

DESY 2030 – Strategy-Loop

Follow Up Meeting / Info on Further Process

Helmut Dosch
Hamburg, 17. August 2022



Kick Off on 4. July

DESY adapts its strategic goals to new challenges

- 18 fact sheets prepared
 - presenting strategic relevant status
 - short, instructive and concise
- 16 key notes presented
 - relevant complementary aspects in 5 minutes

Topics
PETRA IV
FLASH @ XFEL
PITZ and ARES
UED / REGAE
Plasma ARD LK1
Local particle physics experiments (ALPS II, BabylAXO, LUXE, ...)
Test beam
Astro: GW / Einstein
International Cooperations & future role of DESY
Computing Facilities

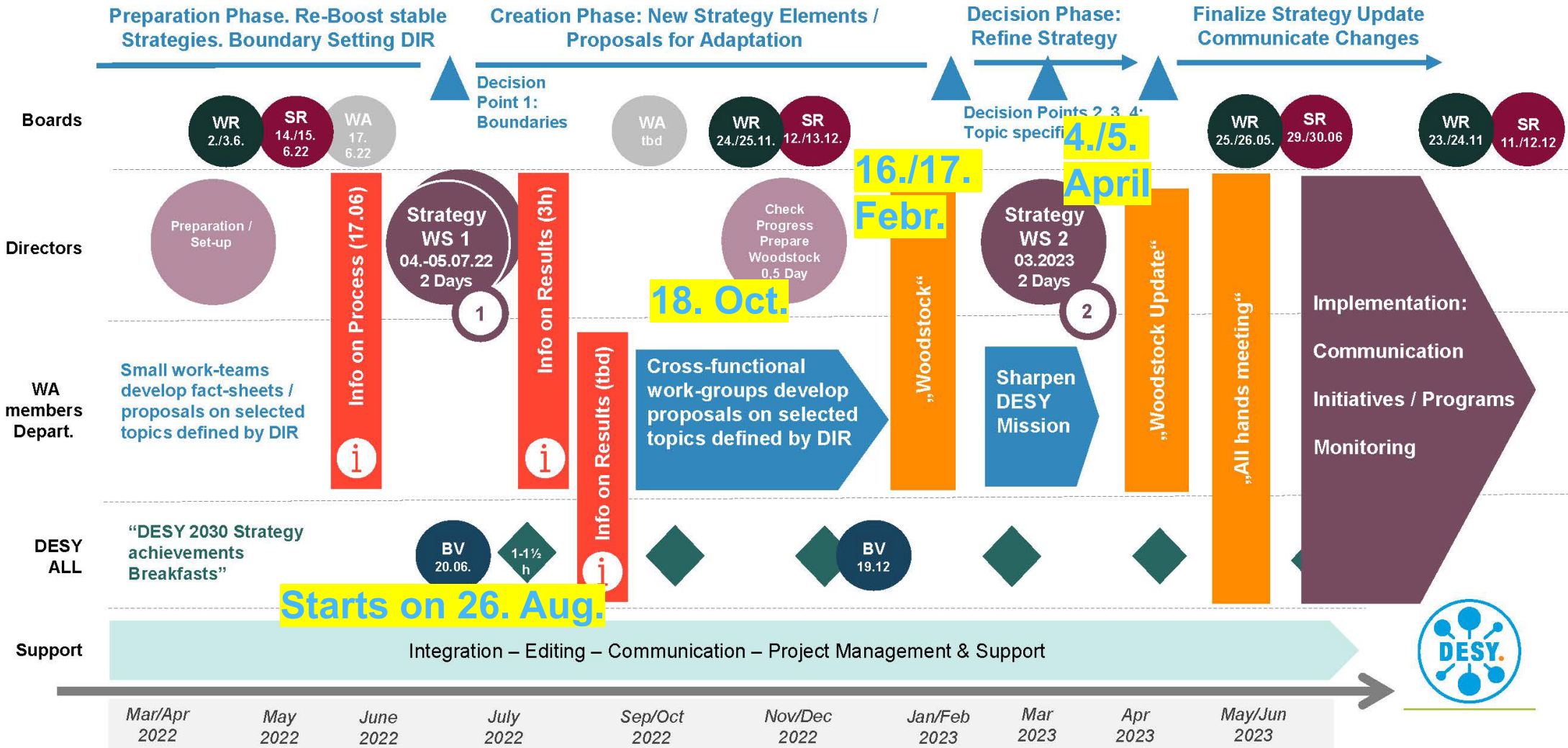
Cross Disciplinary / CCA Scien
Quantum Technology
Water / CMWS
Imaging
Nano / Material Research CIMMS
Life Science / Cryo Platform
Detector Development

Cross-cutting topics
Digital DESY
Technical support units (IK 5, 6, 7)
Administrative support unites
Campus 1 (HH) Campus 2 (Zeuthen)



DESY 2030 Update and Review – Overall Planning

DESY. Strategy Review & Re-Boost Process



Further Procedure for Topics

Each topic under the patronage of a director

PETRA IV

➤ **Highest priority of DESY 2030 strategy**

- No update needed.
- Strategy is in place.
- Organisational structure with close links to directors

Topics to be looked at in October

- CMWS: is already part of the DESY 2030 strategy, Task Force with directors
- Imaging: a campus wide imaging strategy
- Nano / Materials Research / CIMMS
- Life Science / Cryo Platform



Cross Cutting Activities

Framework for scientific priorities and further developments

External Collaboration

- **Fact finding before strategic discussion**
 - Survey on existing collaborations with multi-year plan



Strategic Investment Funds

- **Roadmap for PoF IV and PoF V period**
 - survey on already discussed proposals



Campus / SCHB

- **Science Vision, strategic impact**
 - Campus HH
 - Campus Zeuthen



DESY. 2030 Strategy Review & Updates

VirtEx Meeting

17 August 2022



Wim Leemans

Accelerator Division (M-Division)

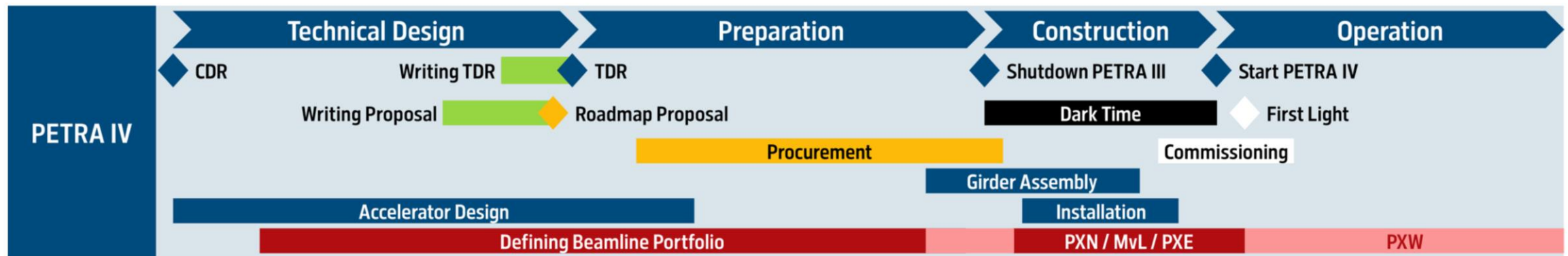
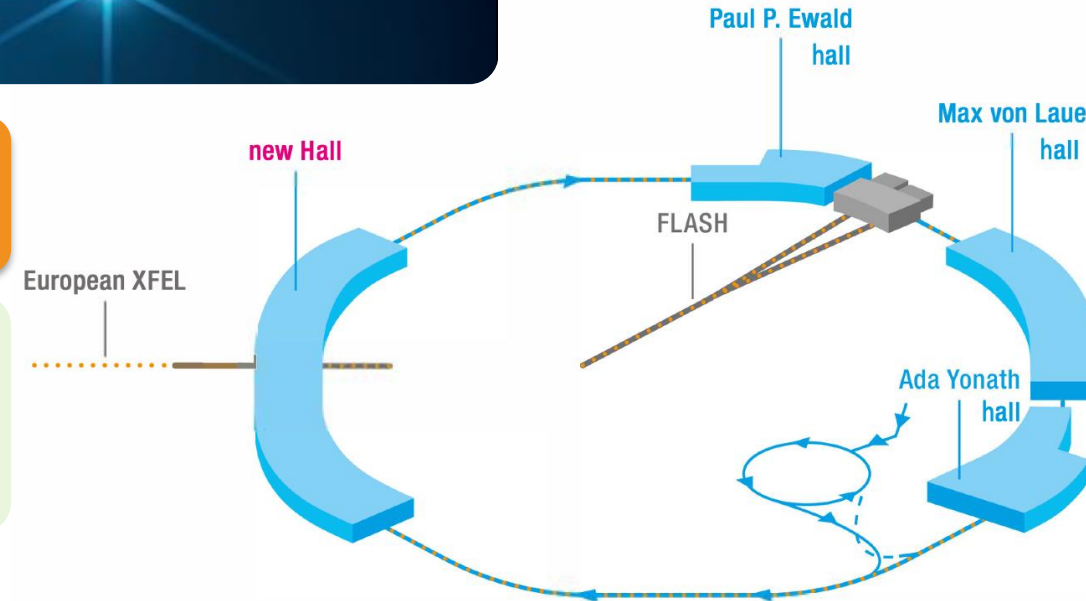
#1 PETRA IV.

New dimensions in research and applications



Core element of the strategy for DESY's future as the national analytics centre using accelerator-based photon beams.

- > Strategy is in place.
- > Support task force computing facilities and scientific computing with input.



#2 FLASH.

The pioneer to watch electrons in action

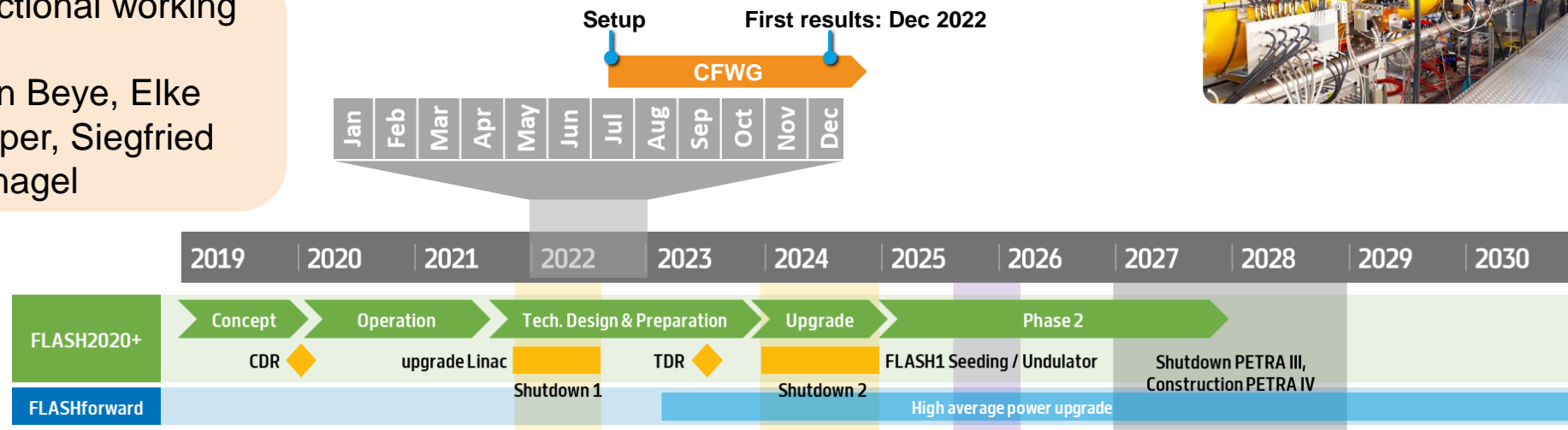
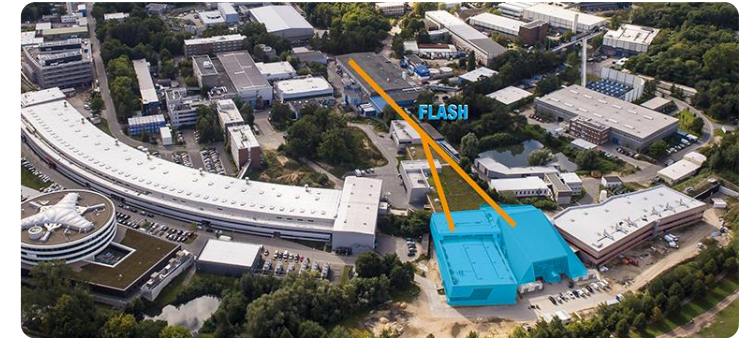
FLASH2020+

Basic strategy: FLASH is continuing to be part of DESY's strategic portfolio (i.e. revision of former decision to close down FLASH).

Next steps:

- > Elaborate on innovation case
- > Broadening of the scientific use and community and impact
- > Build-to-budget rule for FLASH2020+ project

Setup of a cross-functional working group (CFWG):
Markus Gühr, Martin Beye, Elke Plönjes, Lucas Schaper, Siegfried Schreiber, Kai Rossnagel



#3 PITZ/ARES.

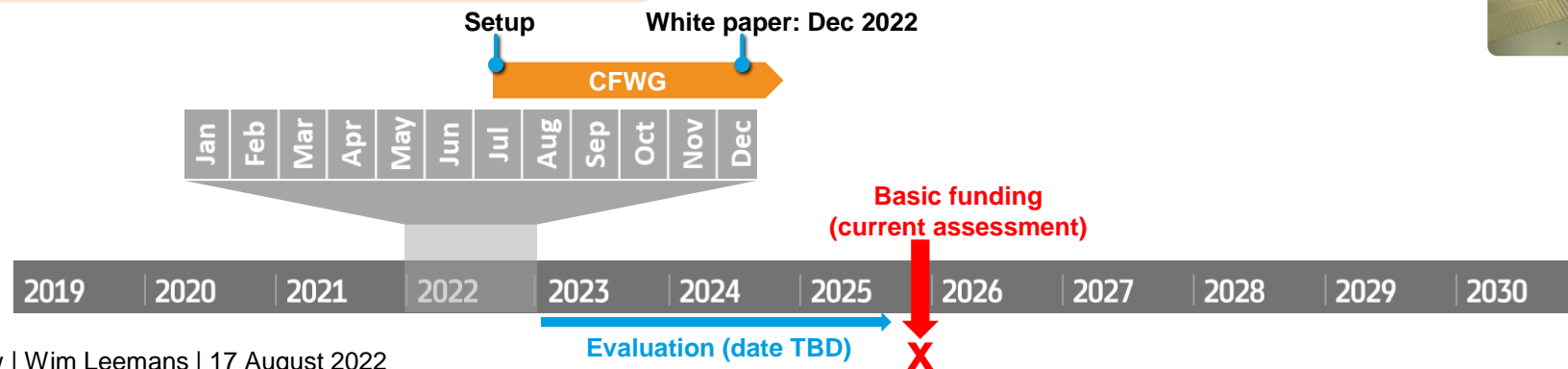
Tools for piloting radiation biology

Piloting FLASH radiation biology is a strategic intent of DESY (potential long-term perspective: market opportunities for compact radiation sources, i.e. transfer into broad practice)

Next steps:

- > White paper from the community is requested by the end of 2022
- > The current strategic decision to close down PITZ by 12.2025 can be revised only, when there is positive “business case” (scientific & financial)

Setup of a cross-functional working group (CFWG):
Frank Stephan, Florian Burkart



ARES



PITZ



#4 UED/REGAE.

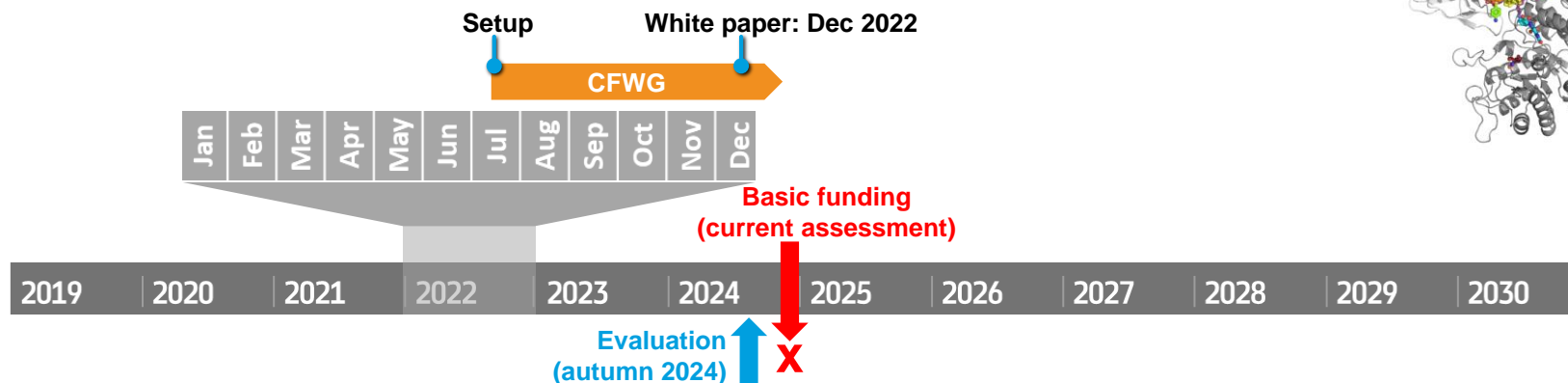
Complementary tool to current XFEL – visibility of hydrogen atoms clear asset

Basic funding is only promised by DIR until the end of 2024. Evaluation in autumn 2024.

Next steps:

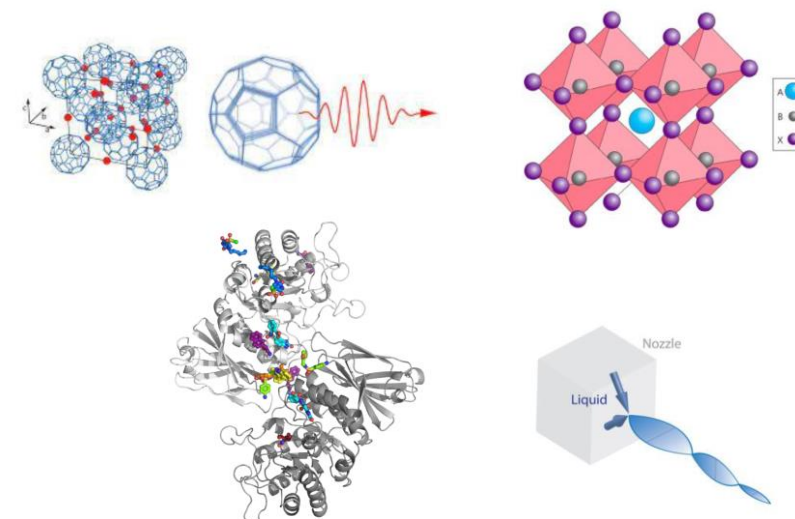
> White paper from the community is requested (analogous to radiation biology at PITZ/ARES) by the end of 2022

Setup of a cross-functional working group (CFWG): **Alke Meents**, Henry Chapman, Franz Kärtner, Markus Gühr, Klaus Flöttmann



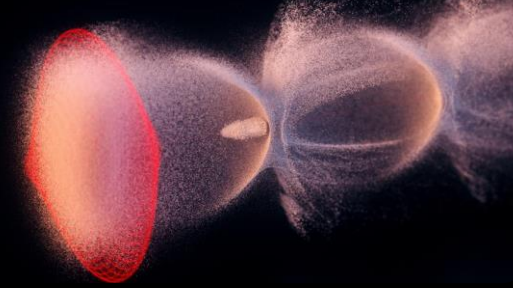
Strong synergies with on-campus research units / groups:

- Center for Free Electron Laser Science Science (CFEL)
- Center for Structural Systems biology (CSSB)
- Center for Molecular water science (CMWS)
- Center for X-ray and Nanoscience (CXNS)
- Research groups for ultrafast laser science



#5 Plasma Accelerator R&D.

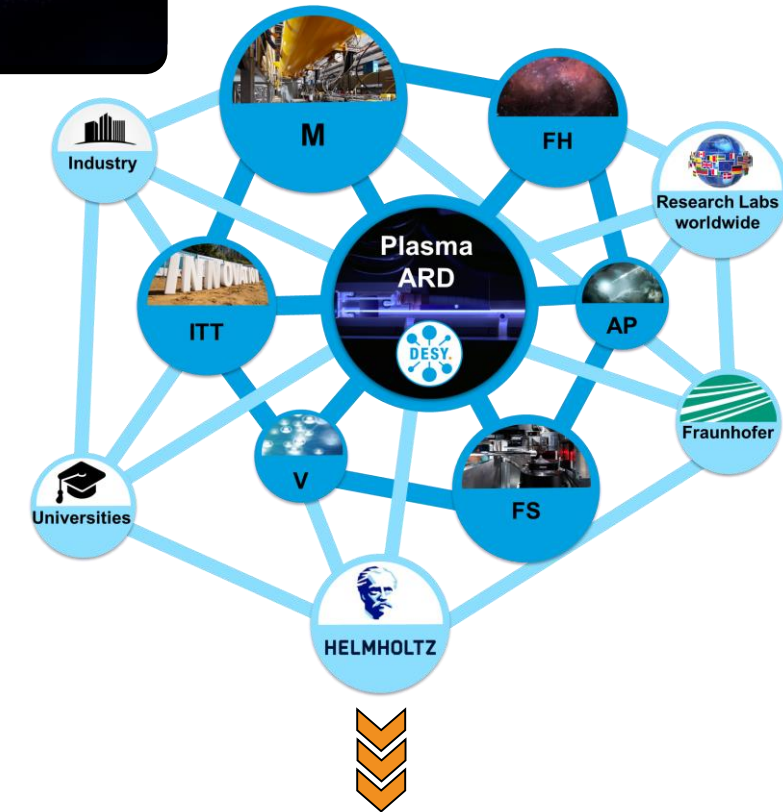
Applications for all DESY Divisions



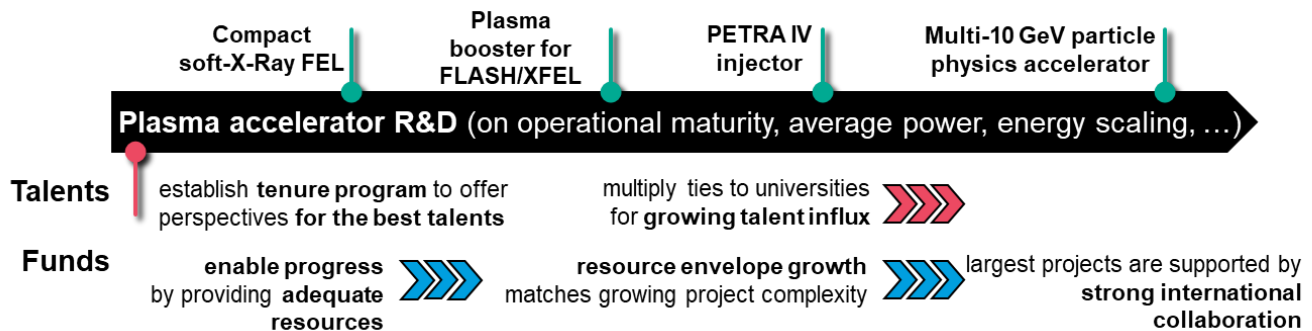
Core Strategy: ARD Research for Plasma to be substantially strengthened

Next steps:

- > Present & discuss in DIR → Oct 2022
- > Plasma roadmap
- > Third-party funding for the topic
- > Priorities (Review M-Prios)
- > Investments



Tying into many other important strategic initiatives



#B Lasers & Photonics.

Central to the current and future missions of DESY

NEW! Fact sheet available now!

FS: Relies on lasers and photonics research to fully exploit the ultrafast domain with DESY's large-scale X-ray light sources.

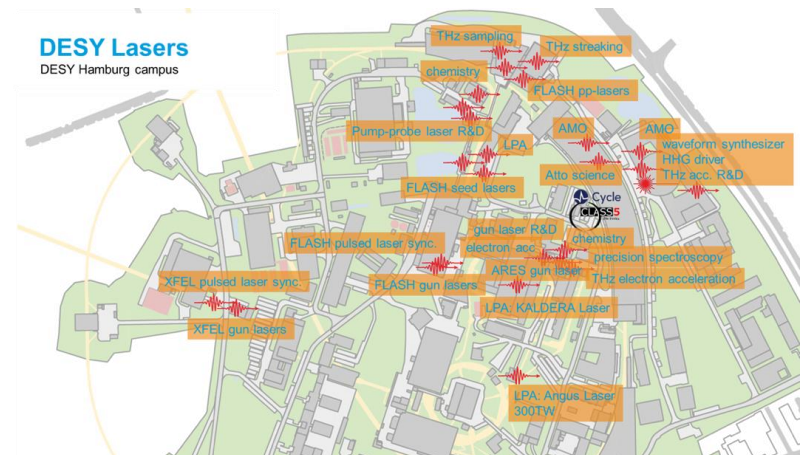
M: High-power laser systems, tailored for driving next-generation plasma accelerators, will play a pivotal role in accelerator research and operation of next-generation machines.

AP: Lasers and photonics will soon become key if DESY significantly contributes to the Einstein Telescope construction.

FH: Applications of lasers in ALPS, LUXE, and further particle physics experiments.

- **Pivotal for DESY** to keep its world-leading position in advanced photon sources
- DESY has a **critical mass** of scientists working in the fields of lasers and photonics.
- **Enormous innovation potential**, which has already led to successful spin-off companies

Requires more visibility: Unfortunately, DESY's lasers and photonics are mostly invisible to the international photonics community, and DESY is still known as a high-energy physics lab.



Thank you



“Progress is impossible without change, and those who cannot change their minds cannot change anything.”

George Bernard Shaw

Contact

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Gravitational Waves

DESY Strategy Update

Information Meeting Findings and Further Process

17. Aug. 2022, 11h – 12h30

Neutron star merger, AEI Golm

Gravitational Waves

Gravitational waves are a topic of the DESY strategy loop

- On-site experiments (see Beate's part)
- Einstein Telescope

DESY's role in the Einstein Telescope

- Joining the ET Collaboration is in preparation to ensure continued contributions of DESY scientists in ET in the field of **gravitational wave theory**.
- DESY is a partner in the initiative to establish the **German Centre for Astrophysics (DZA)** in Saxony.
- A central task of the DZA is to organise access to the Einstein Telescope for the German GW community.
- The decision on the DZA is expected in October
- **DESY's further role in the Einstein telescope will be discussed after the decision on the DZA.**

Working group: Geraldine Servant, Rafael Porto, Andreas Ringwald, Marek Kowalski

Strategy Topics

On-site HEP exp's, Test beam,
Detectors, Computing and Quantum technologies

Beate Heinemann
August 17th 2022

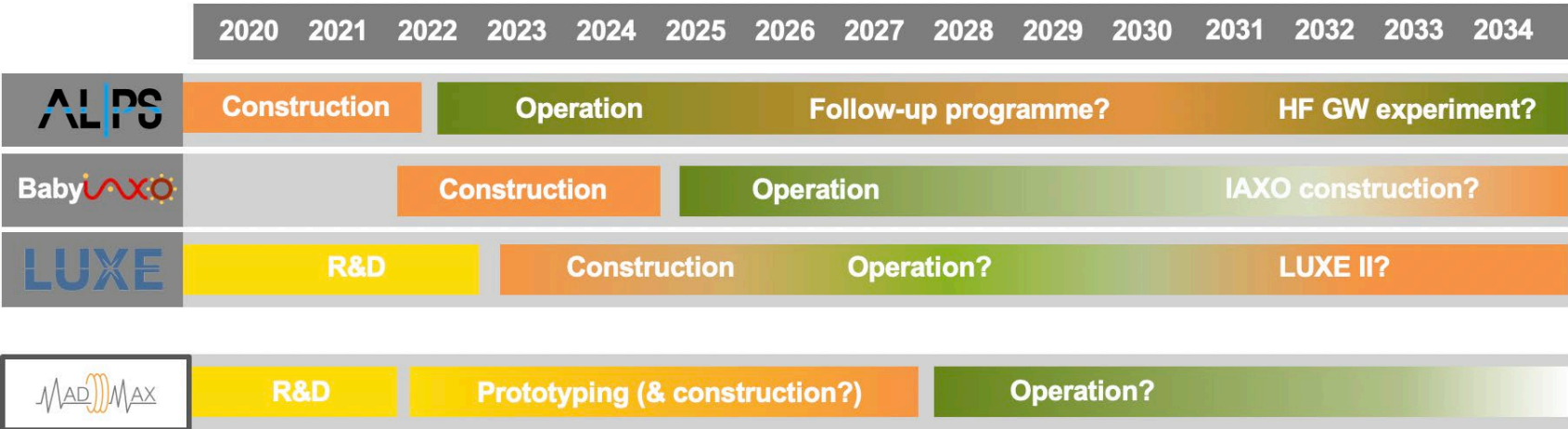
HELMHOLTZ



On-site experiments

Status

- **World-wide leading programm on axions:**
 - ALPS II => BabyIAXO => MADMAX? => IAXO?
 - Construction of experiments staggered to avoid straining technical resources
- **LUXE experiment pioneering new regime of quantum physics**
 - >100 collaborators from about 20 institutions
 - Delayed due effects from Russian attack on the Ukraine
- **New opportunity: Gravitational wave experiments at high frequencies**
 - Exciting opportunity to observe e.g. primordial black holes



On-site experiments

Decisions of directorate in July 2022

Strategy: Mid-size experiments on site in fundamental physics are an essential long- term part of the DESY portfolio

Criteria to decide if a specific onsite experiment can / should be included in DESY's portfolio

- Fit to DESY mission (including external visibility)
- Synergies with / use of existing local DESY infrastructure
- Clear scientific case
- Relevance for excellence cluster(s)
- If possible advances technological competences of DESY

The above criteria will be used in mandatory DESY CD process

On-site experiments

Next steps

Working group: Fact finding of current on-site (particle) physics experiments

(CFWG: Ties Behnke, Axel Lindner Andreas Ringwald Krisztian Peters)

- time evolution and resources (POF IV / POF V):
- dependencies on external resources, cooperation, construction, design
- schedule when experiments are closed down

(expect input by December 2022)

Directorate:

- Develop strategic future scenarios for DESY overall- potential mid-size experiments long-term? (2030 +)
- clarify ideas / proposals / strategy from the divisions for mid-size on-site experiments (as well as for the use of the investment allocation)

DESY Test Beam

Status and decisions

- **DESY test beam runs very successfully based on DESY II**
 - More than 300 users per year (world wide)
 - Important for particle and nuclear physics; only few facilities world wide: DESY, CERN, FNAL
 - Operations cost rather low as beam operation in shadow of PETRA III
 - Test beam can no longer be operated this way when PETRA IV comes
- **Decisions taken by directorate in July 2022:**
 - DESY II will no longer be operated (and most likely be removed)
 - Need to build "hook" at DESY IV to have ability to extract test beam
 - Find ways to secure funding => nationally/european?

DESY Test Beam

Next steps

Tasks for working group (*CFWG: Marcel Stanitzki Heiko Ehrlichmann Ties Behnke*)

- Review fact-sheet with new requirements
- Discuss overall landscape of test beam facilities
- Review third party funding opportunities

Bring topic to DESY directorate in autumn 2022

Detector Research, Development and Construction

Status and decision

- **DESY has a strong legacy in detector development**
 - All DESY divisions require detectors for their science
 - Distributed Detector Laboratory (DDL) funding not yet secured
 - Great technological spin-off opportunities

- **Decision of directorate in July 2022:**
 - Basic strategy: Leadership position for detector development is part of future DESY identity (as today)

Detector Research, Development and Construction

Next steps

- **Cross-functional working group to address the following questions** (*CFWG: Ties Behnke Heinz Graafsma Ingrid Gregor Steven Worm*)
 - Where is DESY really world wide leading? Unique selling point
 - Develop strategy for detector development without DDL
 - What are the big future needs & challenges regarding detector development? What are others doing?
 - Clarify role of software as integral part of the detector strategy
- **Presentation at "Woodstock" meeting in Dec. 2022**

Computing

Status

- DESY is serving a **large and diverse user community** on and off site with storage, CPU/GPU/..., office computing, ... AI/ML..
- Photon science and particle physics require handling of **large data volumes**
- The requirements on all aspects of computing continue to increase and **computing is a very dynamic field**
- **Green IT** plays an ever more crucial role and provides opportunities
- Providing **computing for industry** is crucial for PETRA IV (and already now important and not trivial)
- Strategy for **expansion beyond building 2** needed
- A search for a **new head of the IT division** is currently ongoing

Computing

Next steps

Cross-functional working group: analyse for the various users (HEP expts, PETRA IV/FLASH, acc. science, theory, EU.XFEL,...industry)

- What is the minimum facility for computing and data storage we absolutely need at DESY? Explain for each case why and estimate the corresponding resource requirements vs time?
- Which activities could potentially be realized more economically (or at least as economically) under DESY authority and responsibility at other places e.g. Green-IT- Cube@GSI, FZI, ... ? (e. g. secondary data storage, data analysis, simulation, ...). What resource requirements do these correspond to?
- Are there services that can be outsourced to industry (now or later)? E.g. amazon cloud...
- Discuss the space situation on site at DESY required for the computing resources for the next decade.

CFWG should also discuss Core Competences

- What core competences (intellectually) do we need at DESY?
- Where should we rely on external competences and collaborations?

CFWG: Kars Ohrenberg, Maxence Thévenet, Volker Guelzow, Christoph Wissing, Anton Barty, Christoph Rosemann, Kai Leffhalm, Djam Safi, Janine Fischer

Quantum Technologies

Status, decisions and next steps

- **Status**

- Quantum technologies (computing, sensing and materials) are discussed and advanced in cross-divisional task force at present
- Relies on 3rd party funding, nearly no base funding in POF IV

- **Decisions to be taken**

- Are QTs part of DESY's strategic research portfolio?
- Why and which part are of special relevance for DIR?
- Clarify the role of DESY in this field

- **Next steps**

- Discuss within DESY directorate in Sep/Oct 2022

Thank you

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DESY 2030

Review & Update

Follow-up Meeting on Findings and Further Process

17 August 2022

Christian Haringa
Director of Administration



Administrative Topics (I)

Important Findings, Boundary Settings and Next Steps



Administrative Support

- Extensive needs (projects such as PETRA IV and increased staff, processes + space) vs. financial challenges
- Adapt services together with users in transparent and efficient manner: Simplify, digitalize, standardize processes (with help of Process Map and new systems, e.g. SAP, ARIBA, FMS/GO, DMS, DocuSign, web-based trainings)
- Benchmark with external experts (AAC etc.)
- “Make or buy” decisions



Talent Management

- DESY needs best brains for all strategic fields vs. general talent shortage
- Recruitment strategy: ensure knowledge transfer and analyze knowledge gaps (e.g. biological safety)
- Keeping and developing existing staff (e.g. career paths for scientists)
- Implementation of “strategic officers”?

Administrative Topics (II)

Important Findings, Boundary Settings and Next Steps



Sustainability

- New staff unit was established in 2019
- Develops, supports and monitors sustainability measures in all areas of DESY
- Explore resource synergies, e.g. sale of waste heat
- 2022: First DESY sustainability report
- 2023: evaluation of staff unit



DESY Campus Development

- Campus master planings for both sites ✓
- Continuous further development of campus planning depending on internal and external conditions (e.g. new strategic priorities, construction cost development)
- First construction projects started
- Science City Hamburg-Bahrenfeld: ensure scientific driver seat