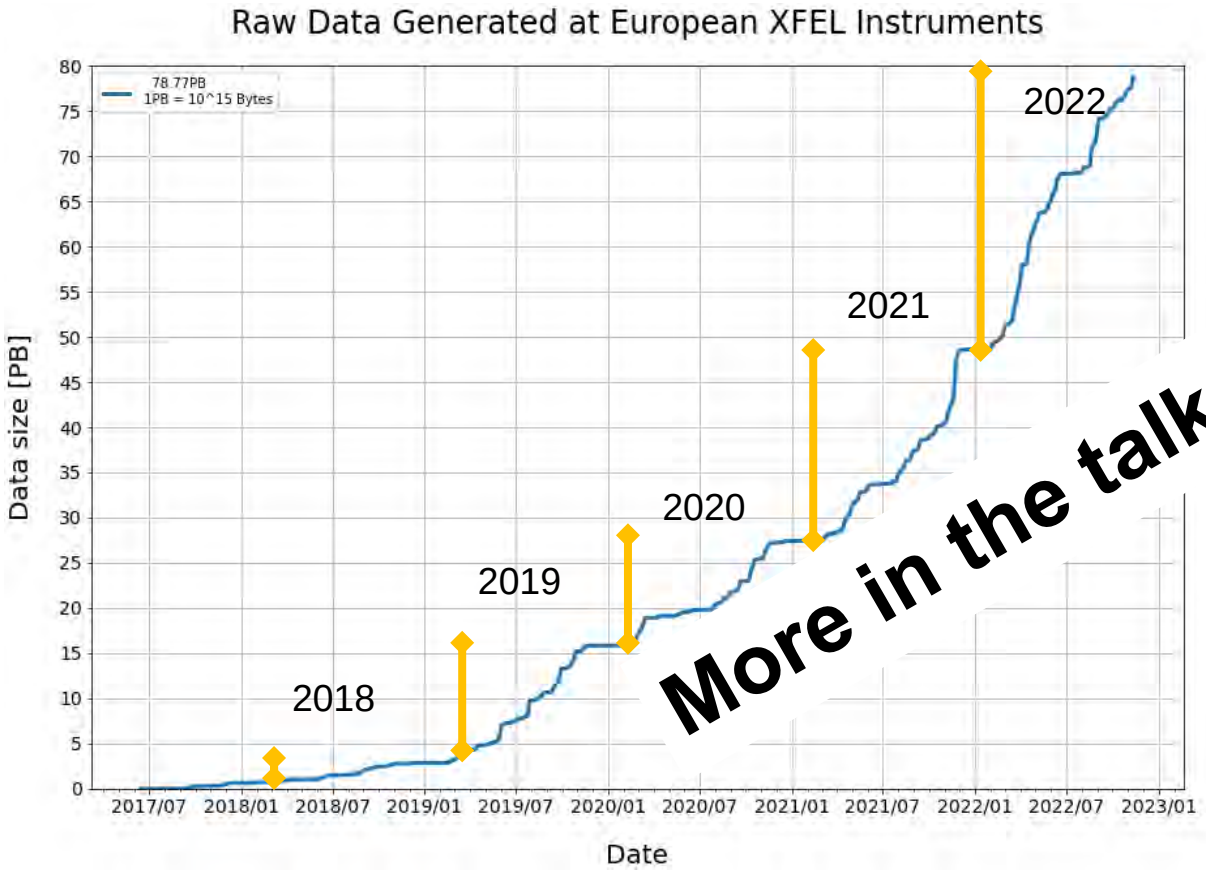


More in the talk by Winni Decking

Delivery statistics for 2022 (Week 05 – Week 42)
Cold Compressor (cc) failures



Data becoming ever more important



The DOC approach has been very successful

More in the talk by Steve Aplin

Karabo will become open source in 2023

Instrument Reviews on SPB/SFX, SQS and SCS in 2022

- SPB/SFX Review in March
- The SQS and SCS Reviews were organized in September
- In each case, ca. 10 international experts were invited and worked during 2-days to give their general feedback and particular recommendations.

- Excellent general assessment was received
- Very useful recommendations related to future scientific directions and techniques as well as personal developments were made that are under consideration by the Management Board.
- Next reviews in 2023 : FXE (March 2023), MID (September 2023), HED (March 2024)

Facts and Figures

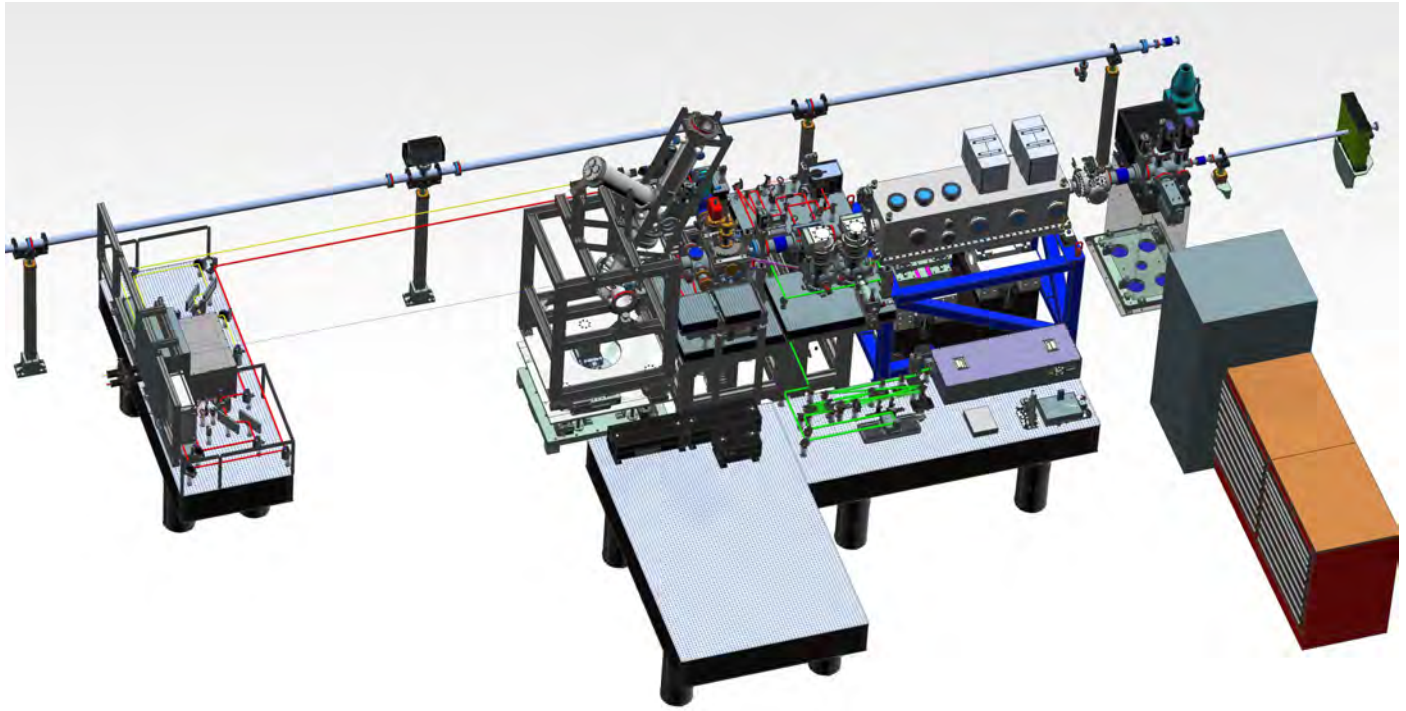
2022

1st Arrival **19. May 2021**
Total amount of Arrivals 2022 **874**
Total room nights 2022 **6.144**
Total room nights since opening **7.372**

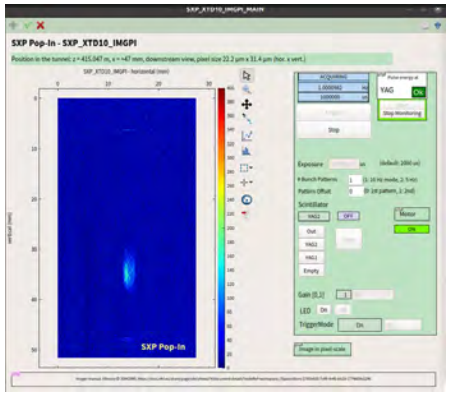
Reason for Stay	Rooms Sold	Arrivals	Average Length of Stay/nights
User	**3.263**	**591**	**5,5**
External Scientific Collaborations	556	102	5,5
Committee	141	81	1,7
Events	51	22	2,3
Business other (inkl. Ukrainian residents)	1.882	50	37,6
New Staff / Job Candidates	243	21	11,6
Contractor and others	8	4	2
TOTAL	**6144**	**871**	**7,1**

Third hutch on SASE 3

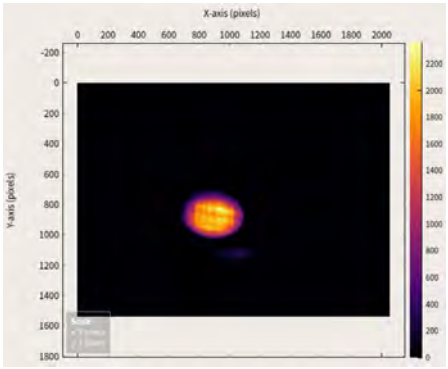
the seventh instrument

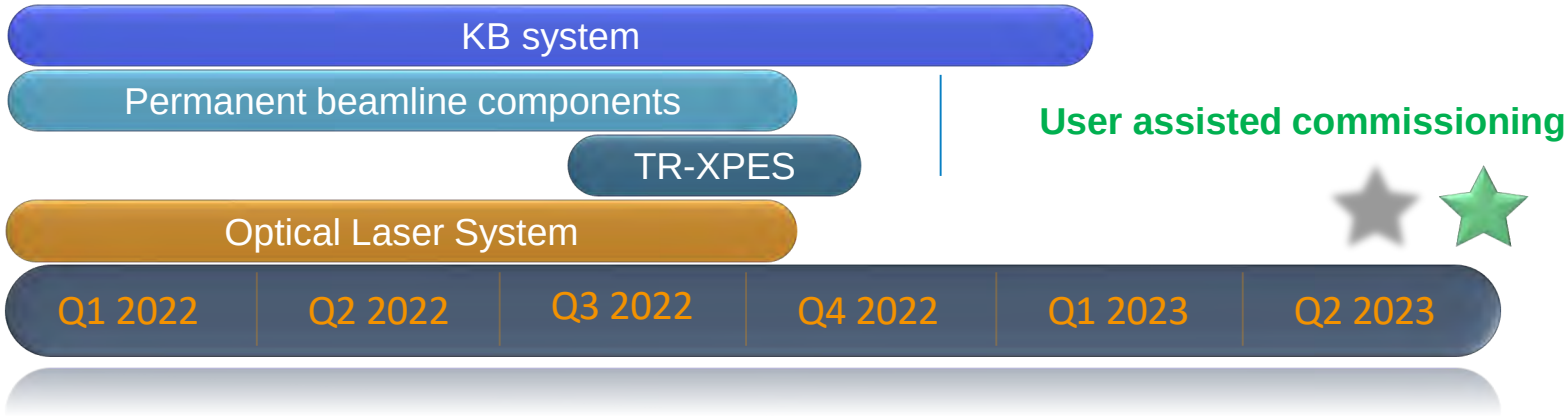


First beam in SXP branch 1 August



First beam in SXP hutch 8 September





APPLE-X Undulators

First lasing in APPLE-X undulators at various polarization settings

Motors show radiation damage from spontaneous synchrotron radiation from upstream undulators

- APPLE-X undulators removed in summer shutdown
- Repair of motors successful
- No reinstallation of undulators in winter maintenance, but installation of vacuum system to verify radiation calculations
- Installation in the summer shutdown 2023
- Commissioning in the fall

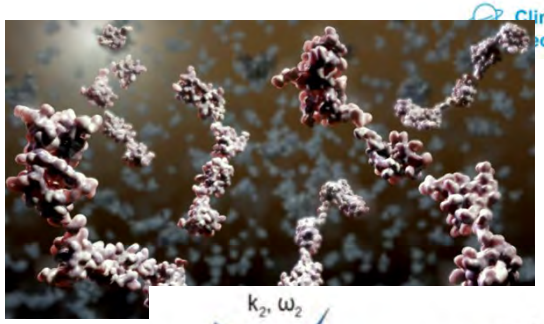
Statistics of submission of proposals for call 9 and 10

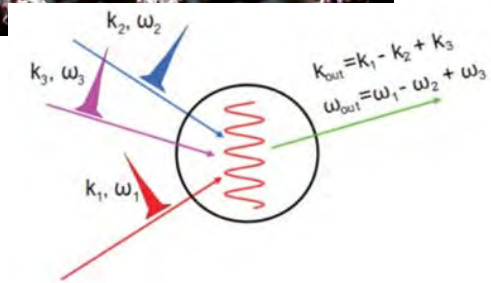
Instruments	Call 9 June 2022			Call 10 Dec. 2022
	2023-I			2023-II
	Reg.	H2O	LTP	Reg
FXE	19	4	1	26
SPB/SFX	15	3	2	15
SPB/SFX Protein Crystal Screening	2			2
HED	30	2	1	31
MID	12	8	4	24
SCS	17	2	0	31
SQS	23	6	1	25
SXP				3
Total Submitted			156	157

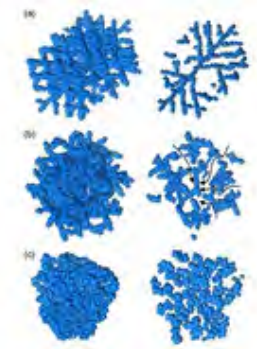
Call 9 – Long Term Proposals and Molecular H_2O Topical Call

- Molecular Water Topical Call
  - 30 Expression of Interest
  - 25 Proposals
  - 8 experiments scheduled in 2023-I
  - 209 proposers, 61 of them new

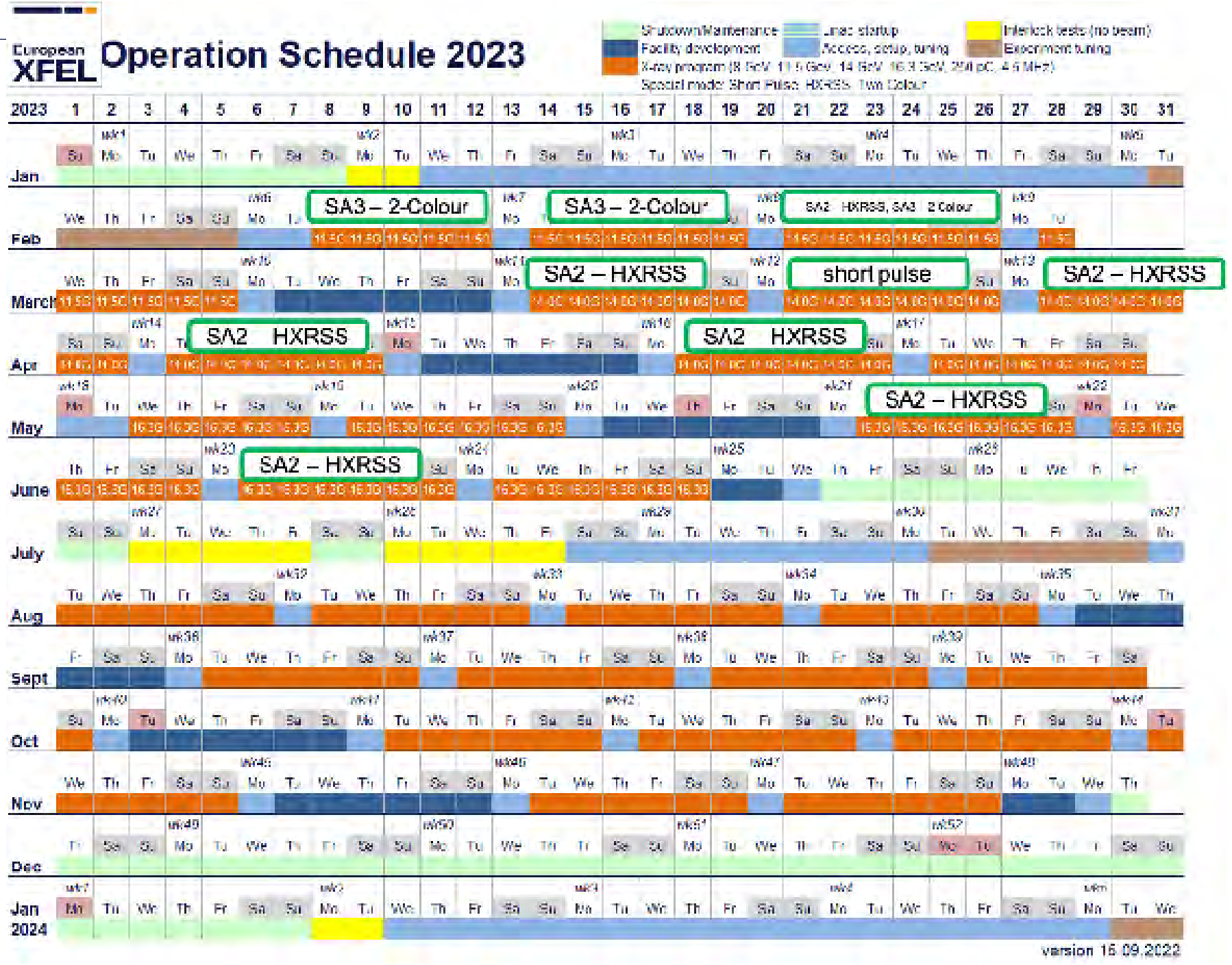
- Long Term Proposals
  - 10 Expression of Interest
  - 9 Proposals submitted
  - 3 accepted (2 start in 2023-I, 1 starts in 2023-II)





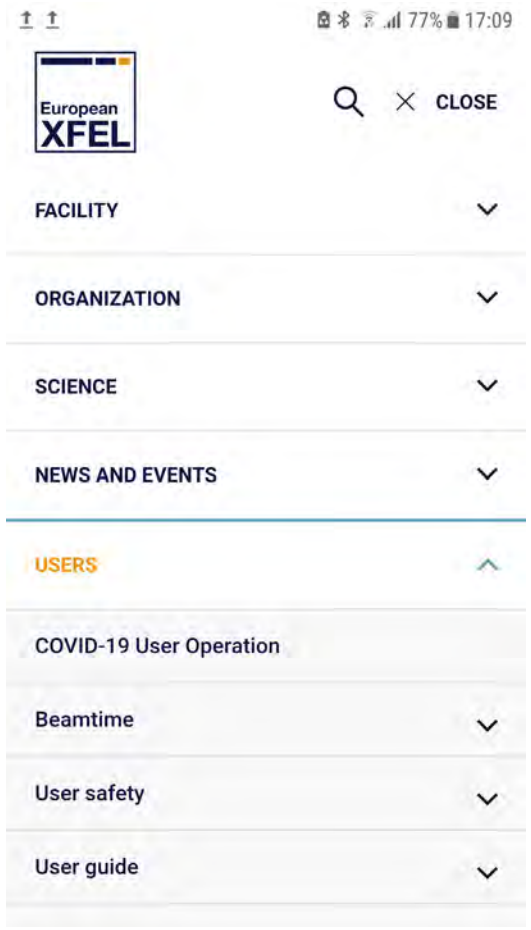


- Spring 16 weeks
  - 4 weeks 11.5 GeV
  - 6 weeks 14.0 GeV
  - 6 weeks 16.5 GeV
- Demand for high energy and high pulse energy vs low photon energy
- Fall 14 weeks
- SFX user consortia expects 4M AGIPD detector to be delivered this year
- DIPOLE commissioning (HED) in the spring
- 1M AGIPD for HED also coming



User access in run 2023-01

- Currently **no user access restrictions in place due to COVID-19**!
  - Still, our experiment hall cannot host more than 100 people…
- Users are requested to self-test before travelling and self-tests are made available on site.
- For hygiene recommendations, updates and other information, refer to user access guidelines online.



Next calls and user access in 2023

Event	Dates
User run 2023-01	Feb-June 2023
Proposal Review Panel Meetings Call 10	2-3 & 9 February 2023
Outcome Call 10 (run 2023-02)	End of March 2023
Opening regular Call 11 (run 2024-01)	Week 15/2023
Deadline Call 11	11 May 2023
Proposal Review Panel Meetings Call 11	27-28 June 2023
User run 2023-02	Aug-Nov 2023
Outcome call 11	Mid-September 2023
User run 2024-01	February-June 2024

Updates about on-site meal options

- Experience of BeamStop opening on 3 test weekends before COVID-19 in 2019 not successful (about 20 guests/day on average)

- Meal options outside opening hours of the on-site restaurant:
  - "Beam-stop made" frozen meals (e.g. pasta, vegetable and chicken curry) can be bought from freezer in XHQ foyer - at any time – and microwaved
  - Pizza fast-baking machine "test concept" under implementation in 2023 – more info to follow

Meal freezer in the XHQ foyer

Where to find the User Office from Spring 2023 onwards

- New office building XHO to be completed in Spring 2023
- User Office will move to the ground floor of the new building with other key groups for user support (Data Department, Safety and Radiation Protection and many other colleagues…)

K Office building (XHO)
L Visitor and conference centre, school labs (XHV)
M Main entrance and gate house (XHGATE)
N Side entrance
O Temporary office building (XTOB)

New Office Building

- Interior finishing is ongoing
- Technical infrastructure installation is in full swing
- Operation and moving in in May 2023

The New Visitor Centre

- Planning phase almost finished
- Tenders for earth works and shell construction awarded
- Groundbreaking has started
- Start of operation is planned for Q1 2024
- Better facilities for workshops

What is coming the future?
Update on Strategy

EuXFEL Facility Roadmap

2017–2021

START-UP
Proof-of Concept
Experiments

2022-2029

HARVESTING

Improve operation
Increase the Quantity & Quality of scientific output
Science driven experiments

2022-2030

MID-TERM DEVELOPMENT

2030+

LONG-TERM DEVEVELOPMENT (UPGRADE)

Societal Challenges & EuXFEL

Climate & Energy

Insight to structural and electronic dynamics of new materials, processes, and molecular reactions

- Photo-catalysis
- Solar cells
- Atmosphere chemistry

FXE, SQS, SCS, SXP

Health

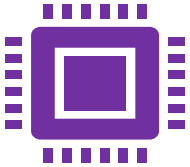
Insight to structural dynamics and reaction pathways of biomolecules, viruses, and cells

- Comprehend function
- Drug development
- Develop new treatments

SPB/SFX, HED, SQS

Digitalization

Insight to structural, electronic, and magnetic dynamics of complex and functional materials and quantum computers



- Magnetism at nm/fs scales
- Induced superconductivity
- Promotion of data technologies

MID, HED, SCS, SXP

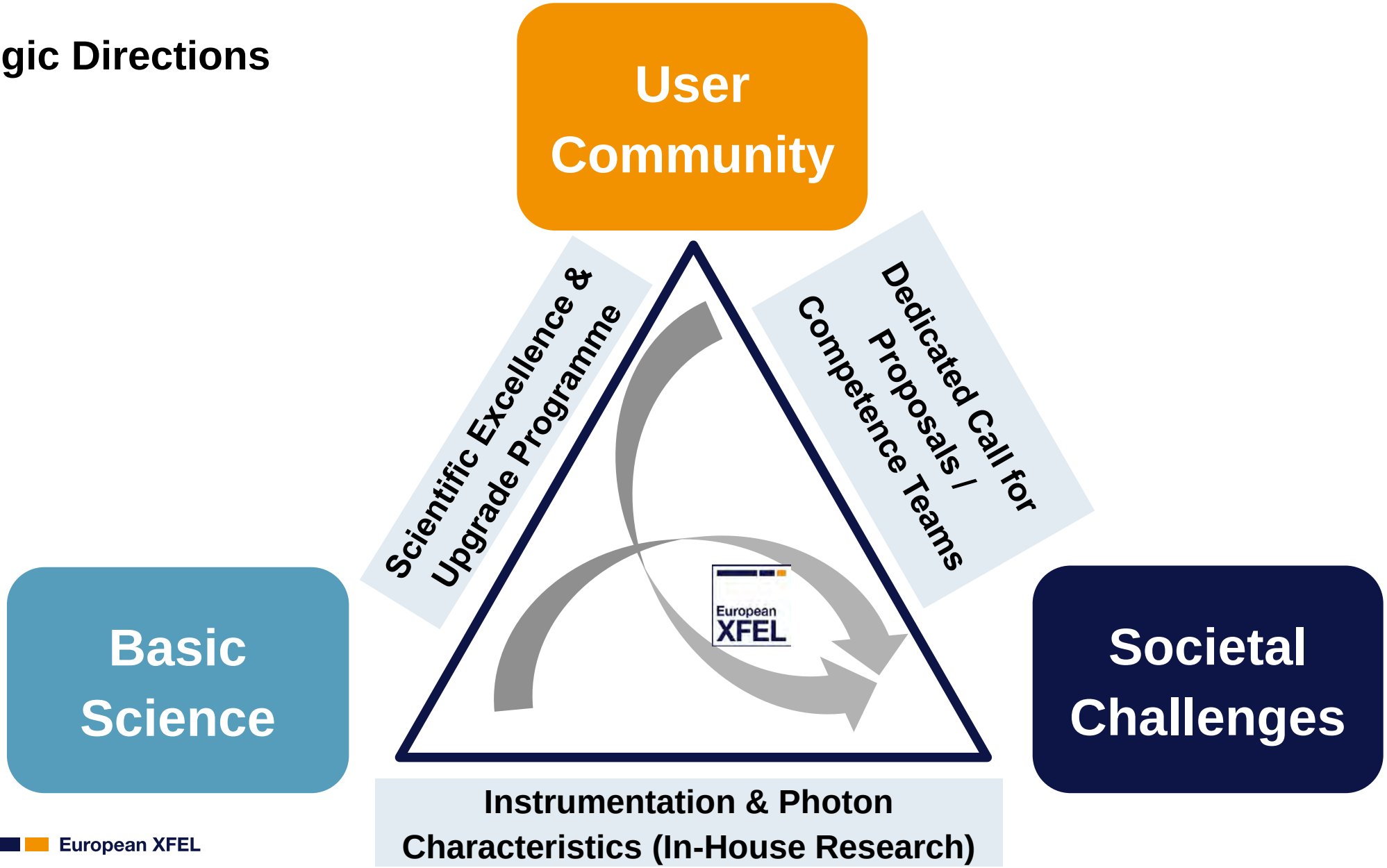
Environment & Sustainability

Insight to properties of durable materials, sustainable agriculture, and planetary processes

- Structure natural insecticides
- Hard materials under load
- High P-T structures

SPB/SFX, MID, FXE, HED

Strategic Directions



EuXFEL provides to the international user community a European lighthouse research facility opening new scientific avenues that contribute to solve important challenges of our society.

COLLABORATION
We collaborate at all levels.
We listen and collaborate in order to contribute to our common purpose.
We are responsible for what we do and reflect on how we act.

EXCELLENCE
We aim to be excellent where it matters.
We support and encourage everyone to be the best they can.
We strive to deliver on our mission to operate and grow a world-class science facility.

TRANSPARENCY
We value transparent processes and decisions.
We communicate honestly and openly and we are encouraged to speak up and present our own views.
We have well defined-processes and roles and we agree on clear, transparent decisions.

TRUST
We value trust-based relationships that respect the expertise and roles of our staff.
We are committed to building a trusting environment and are empowered to act with courage and integrity
We act with empathy, fairness, and respect and we value our diversity

Harvesting Phase

Operation	Scientific Excellence	Enabling Technology	Company Development
Efficiency & Quality	Be scientifically excellent!	Make X-Rays (FEL Sources & beam delivery)	Passion – Culture, Values & Leadership
Lower access barriers	New scientific capacities	Capture X-Rays (Improve use of FEL radiation)	People – Attract & Develop Retain, Acknowledge
Beamtime Access	Guide strategic scientific developments	Read/Interpret X-Rays (Improve data technologies)	Improve & professionalize structures to facilitate science
			Campus – Life, science and sustainability

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Mid-Term Developments

Scientific Excellence

- Developing the scientific case for **high photon energy**
- Developing the scientific case for **attosecond science**
- Developing the scientific case for **non-linear spectroscopy**

Increase Facility Scope

- Super Conducting Undulators
- Detectors
- Data
- Self Seeding at SA1
- Third hutch on SASE2
- ASPECT (atto second)
- SASE 4 & 5 (t.b.d.)

European XFEL Mid-term Development aim to:

- Make operation better & with less effort
- Develop state-of-the-art instrumentation
- Expand on scientific excellence
- Sustainably develop the facility

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Long-term facility development

Increasing Facility Scope

Burst mode +	Long pulse mode	2nd Fan	Provision of THz pumping	Big kJ Laser

Plan for funding, stakeholders & communities	European Upgrade Roadmap

2020-2023 The years of crisis management

- The **COVID-19** pandemic is close to be over
- 24 February start of the War in Ukraine
  - Guesthouse opened for refugees until end of September 2022
  - Russia is a full member of European XFEL and paid its full contribution in 2022
  - If no payments will come in 2023 we have sufficient liquidity for the coming years
  - Due to the sanctions no users from Russian Institutes neither in-person nor on-line participates in experiments
- The (**green!**) electricity for 2023 is procured with only a minor increase in costs (from 17.2 M€ to 18.0 M€)
- Procurement of electricity for 2024 is ongoing
- Cost increases due to wages and inflation are dealt with.

Thank you for your attention