

A. Kopmann

MT Annual Meeting 2022

Welcome to the program
Matter and Technologies

Introduction to large-scale research

- Helmholtz Association
- Evaluation of research
 - PoF – program-oriented funding
- Research infrastructures

Helmholtz Association

Research for grand challenges



19
Helmholtz
Centers



>40,000
employees



>4.8
billion euros
annual budget



6
research fields



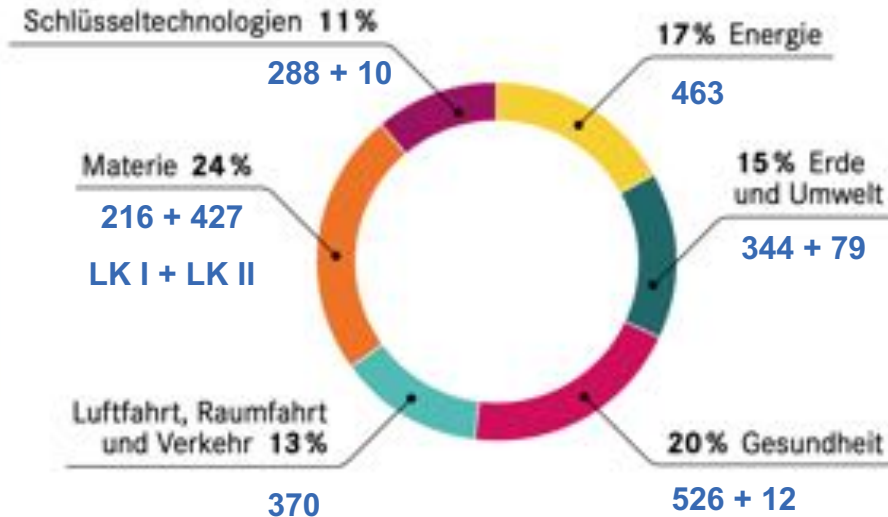
>6,500
scientific staff
from other countries



Helmholtz association

Research fields

- Budget (2019): 4810 MEUR
- PoF 2724 / 3rd party 1380 / rest 706
 - In-house research (LK 1)
 - Research infrastructures (FIS, LK 2)



- Publications (2018): 16.731 (13% DtlD)

Nature Index 2018

Platz	Institution	FC*
1	Chinese Academy of Sciences (CAS), China	1.697
2	Harvard University, USA	877
3	Max-Planck-Gesellschaft, Deutschland	744
4	French National Centre for Scientific Research (CNRS), Frankreich	693
5	Stanford University (SU), USA	624
6	Massachusetts Institute of Technology (MIT), USA	567
7	Helmholtz-Gemeinschaft, Deutschland	489
8	University of Cambridge, UK	444
9	The University of Tokyo (UTokyo), Japan	426
10	Peking University (PKU), China	407

Research field Matter

Participating centers

Helmholtz-Zentrum Hereon
Geesthacht

**Deutsches Elektronen-
Synchrotron DESY**
Hamburg

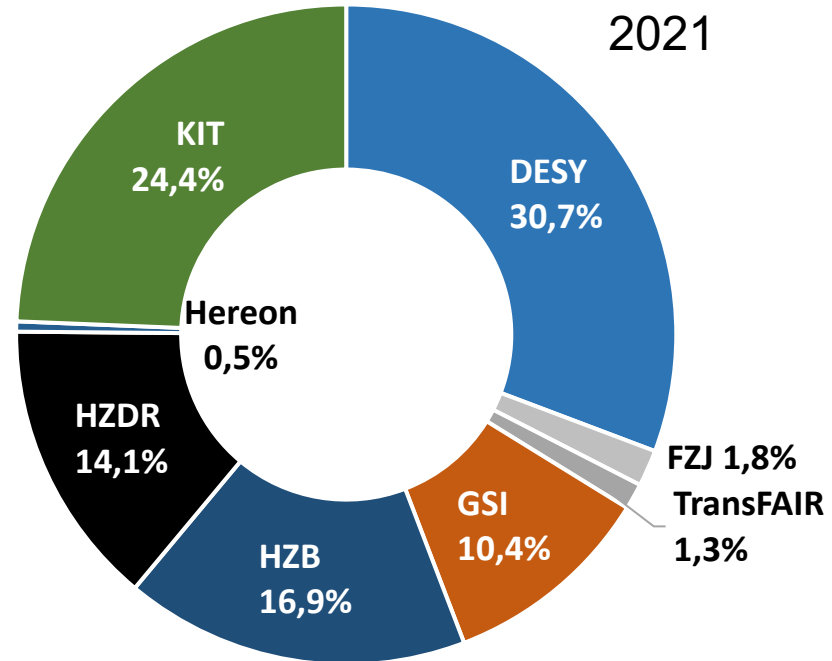
**Helmholtz-Zentrum Berlin für
Materialien und Energie (HZB)**
Berlin

**Helmholtz Center Dresden-
Rossendorf (HZDR)**
Dresden

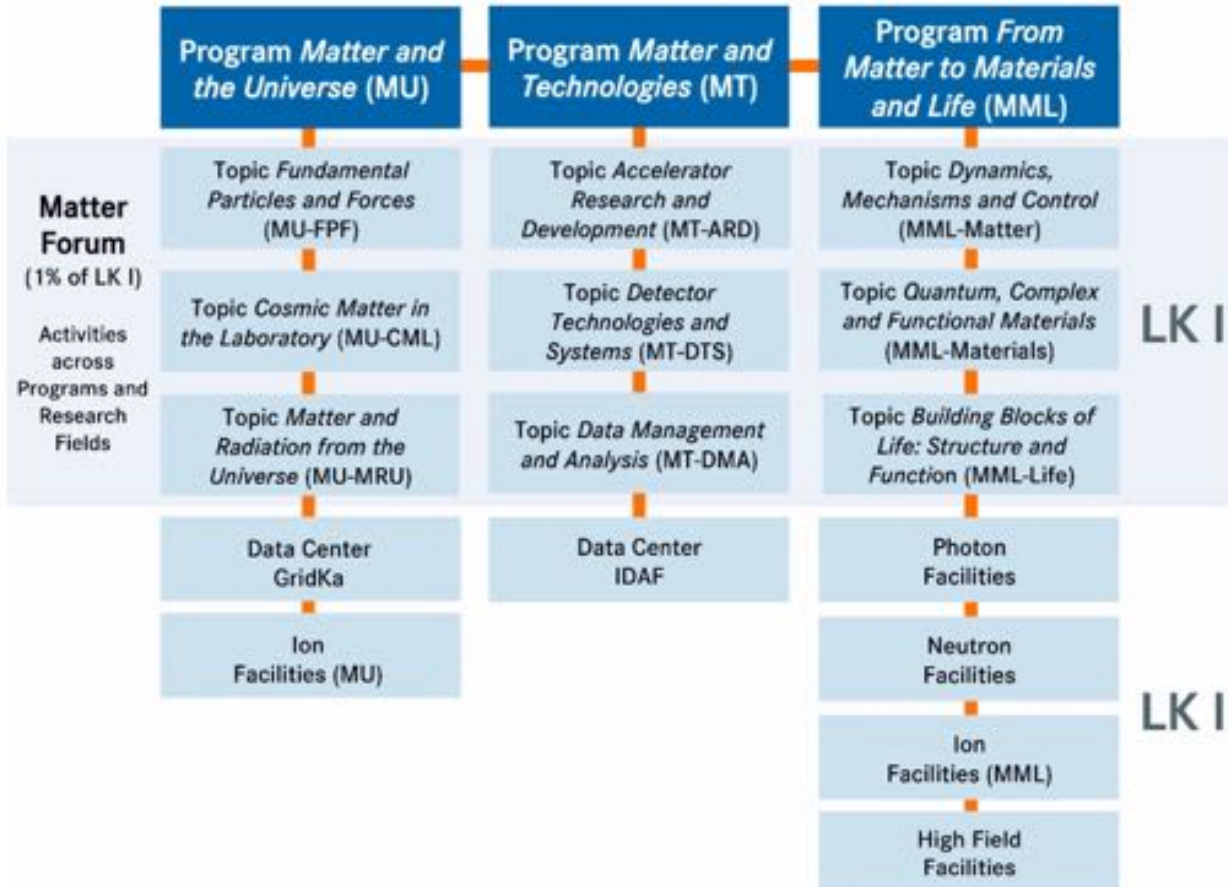
**Forschungszentrum Jülich
(FZ Jülich), Jülich**

**GSI Helmholtz Center for
Heavy Ion Research**
Darmstadt

**Karlsruhe Institute of
Technology (KIT)**
Karlsruhe



Research Field *Matter*



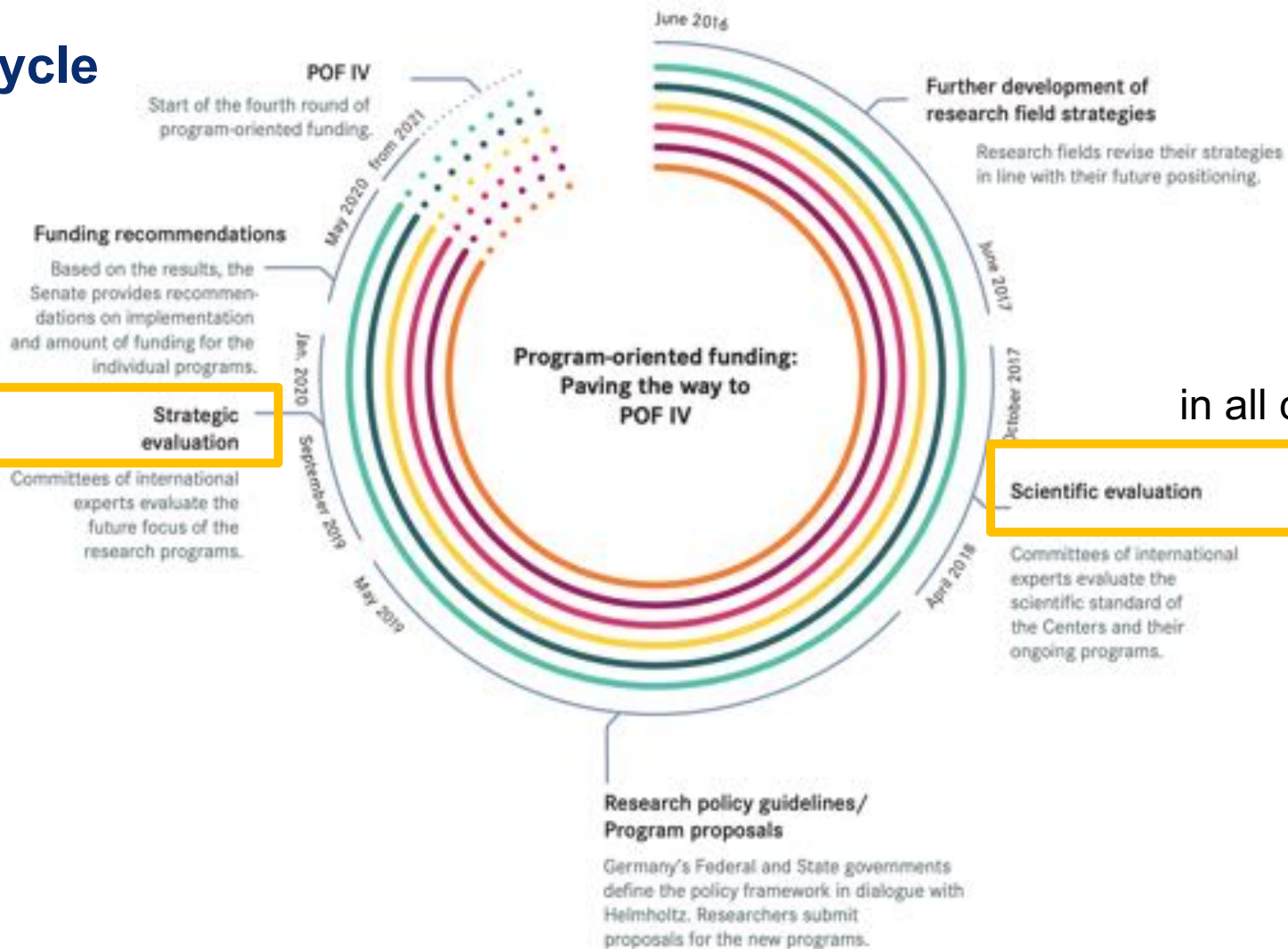
Funding principles – PoF

- Programm-oriented funding
 - Distribution by by topics and not by centers
- Funding period of 5, now 7 years
 - Reliable budget
 - Little opportunity to cover on unexpected demands (e.g. Covid-19, ...)
- Presidential funds: Initiative and Networking (IVF)
 - Strategic development of new topics
 - Reaction on unexpected challenges
 - Transfer + talent management



PhD thesis, Verwaltungshochschule Speyer, 2008

PoF cycle



2 Strategic evaluation

in Berlin

Scientific evaluation 1

in all centers

Definition of grades

Same definition from PoF III to PoF IV

7 outstanding: Extremely strong performance at the level of **international leadership**. Groundbreaking research with transformative impact and/or with high potential for significant societal impact. Essentially no weaknesses.

6 excellent: Very strong performance and innovative research at an exceptionally **high international level**. Significant impact on the field and/or potential for significant societal impact. Some negligible or minor weaknesses.

5 very good: Strong research at the level of **national leadership**. Considerable impact on the field. Several minor weaknesses

4 good: Overall performance at a **nationally competitive level** with solid potential for impact on the field. Several minor and at least one moderate weakness.

3 fair: Mediocre performance and **unconvincing research approaches**. Limited potential for relevant impact on the field. At least one major weakness.

Evalute research quality - performance criteria

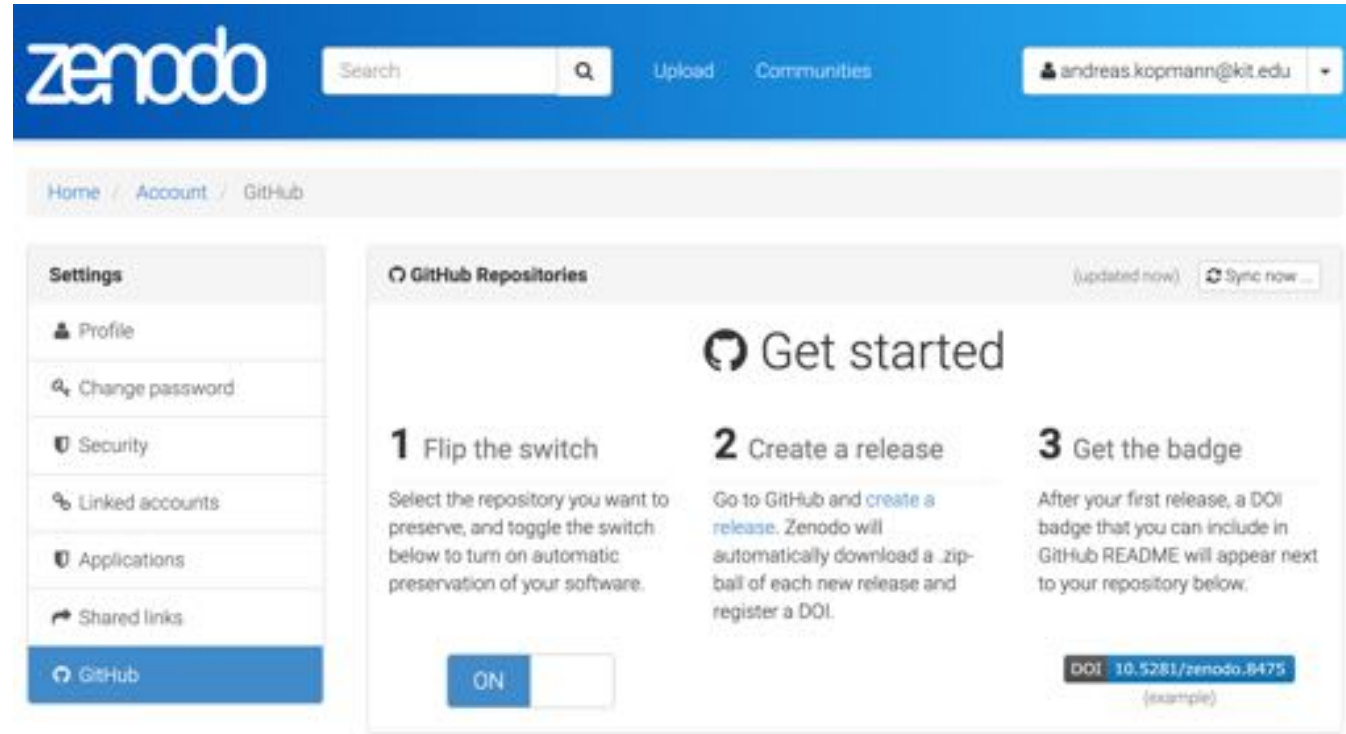
1. WoS-, SCOPUS oder Open Research Europe indexierte Publikationen	Anzahl
2. ... davon Open-Access-Publikationen - neu in PoF IV	Anzahl
3. Drittmittelträge	TEUR
4. Abgeschlossene betreute Promotionen	Anzahl
5. Postdocs - neu in PoF IV	Anzahl
6. Nachwuchsgruppen	Anzahl
7. Ausgewählte koordinierte, nationale und internationale Förderprogramme	Anzahl
8. Kooperation mit der Wirtschaft und externen nichtwissenschaftlichen Institutionen, öffentlich oder privat finanziert - neu in PoF IV	Anzahl
9. Ausgründungen (Spin-Offs) und kompetenzbasierte Gründungen (Start-ups) - neu in PoF IV	Anzahl
10. Wissenstransferaktivitäten in FTE, gemessen am Programmbudget - neu in PoF IV	%
11. Zitierbar publizierte Forschungsdaten- und Forschungssoftware-Publikationen - neu in PoF IV	Anzahl

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Open access publications and research data

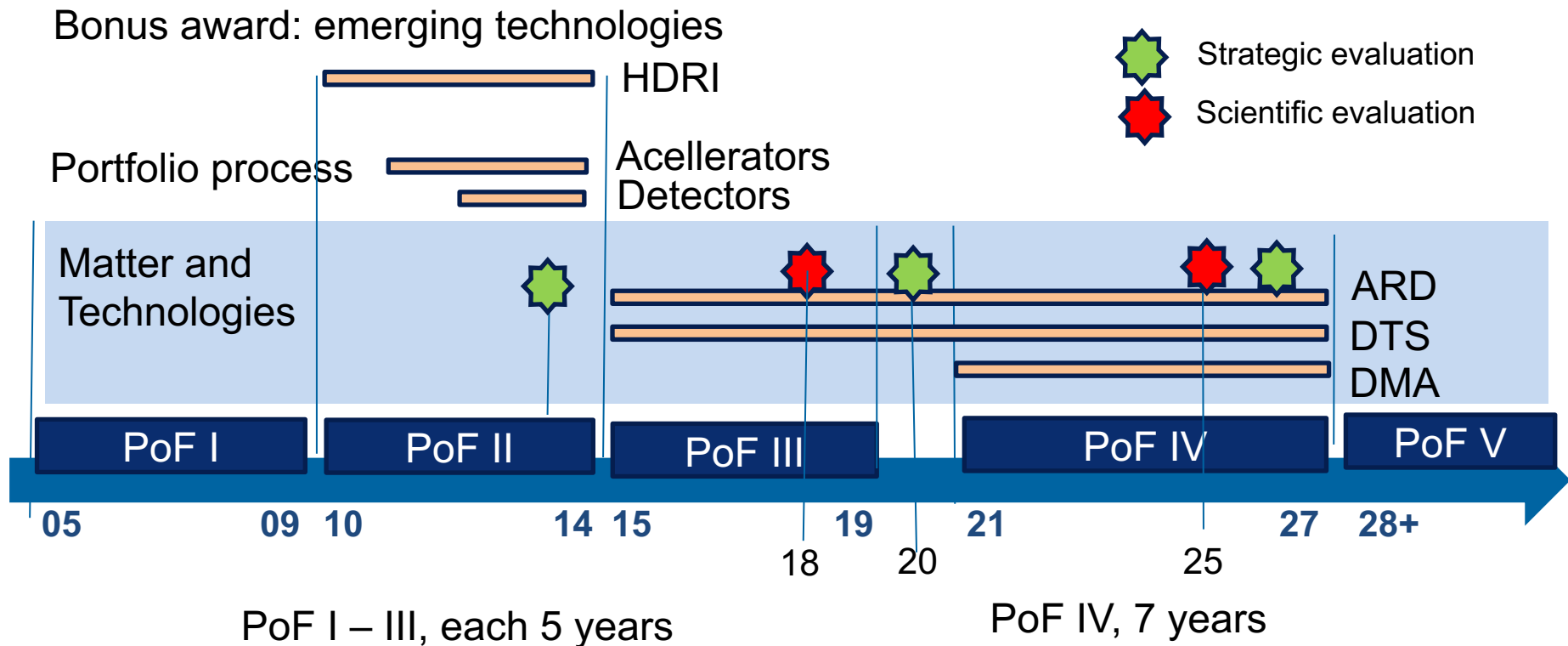
- Link data to your publication
- Use Zenodo to create a DOI for source code at Github



The screenshot displays the Zenodo website interface. At the top, there is a blue header with the Zenodo logo, a search bar, and navigation links for 'Upload' and 'Communities'. The user's email address, 'andreas.kopmann@kit.edu', is visible in the top right corner. Below the header, a breadcrumb trail shows 'Home / Account / GitHub'. The main content area is divided into two sections. On the left is a 'Settings' sidebar with options: Profile, Change password, Security, Linked accounts, Applications, and Shared links. The 'GitHub' option is highlighted in blue. The right section is titled 'GitHub Repositories' and includes a '(updated now)' status and a 'Sync now...' button. It features a 'Get started' guide with three steps: 1. Flip the switch (with an 'ON' toggle), 2. Create a release, and 3. Get the badge. An example DOI badge is shown as 'DOI 10.5281/zenodo.8475 (example)'.

Establishment Matter and Technologies

Giving higher visibility to technologies in research



PoF II 2010-2014:

Research field “Structure of Matter”

Elementary
Particle Physics

Astroparticle
Physics

Physics of
Hadrons and
Nuclei

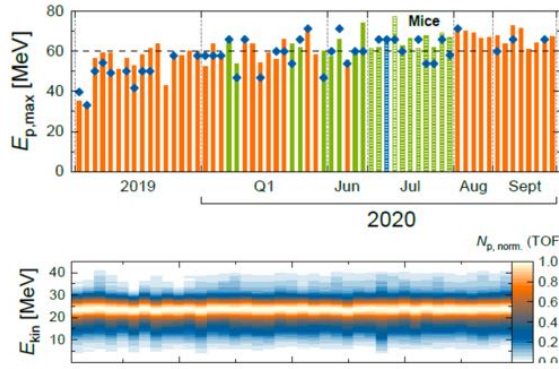
Large-Scale
Facilities for
Research with
Photons,
Neutrons and
Ions (PNI)

Accelerator, detector and computing activities were scattered over various programs

MT highlights

Increased visibility for technologies

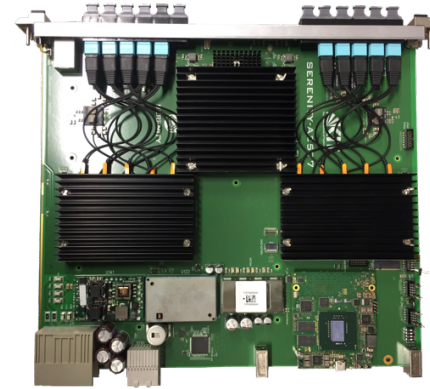
Tumor irradiation in mice with a laser-accelerated proton beam



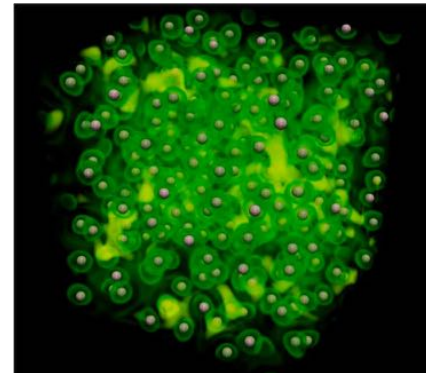
Beam diagnostics for electron beams with femtosecond resolution



Examples from the last annual report



Intelligent readout of detector systems with Terabit per second



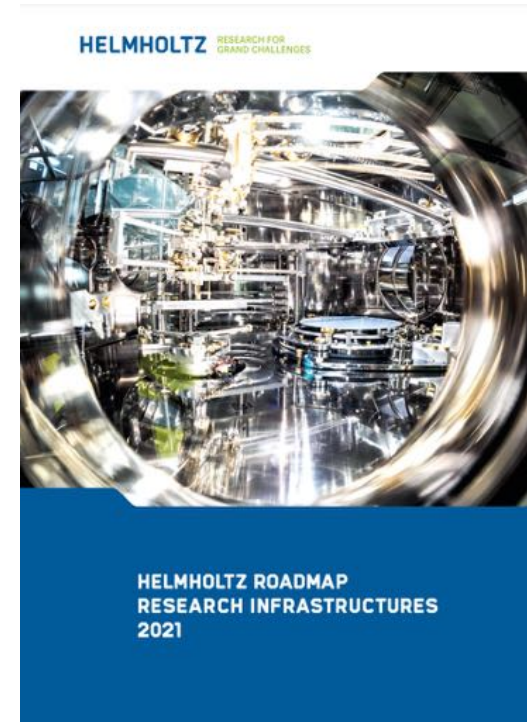
Simulation of field of matter under extreme conditions

Helmholtz Roadmap Research infrastructures

List of planned research projects

“Design, construction and operation of large-scale facilities and complex, scientific infrastructures are core elements of the Helmholtz Association’s mission.”

- Updated every ~ 5 years
- Not all projects are realized
- Categories: A, B, C
 - A: Helmholtz projects financed by the Helmholtz (€15 to €50 million)
 - B: Large national projects additional funding (> €50 million)
 - C: Helmholtz participation in international research infrastructures




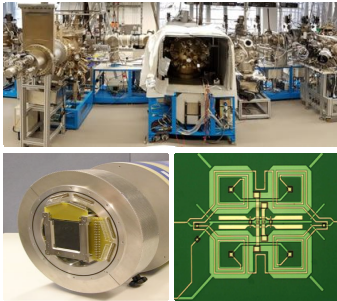
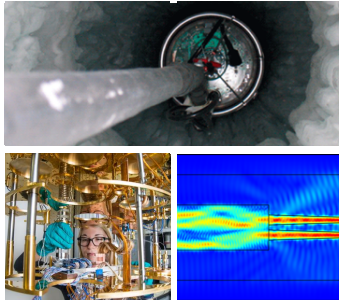
Helmholtz Roadmap Research infrastructures

Matter	Distributed Detector Laboratory	DDL	DESY	GSI (HJ Jena), HZB, KIT	A	2023 - 2027	31.6	31.6	31.6
	Upgrade of the Grid Computing Centres for the HL-LHC	TIER-Upgrade	KIT	DESY, GSI	A	2025 - 2028	33	33	33
	Upgrade of the Synchrotron Radiation Source PETRA III	PETRA IV	DESY	Hereon	B	2023 - 2028	670.8	670.8	
	Dresden Advanced Light Infrastructure	DALI	HZDR		B	2023 - 2029	200	200	
	Berlin Electron Storage Ring for Synchrotron Radiation III	BESSY III	HZB		B	2026 - 2031	550	550	
	ACcelerator-Driven multipurpose ion beam Complex	ACDC	HZDR	GSI	B	2024 - 2028	94	94	
	IceCube-Generation 2	IceCube-Gen2	DESY	KIT	C	2024 - 2031	285	40	
	Dark Matter WIMP Search with Liquid Xenon	DARWIN	KIT		C	2025 - 2030	175	44	
	Einstein Telescope, a 3rd Generation Gravitational Wave Detector	ET	DESY	HZDR, KIT	C	2026 - 2031 et seq.	1736	n/a	
	Global Cosmic Ray Observatory [GCOS]	GCOS	KIT		C	2028 - 2031 et seq.	390	40	
Helmholtz International Beamline for Extreme Fields 2.0	HIBEF 2.0	HZDR	GSI	A*	2023 - 2025	28	28	28	

MT infrastructures

Establishing unique research opportunities

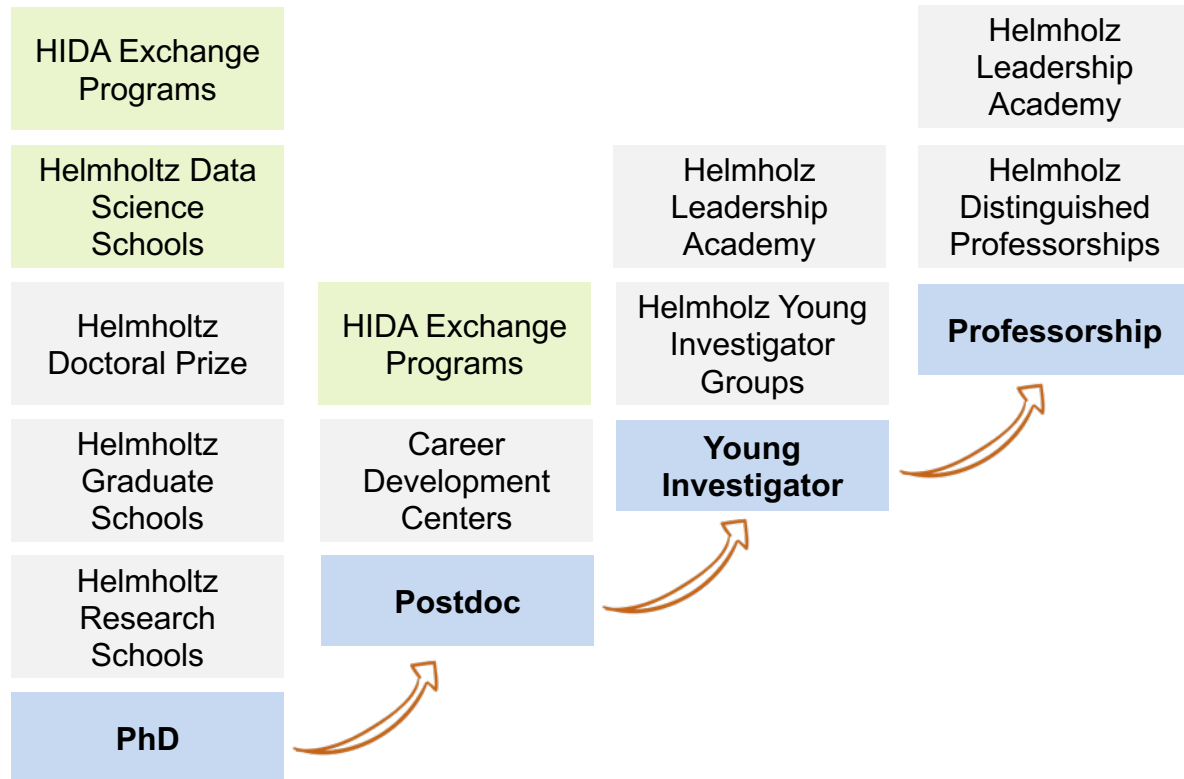


Test beam facilities	Sensor production facilities	Detector integration, diagnostics and characterization
		
Helmholtz Distributed Detector Laboratory (DDL)		



Talent management at Helmholtz level

Make use of the opportunities in a large organisation



Helmholtz Calls for Applications

- **Helmholtz Enterprise - 2. Batch 2022** is the internal program for spin-offs
- **Funding for innovative AI projects - Helmholtz AI Projects 2022 Call** aims strengthens the fields of Artificial Intelligence and Machine Learning
- **Helmholtz Visiting Researcher Grant** for a doctoral researcher or postdoc ...
- **Funding for validation projects in the transfer campaign**
- **Funding of first-time professorial appointments of excellent women scientists**
- **Funding opportunities for innovative metadata projects.** The Helmholtz Incubator serves as a key hub to foster these initiatives.
- **Funding for innovative imaging projects**