KfB activities

KHuK Annual Meeting 07.-08.12.2023

Carsten Mai for KfB and Forum

08.12.2023 – 9:10 – 15´+5´min

KOMITEE FÜR BESCHLEUNIGER-PHYSIK

KfB

KfB – Who we are?

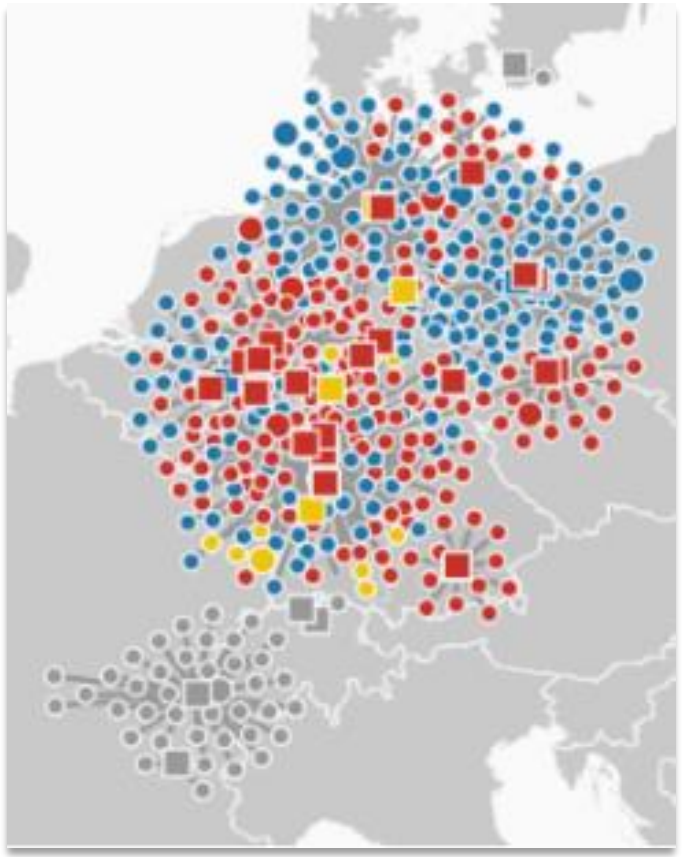
- **5th period of KfB from 2023 to 2025**
  - 5. Jan 2023, official constituting meeting

- Elected by the FORUM **Beschleuniger**physik
  - **A community**
    - Physicists, engineers, computer scientists, mathematicians, and more
    - Cross-sectional technologies in **Accelerator R&D**

- FORUM email list > 350 persons

- From **Universities**, **Helmholtz**, **International**, **Labs**

Accelerator R&D



Beschleunigerforschung

KfB – Who we are?

KOMITEE FÜR BESCHLEUNIGER-PHYSIK KfB

5. Komitee für Beschleunigerphysik

- CERN, DESY, HZB, KIT, U Hamburg, U Mainz, TU Darmstadt, TU Dortmund

www.beschleunigerphysik.de/de/kfb/

KfB roles, activities, and actions

- **Contact for** politics, industry, media
- **Recommendations** on **R&D topics**
- Links to **DIG-UM**/ErUM-Data
- **Sustainable research infrastructures**
- Promoting
  - **Networking**
  - **Early-career researchers**
  - **Young talents**

KfB-Vorsitender
Dr. *ERIK* ***BRÜNDERMANN***
KIT Helmholtz-Zentren
H

Stellv. KfB-Vorsitender
Prof. Dr. *FLORIAN* ***HUG***
Uni Mainz Universitäten
U

KfB-Mitglied
Dr. *MICHAELA* ***ARNOLD***
TU Darmstadt Universitäten
U

KfB-Mitglied
Dr. *PAUL* ***GOSLAWSKI***
HZB Helmholtz-Zentren
H

KfB-Mitglied
Dr. *BASTIAN* ***HÄRER***
KIT Universitäten
U

KfB-Mitglied
CARSTEN ***MAI***
TU Dortmund Universitäten
U

KfB-Mitglied
Dr. *EVA* ***PANOFSKI***
DESY Helmholtz-Zentren
H

KfB-Mitglied
Dr. *MICHAELA* ***SCHAUMANN***
DESY Helmholtz-Zentren
H

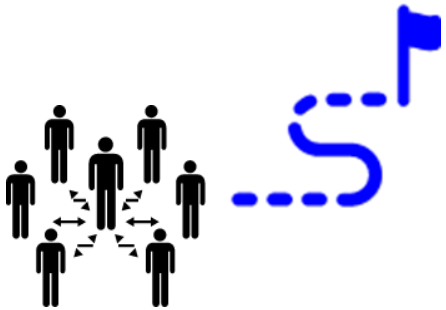
KfB-Mitglied
Dr. *LUCAS* ***SCHAPER***
DESY Helmholtz-Zentren
H

KfB-Mitglied
Dr. *MARC* ***WENSKAT***
Uni Hamburg Universitäten
U

KfB-Mitglied
Dr. *FRANK* ***TECKER***
CERN Ausländische Institute
I

Schedule for the strategy process

- Frequent unofficial KfB-meetings, virtual
  - “coffee sessions”
- Strategy brochure 2035 – work in progress
  - Led by *B. Härer*, KfB
- Strategy workshop planned for 2024 to review the brochure



Education of the next generation

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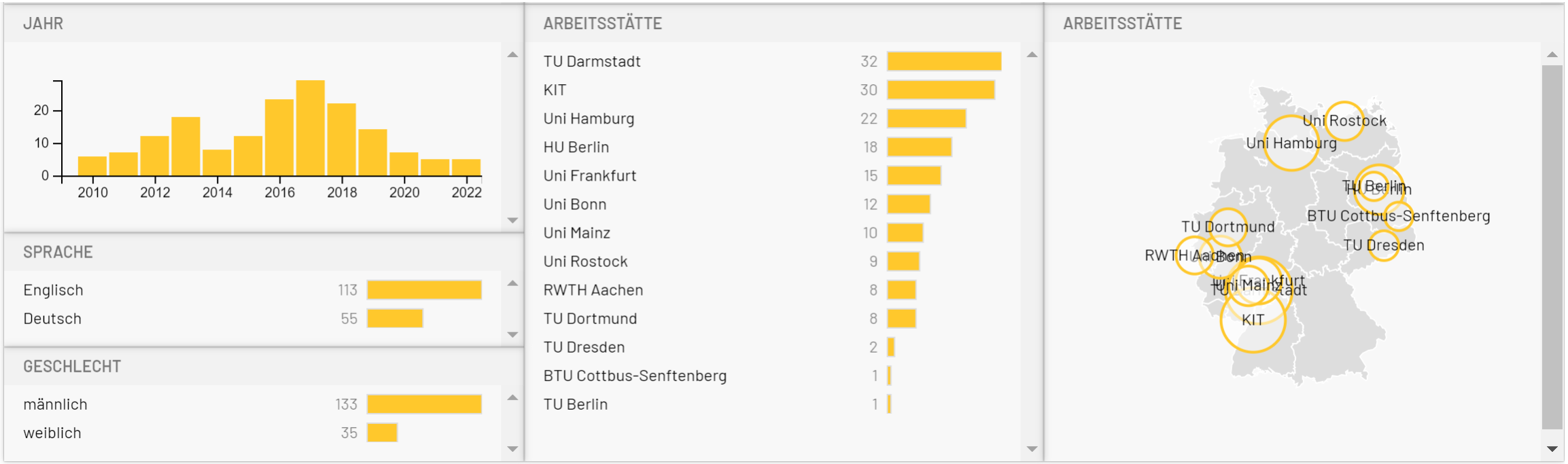
Finished dissertations



Source: www.beschleunigerphysik.de/de/service/dissertationen/

Promotion of young talent and training

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Challenges in Accelerator R&D

- Skilled personnel retire at accelerated pace
- Cross-sectional domain knowledge mandatory
- High level training of young talents necessary, thus attractiveness for highly qualified staff and educators
- High demand of our excellent graduates in industry starves human resources for R&D and education
  - Entry salaries for accelerator researcher and engineers in industry >= E15
  - Difficult to sustain large-scale research infrastructures & projects
- Administrative processes slow & short time between written funding announcement and project start
  - Existing time-contracted employees receive letter to go to employment agency 3 months before current project ends, thus potential demotivation of young talents
  - Difficult to quickly find skilled talents, thus task & budget plan vs. cash outflow under pressure

Promotion of young talent and training

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Possible measures

- Strengthening of accelerator physics/R&D and accelerator-related engineering, computer science, …
  - At present small subject at universities
- Improvement of working conditions
- Transfer of excellent young talents within the ErUM- and accelerator communities, market for jobs
  - E.g. in the event of timing and funding bottlenecks
- Funding intervals adapted – strive for overlapping, e.g. as proposed in ErUM-Data
  - Adapt administrative processes
  - Building careers: more time between written funding confirmation & when prior projects ends
- Accelerator technologies/R&D cover all MINT/STEM – motivate young talents early
- Increase outreach activities
  - Support by ErUM-Data-Hub and other initiatives (ErUM-FSP Accelerator Technologies?)
  - Use activities for community building
  - Even closer cooperation of the 8 ErUM committees

KfB members support teaching

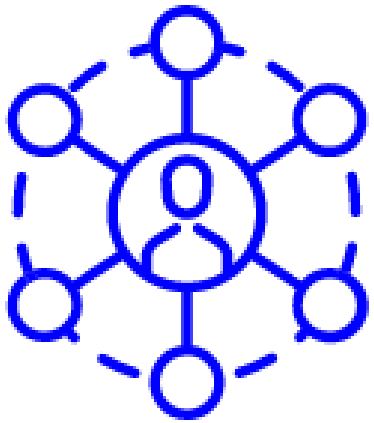
- CERN Accelerator School (CAS) – 40 years since 1983
  - Head of the CERN Accelerator School: *F. Tecker*
- Joint Universities Accelerator School (JUAS)
  - *e.g. B. Härer, C. Mai, M. Arnold*

juas
Joint Universities Accelerator School

JUAS PROVIDES POSTGRADUATE-LEVEL EDUCATION IN THE SCIENCE AND TECHNOLOGY OF PARTICLE ACCELERATORS since 1994

Networking

- Delegates to: KET (*M. Wenskat*), KFS (*C. Mai*, *P. Goslawski*), KHuK (*F. Hug*), …
- Germans at CERN (DAC), *F. Tecker*
- DIG-UM with 8 (!) Committees
  - Digitization Board (*E. Bründermann, F. Hug)*
  - KfB in Overview Board DIG-UM
- DPG Spring Meeting, 20.-24. Mar 2023
  - Arbeitskreis Beschleunigerphysik (AKBP)
  - KfB presentation (*E. Bründermann*) at AKBP, 23. Mar 2023
    - Next DPG Meeting with AKBP & KfB in Berlin, 17.-22. Mar 2024
- Conferences: IPAC, IBIC, …
- Helmholtz meetings: Matter and Technologies (MT), Accelerator R&D (MT-ARD), …



Erforschung von Universum und Materie

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- **PRISMA strategy discussions “Teilchen 24-27”**, 2.-3. Feb 2023
  - Two presentations by KfB
- **ErUM-Pro Teilchen** - Verbundforschung
- **KfB Workshop**, 19.-20. Apr 2023

In view of the

- **European Strategy for Particle Physics – Accelerator R&D Roadmap**
- Authors from the German & Germans@CERN accelerator community
- Supported in review by KfB connecting to accelerator experts

Accelerator R&D Roadmap

KOMITEE FÜR BESCHLEUNIGER-PHYSIK KfB

Excerpt: European Strategy for Particle Physics **Accelerator R&D Roadmap**

… design and delivery of future particle accelerators in a timely, affordable and sustainable way.

… roadmap for **European accelerator R&D** for the **next 5 to 10 years**, covering **five** topical **areas** identified in the Strategy update.

The R&D objectives include:

improvement of the performance and cost-performance of magnet and radio-frequency acceleration systems;

investigations of the potential of laser / plasma acceleration and energy-recovery linac techniques; and

development of new concepts for muon beams and muon colliders.

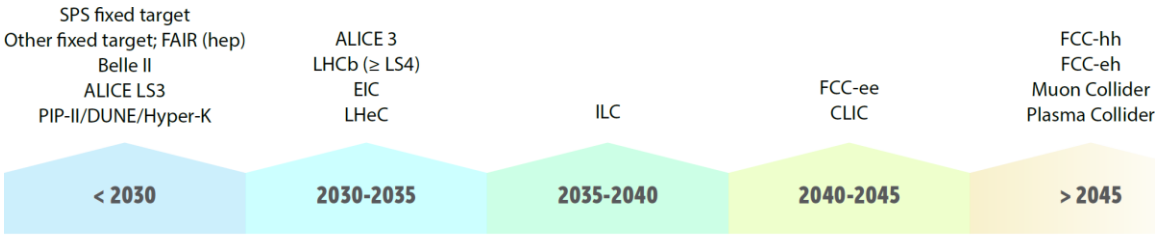

Fig. 1.2: Future accelerator facilities timeline.

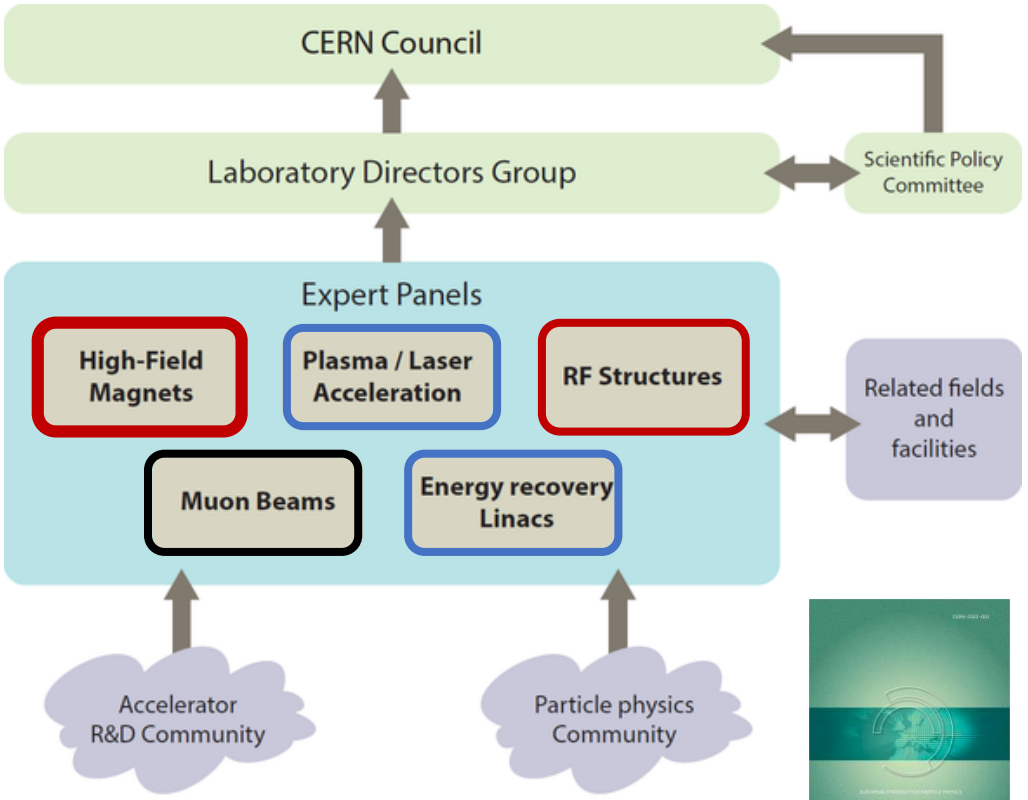

Fig. 1.1: Roadmap panel structure.

Revision:
30 März 2022

Promoting Verbundforschung

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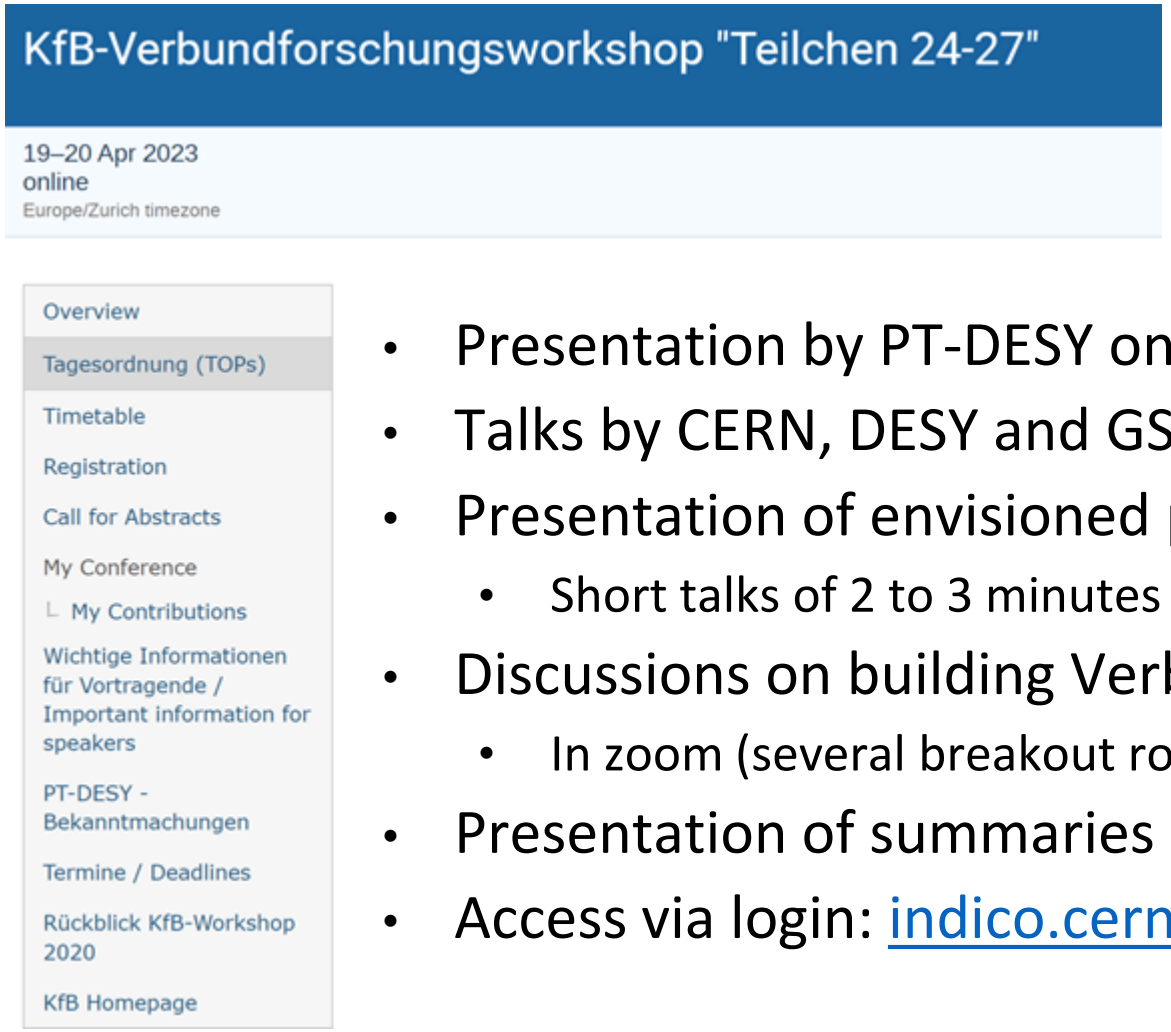
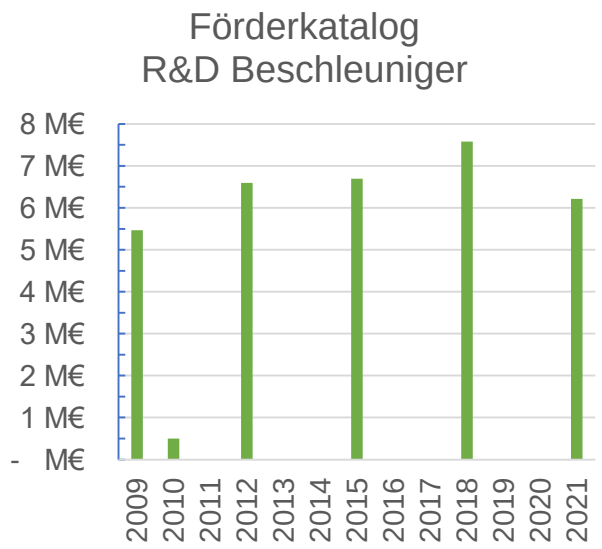
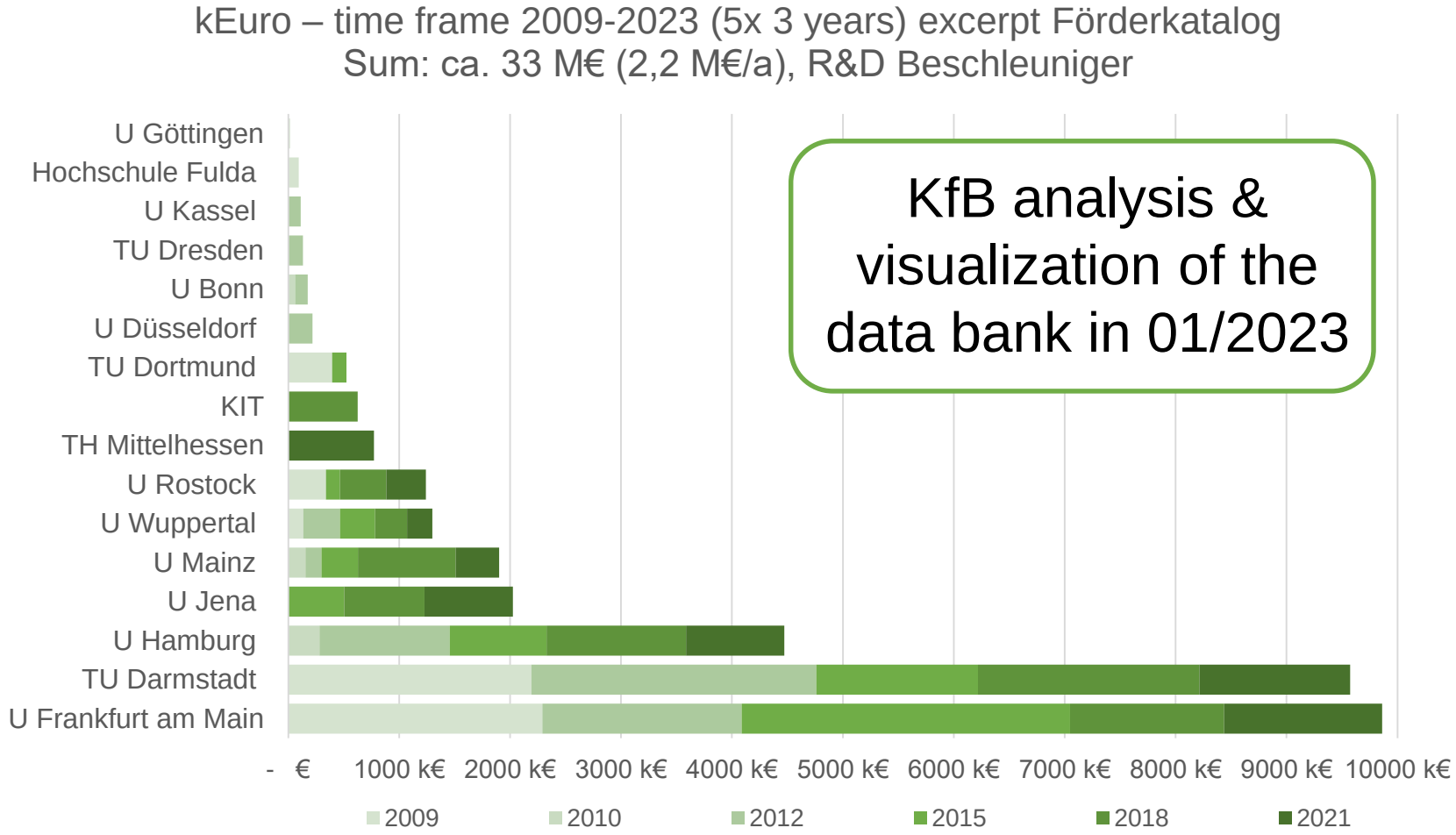


- Presentation by PT-DESY on call/Ausschreibung by BMBF (incl. Q&A)
- Talks by CERN, DESY and GSI (each ca. 30 min, incl. Q&A)
- Presentation of envisioned projects for Verbünde
  - Short talks of 2 to 3 minutes
- Discussions on building Verbünde
  - In zoom (several breakout rooms with topics: RF, magnets, diagnostics, …)
- Presentation of summaries on envisioned Verbünde & Budget requests
- Access via login: indico.cern.ch/e/teilchen24-27

Excerpt Förderkatalog: Accelerator R&D

- **Reduced funding & increasing salaries**
- **In future, fewer young talents**





KfB analysis & visualization of the data bank in 01/2023

Sustainability

BMBF PRISMA-Trialog Nachhaltigkeit, 24. May 2023

Nachhaltigkeit in der Forschung an Großgeräten: Ressourceneffizienz & Zukunftssicherung
(*Sustainability in Research at Large-Scale Facilities: Resource Efficiency & Securing the Future*)

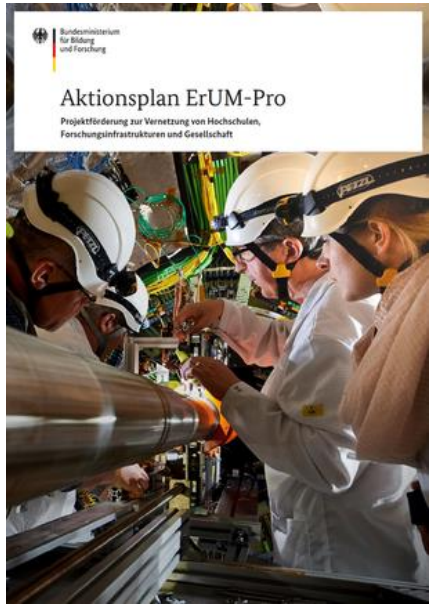
Join working groups

- WG 1: Forschungsplanung und Organisation
- WG 2: Forschungsförderung in ErUM

- WG 3: **Daten und Computing** ⬅ supported by yHEP & KfB

- WG 4: **Technologien an Forschungsinfrastrukturen (FIS)**
  - Coordination: *E. Bründermann*, KfB
  - Sign up at indico.desy.de/e/WG4_Trialog_Nachhaltigkeit

- WG 5: Datenerhebung, Monitoring & Bilanzierung
- WG 6: Forschung für Nachhaltigkeit



Sustainability on several levels

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Challenges

- Responsible use of
  - Energy
  - Materials
- Climate
- Geopolitical issues
- Trend of prices
  - e.g. operating costs
- Intensification of work load
  - Accelerator scientists do not only R&D
  - They do operational tasks – on top
  - They do teaching – on top

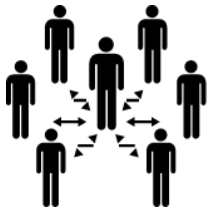
Possible measures

- Energy efficiency & circular economy
  - Components and systems
- Energy production
  - E.g. facility roofs for photovoltaics
- Strategic autonomy, focus on D and EU
- Thinking in systems and holistically
  - Investments + Operating Costs + Recycle
- Promotion of young talent and training
  - Automation & AI helps, but requires initially more and highly qualified work force
  - Humans essential for world-leading science!

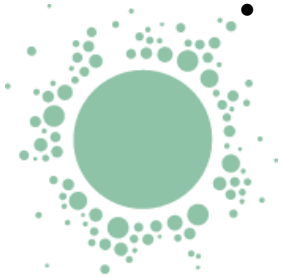
Wrapping up

- **Severe challenges ahead.**
  Opportunities are plenty, but funding and prioritization important!

- **KfB tries to mitigate present, visible and certain outlook of lacking work force.**
  - **Recognize asymmetry & prioritize cross-sectional activities.**
    If an accelerator is off, many users suffer – the reverse is lesser the case.



- **Cross-sectional/interdisciplinary R&D** such as **Accelerator R&D** difficult to make visible to the outside to attract young talents – although **excellent job opportunities** in industry and (probably also) in large-scale projects and facilities.



- **Coming up in 2024 – selection.**
  - **KfB/FORUM Vollversammlung**/general assembly (**31. Jan. 24**, 16:00-17:00, online).
  - Strategy discussions: **ErUM-Data**: 23.-24. Jan., **ErUM-Pro Materie**: to be decided.
  - Workshops: **strategy brochure**; ErUM-Pro Materie (**accelerator-based particle & light sources**).