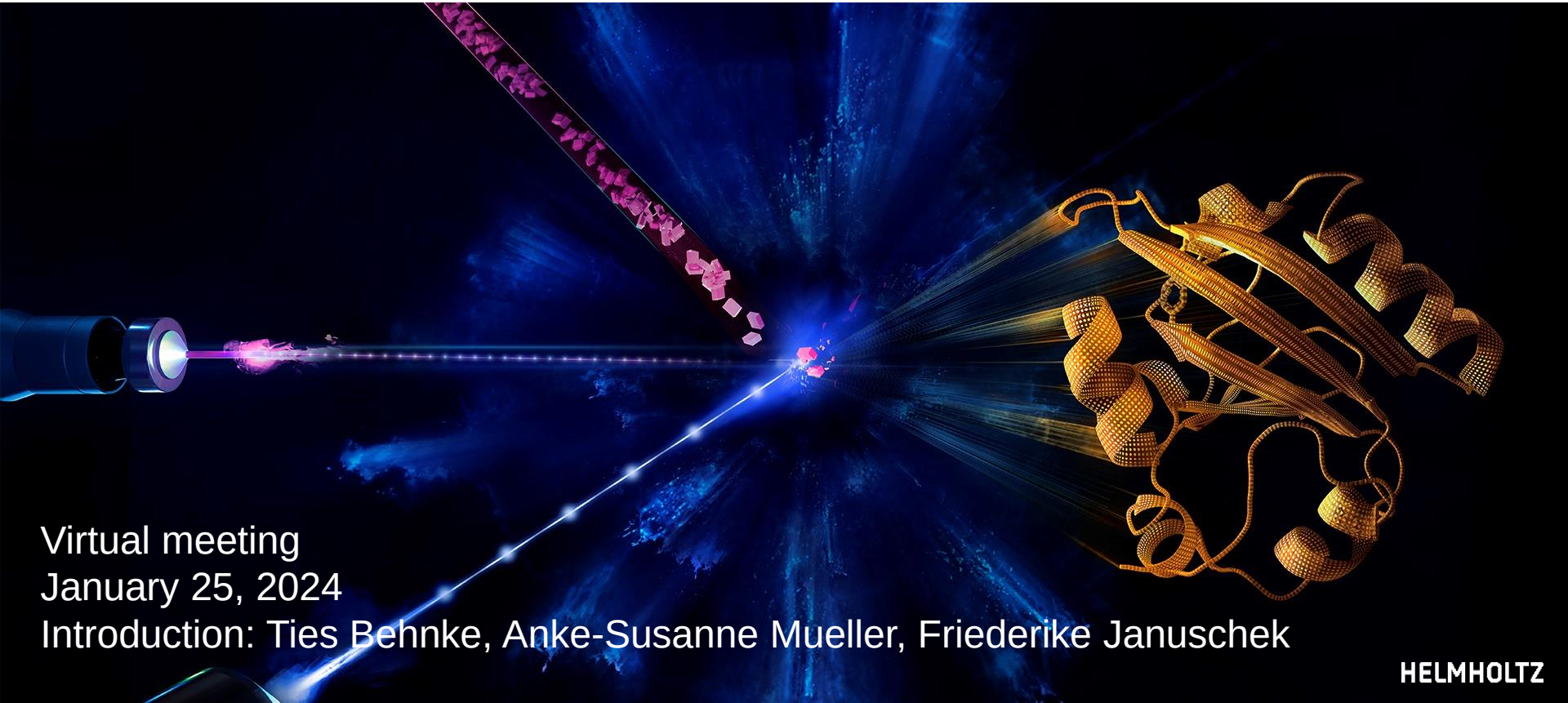
MT strategy meeting

MATTER AND TECHNOLOGIES



Virtual meeting
January 25, 2024
Introduction: Ties Behnke, Anke-Susanne Mueller, Friederike Januschek

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Where are we? Schedule?

PoF: program oriented funding

Some Reminders

Everything we do at our centers from base funding is financed through PoF.

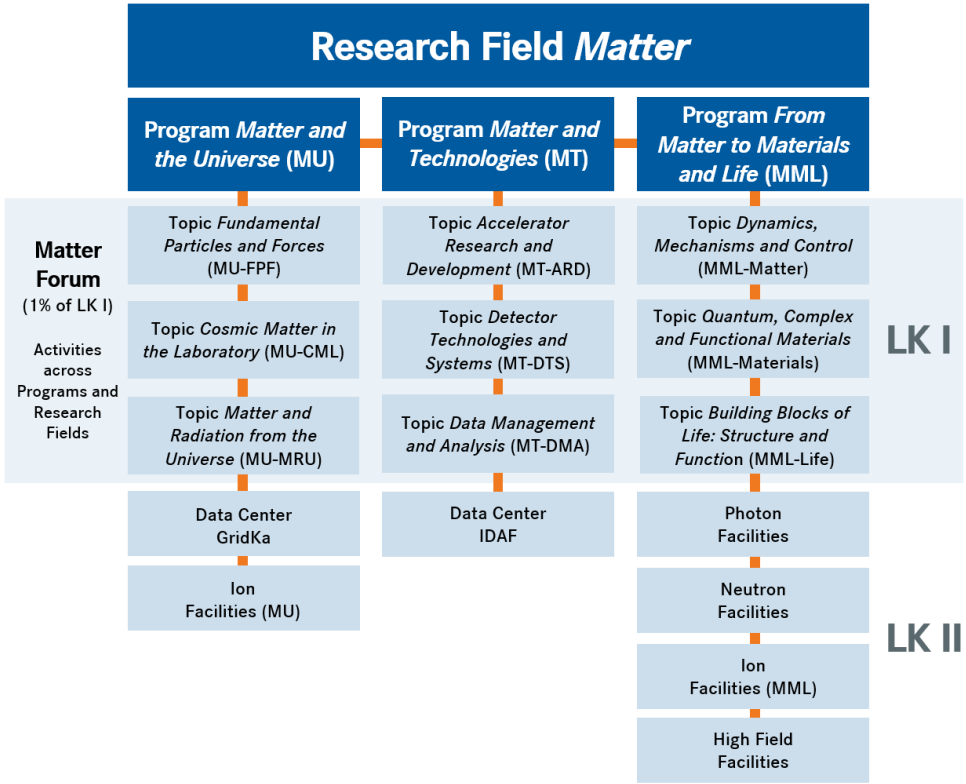
- PoF is a re-branding / re-focusing from global funding to project funding
- 100% of the center funds need to be covered
- We can define “lighthouse” projects, but need to make sure that we can still cover “everything”

There are only two funding types: LK I and LK II

All infrastructure etc is accounted as overhead on top of LK I and LK II

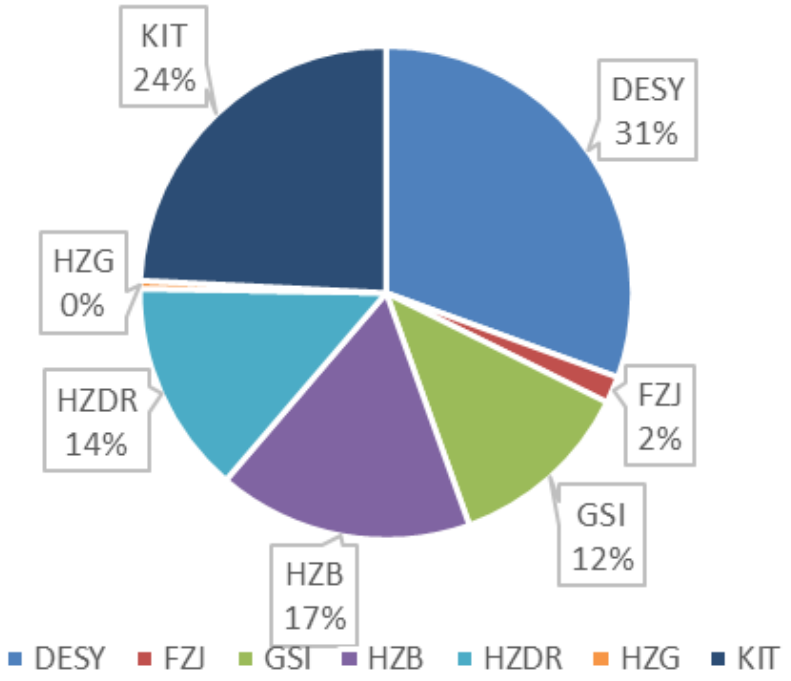
Our Research Field

Matter as is (PoF IV)



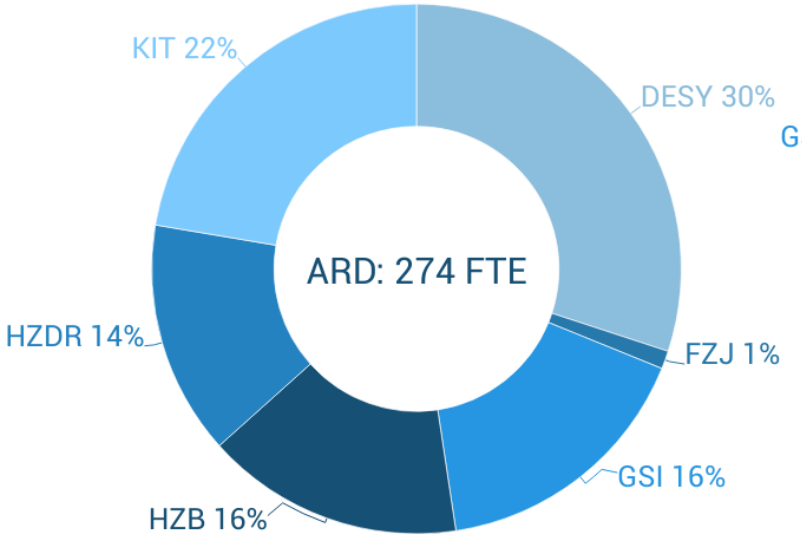
Total Program Budget per center

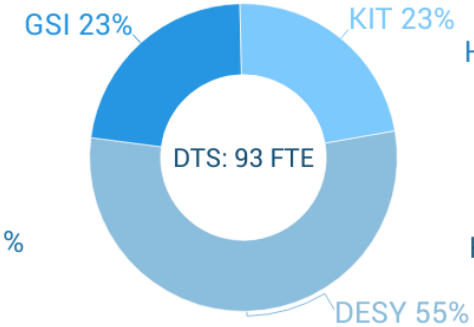
Volume:
83 Mio EUR
in 2022

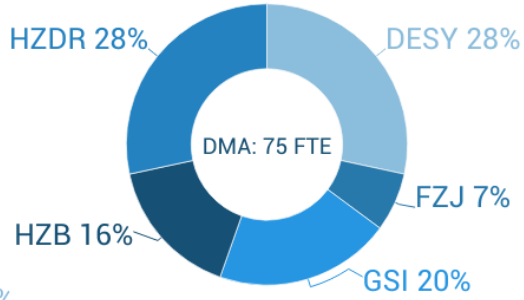


Matter and Technologies

Topics: ARD, DTS, DMA

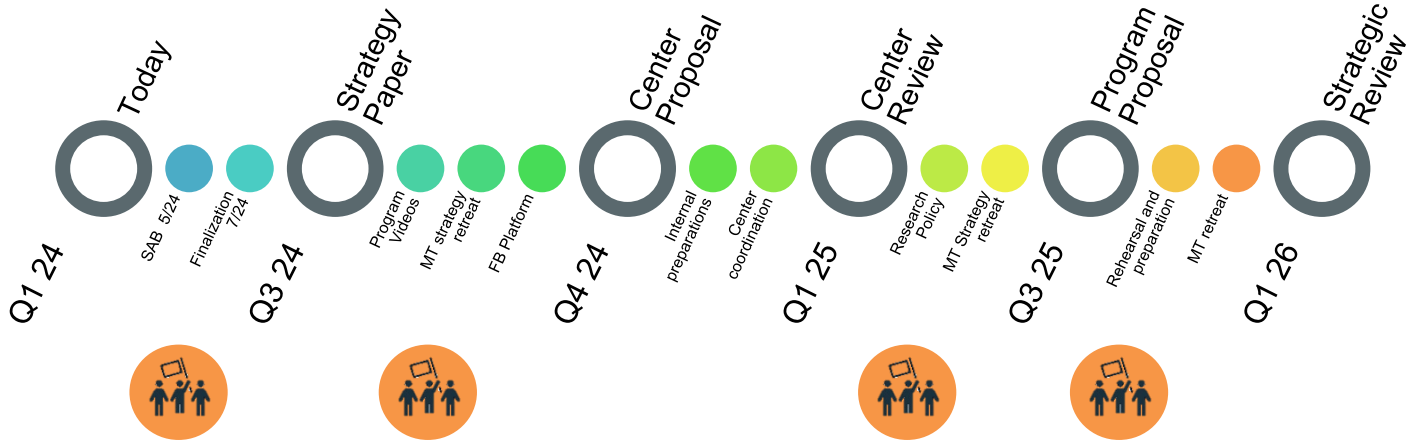






PoF V: 2028-2035

Schedule PoF V Review



MT retreat

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First half of 2025

Center review schedule

Zentrum	Gutachtervorsitz	Termin/reservierter Zeitraum	Dauer
FZJ	Fragneto	27.01.-31.01.2025	Ca. 3 Tage
DESY	Zaifman	10.02.-14.02.2025	Ca. 4,5 Tage
KIT	Kim	24.02.-26.02.2025	Ca. 3,5 Tage
Hereon (mit FB Information)	Kremer	01.04.-03.04.2025	Ca. 3 Tage
GSI	Rossi	07.04.-11.04.2025	Ca. 4 Tage
HZB (mit FB Information)	Ruegg	12.05.-16.05.2025	Ca. 3 Tage
HZDR	Sette	16.06.-18.06.2025	Ca. 3 Tage

Changes PoF IV ➔ PoF V

- Global
- Matter
- MT

Global Challenges/ Issues

Developments

Some fundamental issues:

- Overall consolidation needed
  - Resources will not grow as fast as costs
  - Increasing gap between ambition and reality
  - Organization of approval process for new major infrastructures is slow

PoF V

Changes in the Research Field Matter

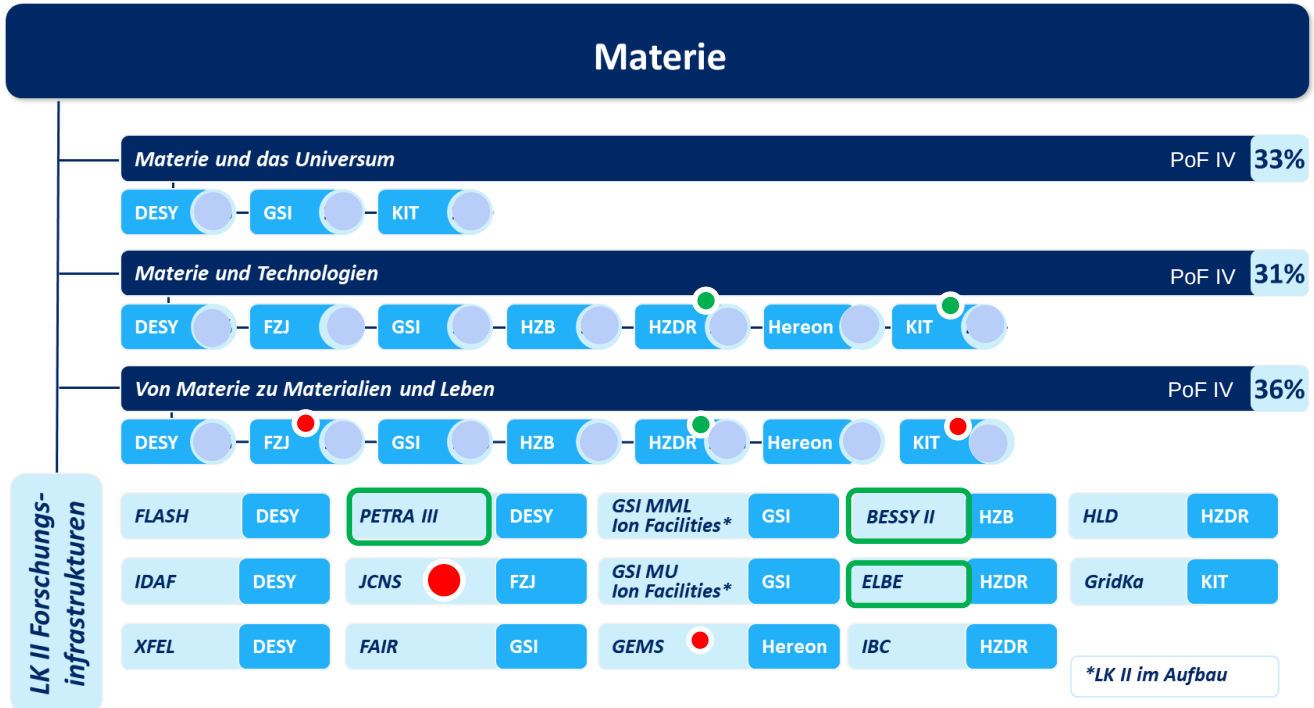
- Neutrons in FZJ will move from Matter to Information
  - Neutrons in Hereon will stay in Matter
- KIT will leave MML, part of the MML activities will move into MT, materials research will move into Information
- Some centers still have discussions ongoing on the scope of the Matter participation
- The former cross-cutting activities will be stopped/ dissolved
- Within Matter: 3 “Platforms” to be established:
  - X-topic structural biology (lead program MML)
  - Materials research (lead program MML)
  - Frontiers of optical technologies (lead program MT)

Light weight governance: separate budget, separate reporting, but all personnel and budget will eventually be accounted for by topics.

Research Area Matter

Matter in PoF V

Fundamental structure is well proven and will stay



PoF V

LK I
Significant developments in MML and MT

LK II
- Photon Science Roadmap
- Neutrons ➔ RFI

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Forschungsbereich Materie

Common Research Topics

Matter Competence platforms (category I)

coordinated by the research field

Materials Research (MATF)

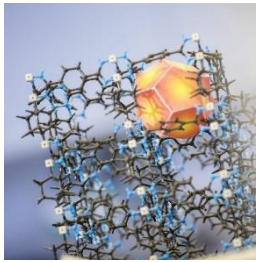
- Responsible Program: MML Matter
- PoF V Projects in the field of "Safe and Sustainable Materials"
- Envisaged cooperation with Information, Energy, LRV

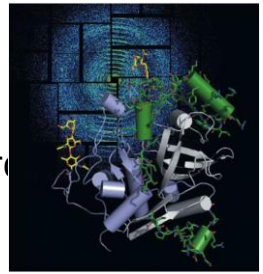
Structural Biology and Biological Processes (SBBP)

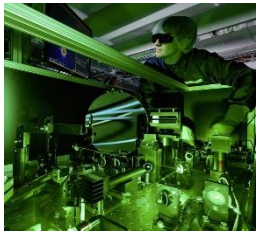
- Responsible Program: MML-Life ("Merger of Structural Biology and Radiation Researc
- PoF V Projects in the fields of "CSSB" and "Radiation Research"
- envisaged cooperation with health, LRV

Frontiers in Optical Technologies (FOPT)

- Responsible Program: MT
- new: Bundling of competencies in laser and optics R&D
- Intended collaborations (still to be clarified, also with Leibniz-G.)







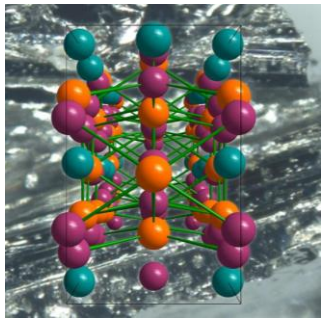
Forschungsbereich Materie
Übergreifende Forschungsthemen

Matter Competence platforms (category II)

contact point for Helmholtz-wide Platforms

Quantentechnologien

- zuständiges Programm: MML-Materials, MT
- Materie-Kompetenzteams im Aufbau

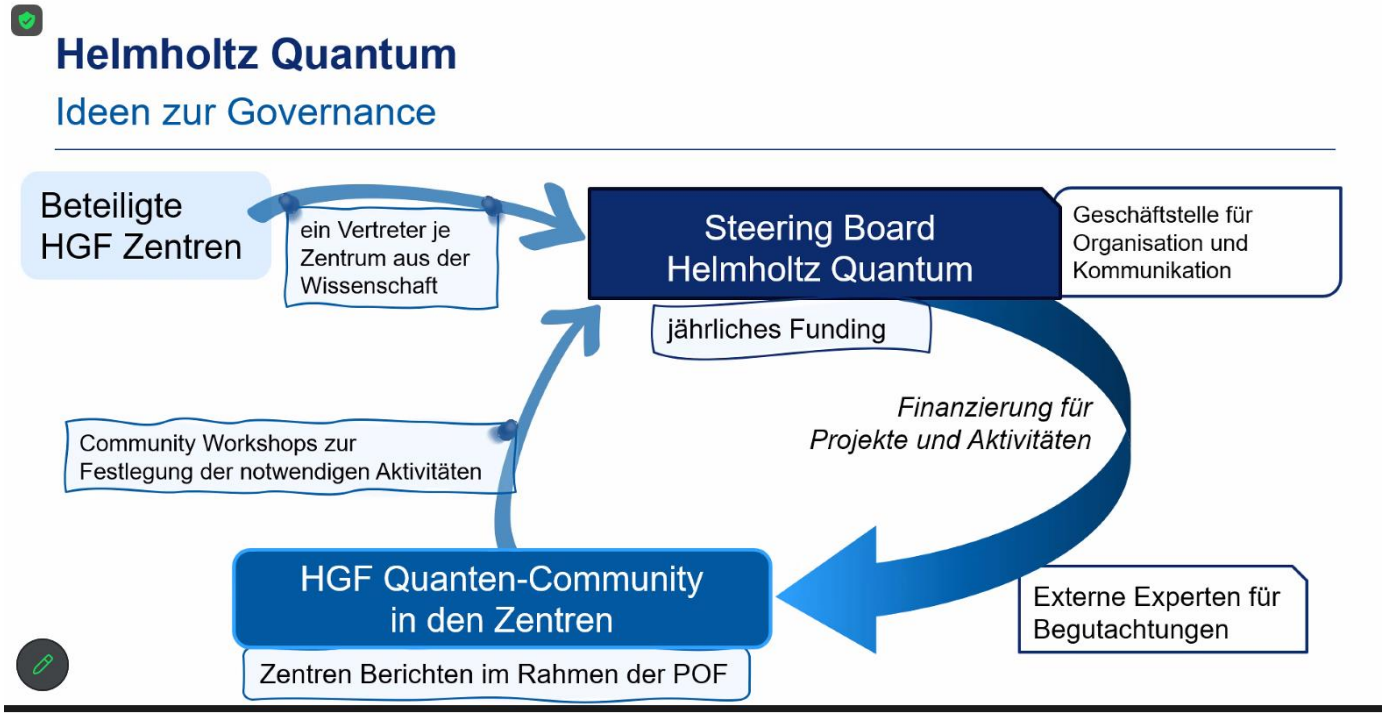


Klima

- zuständiges Programm: MML-Materials, MML-Life
- Materie-Kompetenzteams im Aufbau

Governance model

Helmholtz Quantum



Tommaso Calarco
FZJ

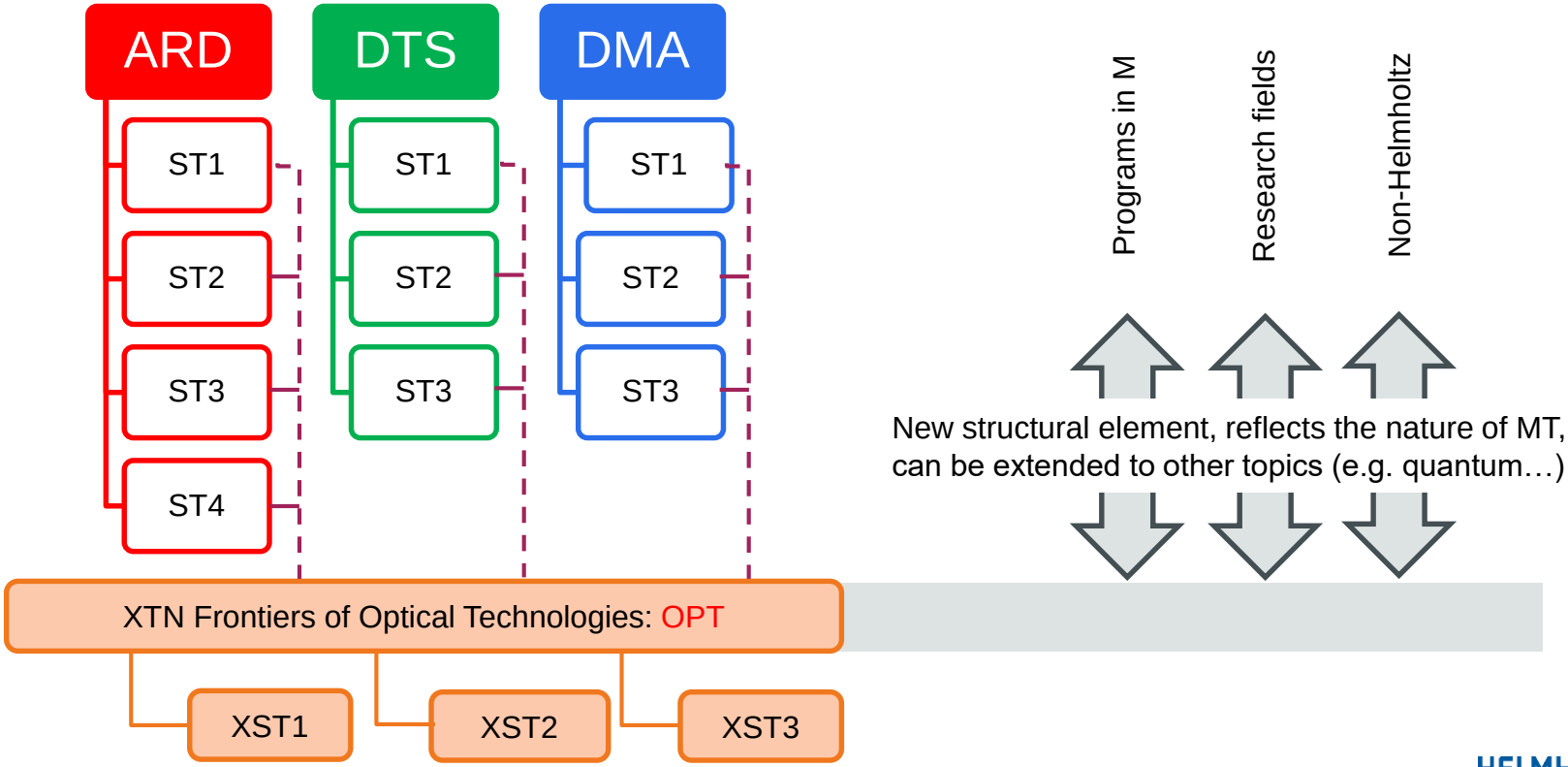
Matter and Technologies and PoF V

Changes in MT

- CASUS integration into MT (approx. 30 FTE to DMA)
- Health@HZDR will move into MT (? FTE/ X EUR)
- KIT will join DMA (6? FTE)
- New X-topic “Frontiers of optical technologies, OPT”

Expanding MT

MT structural evolution towards PoF V



Governance

Frontiers of Optical Technologies

Two spokespersons

- Coordinate the central activities
- are permanent guests in the MT management
- ensure representation of topics outside of MT and Matter

OPT

Frontiers of Optical Technologies

Resources

- Resource from base funding stay in respective topics
- Additional resources will be explicitly assigned to OPT (analogue to innovation pool projects)

Personpower review ongoing
Significant number of people involved,
Small number of people exclusively on OPT

A new associate partner in DMA

CASUS Association

CASUS: institute at HZDR, financed mainly through a long-term separate funding (distinct from Helmholtz base funding)

- Scientific Computing and Data Analysis with a broad range of applications
- “Matter” close component:
  - associate partnership, no integration (due to different funding base)
  - integrate scientific activities into DMA as a contribution (dedicated collaboration partner in PoF)
  - attribute specific resources to DMA (cannot fully attributed, due to broader portfolio beyond DMA scope)
  - strategically fully alignment of the Matter part with the DMA strategy (common governance structure and rules to ensure commitment and to keep alignment)

Will significantly strengthen DMA at the level of 20% additional resources

Center Matrix

Matter and Technologies

Center	ARD	DTS	DMA	OPT	IDAF
DESY	X	X	X	X	x
GSI	X	X	X	X	
HZB	X		X	X	
HZDR	X		X	X	
Hereon			X		
KIT	X	X	X	X	

Strategy Paper

Strategy Paper Matter

Template

1 Research field Matter and its current research portfolio
2 National and international context
3 Challenges for the next ten years
4 Mission and research objectives
5 Future thematic and programmatic positioning
  5.1 Scientific positioning
  5.2 Structure of the research field
  5.3 Role of infrastructures in the research field
  5.4 Internal and external cooperation
  5.5 Cross-cutting topics
  5.6 Commitment to strengthening and advancing our workforce and infrastructures
6 Annex

Focus today: Input from topics on Scientific positioning (1 page total for MT)

Strategy Paper Matter

Template

1 Research field Matter and its current research portfolio
2 National and international context
3 Challenges for the next ten years
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- 5.6 Commitment to strengthening and advancing our workforce and infrastructures

6 Annex

We also need MT input on Challenges, Mission and Research Objectives

(Strategy) Paper

Plan for today

- Draft the input **from the topics** for the strategy paper
- Consolidate the more basic and fundamental MT statements in the strategy paper
- Continue to discuss the X-topic frontiers of optical technologies

We intend to have an in-person strategy meeting in a few weeks time, to in depth discuss the MT strategy and organisation.

Timetable

Thu 25/01

Print | PDF | Full screen | Detailed view | Filter

13:00

Introduction/ Goal of the meeting/ timeplan PoFV — *Anke-Susanne Mueller et al.*
Zoom 13:00 - 13:45

14:00

ARD Parallel — *Andreas Jankowiak*
Zoom 13:45 - 14:45

DTS parallel — *Marc Weber et al.*
Zoom 13:45 - 14:45

DMA parallel — *Michael Bussmann*
Zoom 13:45 - 14:45

Coffee/Tea break
Zoom 14:45 - 15:05

15:00

Feedback from parallel sessions
Zoom 15:05 - 15:35

STatus of OPT — *Andreas Maier*
Zoom 15:35 - 15:50

Conclusion and Planning for next meeting(s)

16:00

Zoom 15:50 - 16:30

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Strategy Paper

Going through chapters

Strategy Paper: Chapter 1

Research field Matter and its current research portfolio

- 1 page
- Introduction to Research Field Matter & current research portfolio (this will probably also address the current strategic objectives to some extent)

	LK II User facilities	Research Infrastructures and Cooperations	
		International	Local
DESY	FLASH PETRA III TIER-2	CERN, ATLAS, CMS Belle II CTA (under construction) IceCube XFEL	CFEL CSSB NanoLab DESY Testbeams DAF HIB@XFEL PITZ
FZJ	MLZ/FRM-II	ESS (under construction) ILL, SNS FAIR	JCNS COSY
GSI	UNILAC SIS18 ESR	FAIR (under construction) CERN, ALICE	HI Jena HI Mainz
HZB	BESSY II BER II		bERLinPro HoBiCaT GunLab
HZDR	ELBE HLD IBC	XFEL EMFL ESRF	HIB@XFEL WHELMI
HZG	GEMS-p GEMS-n	ESS (under construction)	EMSC
KIT	GridKa	KATRIN Auger IceCube	ATP FLUTE TLK SR Beamlines

Strategy Paper: Chapter 2

National and international context

- 1/2 page

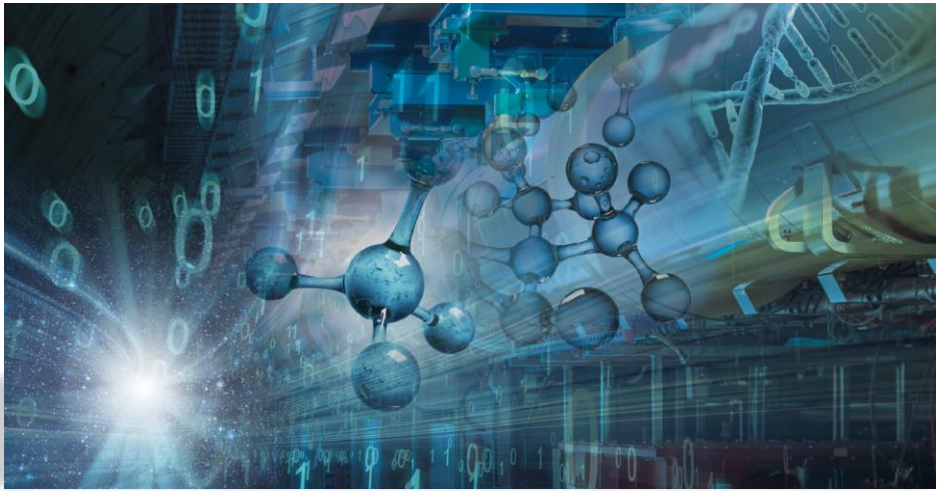
Forschungsbereich Materie: Member assembly slides

Ausgangspunkt

PRELIMINARY

Einordnung in den (inter-)nationalen Kontext

- Das Forschungsportfolio des Forschungsbereichs und die enge interdisziplinäre Zusammenarbeit mehrerer Zentren sind international wegweisend.
- Die Programmstruktur ist weltweit einzigartig, da sie die enge interdisziplinäre Zusammenarbeit verschiedenster Forschungsdisziplinen ermöglicht und Synergien schafft.
- In enger Abstimmung mit den nationalen und internationalen Forschungsgruppen betreibt der Forschungsbereich modernste Forschungsinfra-strukturen, die weltweit Wirkung zeigen.
- Der Forschungsbereich ist strategischer Partner in zahlreichen internationalen Kooperationen der Teilchen- und Astroteilchenphysik.



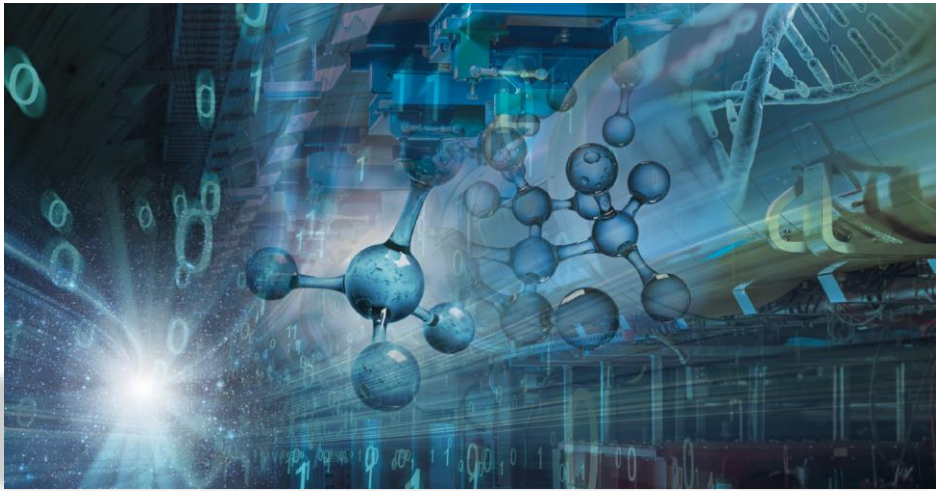
Forschungsbereich Materie: Member assembly slides

Starting point

PRELIMINARY

- Placement in the (inter)national context

- The research portfolio of the research area and the close interdisciplinary cooperation of several centers are internationally groundbreaking.
- The program structure is unique in the world, as it enables close interdisciplinary cooperation between a wide range of research disciplines and creates synergies.
- In close coordination with national and international research groups, the research area operates state-of-the-art research infrastructures that have a large impact worldwide.
- The research area is a strategic partner in numerous international collaborations in particle and astroparticle physics.



Strategy Paper: Chapter 3

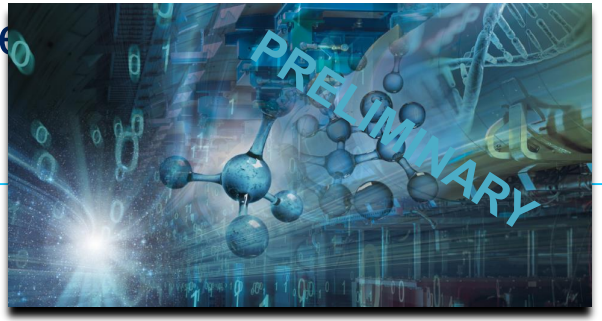
Challenges of the next decade

MATTER AND TECHNOLOGIES

- 1/3 page introduction of the Research Field followed by approx**. 9 major scientific challenges & technological questions**.
- The three programs should be in close exchange to fine-tune the level of detail of the questions/challenges and ensure that a diverse picture of the Research Field is be shown here. In addition, the overarching Matter-perspective should always be considered (the questions/challenges could at best relate to the “grand challenges” of the Research Field Matter in a way).
- Aus dem Protokoll der MB-Sitzung am 13.12.2023: “Gesellschaftliche Herausforderungen darstellen und nicht nur auf (mögliche neue) Großgeräte verweisen”

Forschungsbereich Materie: Member assembly slide

Vision PoF V



Herausforderungen der nächsten 10 Jahre

Programm MML

- Daten-basierte Entwicklung von maßgeschneiderten Materialen für Quantentechnologie und für erneuerbare Energien
- KI-gestütztes Design von Makromolekülen für die Medikamentenentwicklung
- Vertieftes Verständnis von den Strukturen und Prozessen in Hochenergiedichte-Materie und Plasmen (in Koop mit MT-ARD)

Programm MU

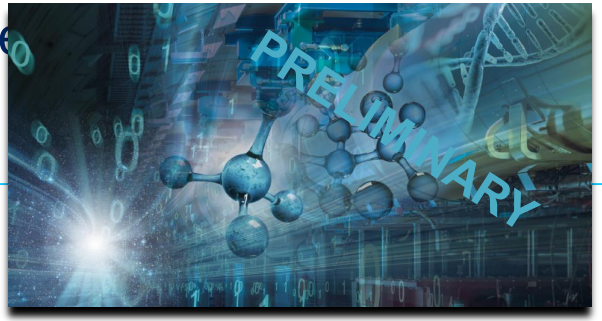
- Wesentliche Beiträge zur Klärung der Natur von Dunkler Materie, des Ursprungs der Materie-Antimaterie Asymmetrie und der Verbindung von Teilchenphysik mit den Prozessen im Universum
- Vertiefung der Einbindung in die Gesellschaft durch Vermittlung der Attraktivität der Grundlagen-Forschung
- Gewinnung der besten Talente

Programm MT

- Die Voraussetzungen schaffen, in der Zukunft erstklassige resiliente Infrastrukturen für Forschung in Materie und darüber hinaus nachhaltig entwickeln und betreiben zu können.
- Den Wissenschaftsstandort Deutschland durch den Ausbau technologischer Souveränität und durch eine breite Teilhabe an Spitzentechnologie stärken.

Forschungsbereich Materie: Member assembly slide

Vision PoF V



Challenges of the next 10 years

Program MML

Data-based development of tailor-made materials for quantum technology and renewable energies

AI-Powered Design of Macromolecules for Drug Development

In-depth understanding of the structures and processes in high-energy density matter and plasmas (in co-op with MT-ARD)

Program MU

Significant contributions to the clarification of the nature of dark matter

Deepening the integration into society by communicating the attractiveness of basic research

Attracting the best talent

Program MT

Creating the conditions to be able to sustainably develop and operate first-class resilient infrastructures for research in matter and beyond in the future.

To strengthen Germany as a centre of science through the expansion of technological sovereignty and broad participation in cutting-edge technology.

Forschungsbereich Materie

Vision PoF V

MATTER AND TECHNOLOGIES

1-2 Folien

MT Challenges of the next 10 years

- Creating the conditions to be able to sustainably develop and operate first-class, resilient and efficient infrastructures for research in matter and beyond in the future.
- To strengthen Germany as a centre of science through the expansion of technological sovereignty and broad participation in cutting-edge technology.

MT Mission and Objectives

- Our mission is to research technologies, and to do research enabled by technologies.
- We want to use emergent technologies in an integrative approach in accelerator, detector and data sciences to create new opportunities for sustainable cutting-edge research.
- We want to strengthen the visibility of technological research both internally and externally, and expand links into other areas such as information or health.

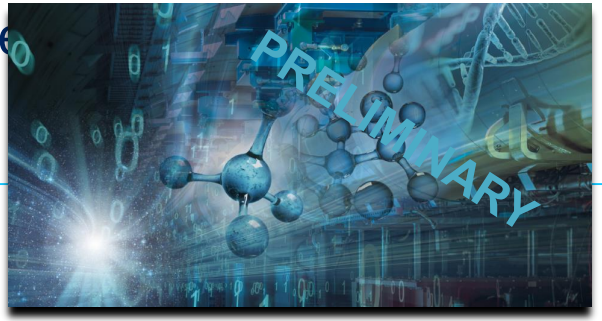
Strategy Paper: Chapter 4

Mission and Research Objectives

MATTER AND TECHNOLOGIES

- Research Field and programs each 1/4 page
- Focus on overarching, long-term strategic mission/objectives (to better separate from chapter 5)

Forschungsbereich Materie: Member assembly slide
Mission/ Forschungsziele



Mission und Forschungsziele

Programm MML

- Die gezielte Nutzung der Forschungsinfrastrukturen des FBs zur Präzisionsmessung von elektronischen, magnetischen und molekularen Prozessen auf allen relevanten Längen- und Zeitskalen als Basis für die beschleunigte daten-basierte Entwicklung von neuen Materialien und Wirkstoffen.

Programm MU

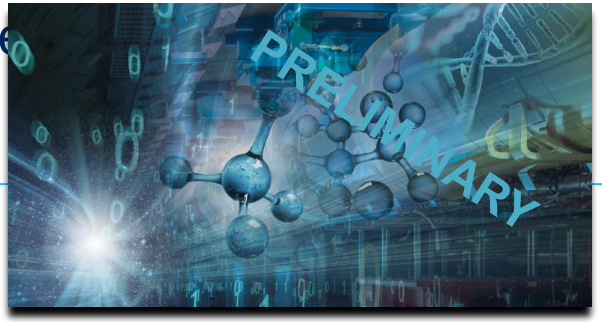
- Aufbau, Betrieb und effiziente Nutzung von Forschungs- und Computing-Infrastrukturen als auch die Entwicklung der theoretischen Grundlagen und Analysemethoden für grundlegende Erkenntnisse in einem internationalen Umfeld.

Programm MT

- Schaffung neuer Potentiale für Spitzenforschung mittels neuer Technologien in einem integrativen Ansatz in Beschleuniger-, Detektor- und Datenwissenschaften.
- Ausbau der Sichtbarkeit technologischer Forschung nach innen und nach außen und der Verbindungen in andere Bereich wie Information oder Gesundheit.

Forschungsbereich Materie: Member assembly slide

Mission/ Research Goals



Mission and Research Goals

Program MML

The targeted use of the research infrastructures of the FB for the precision measurement of electronic, magnetic and molecular processes on all relevant length and time scales as a basis for the accelerated data-based development of new materials and drugs.

Program MU

Establishment, operation and efficient use of research and computing infrastructures as well as the development of the theoretical foundations and analysis methods for fundamental insights in an international environment.

Program MT

Creation of new potential for cutting-edge research using new technologies in an integrative approach in accelerator, detector and data sciences.

Increasing the visibility of technological research both internally and externally, and of links to other areas such as information or health.

Forschungsbereich Materie

Vision PoF V

1-2 Folien

MATTER AND TECHNOLOGIES

MT Challenges of the next 10 years

- Creating the conditions to be able to sustainably develop and operate first-class, resilient and efficient infrastructures for research in matter and beyond in the future.
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Strategy Paper: Chapter 5

Future thematic and programmatic positioning

MATTER AND TECHNOLOGIES

5 Future thematic and programmatic positioning

- 5.1 Scientific positioning
- 5.2 Structure of the research field
- 5.3 Role of infrastructures in the research field
- 5.4 Internal and external cooperation
- 5.5 Cross-cutting topics
- 5.6 Commitment to strengthening and advancing our workforce and infrastructures

Forschungsbereich Materie

Zukünftige Aufstellung des Forschungsber

MATTER AND TECHNOLOGIES

1-2 Folien

Scientific-Programmatic Orientation

In MT, all matter centers work together, and jointly develop the technological basis for our future research.

Structure

In order to take into account the ever-growing importance of research with and on lasers, a platform on "optical technologies" in MT will be established as a new content element in addition to the existing topics.

Infrastrukturen

- Text

u.a. Photon Science Roadmap

Kooperation

- Text

HD: ggf. Input Programme & Zentren notwendig

In FBM: starke Vernetzung der Zentren

National: Unis EXIni

Strategy Paper: Chapter 5.1

Scientific Positioning

MATTER AND TECHNOLOGIES

- Each program 1 page
- Input: Programs
- **Goal**: formulate today input for this part
  - List of bullets/ topics/ key issues
  - No polished text needed
  - First idea about major goals and matrix of participation

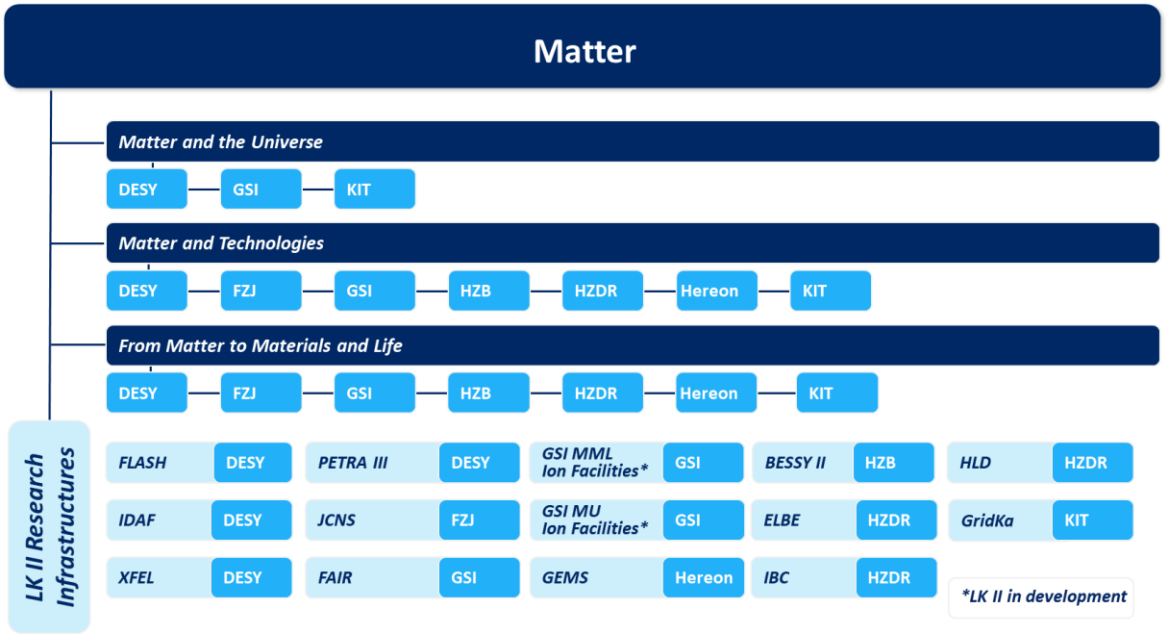
Input from Topics

- Core part of discussion today

Strategy Paper: Chapter 5.2

Structure of the Research Field

- ½ page



Strategy Paper: Chapter 5.3

Role of infrastructures in the research field

- ½ page
- Please do not name and list all infrastructures. Only describe the general importance of our different groups of infrastructures (e.g., computing centers, photon sources, neutron sources, etc.), LK I, LK II as well as the large international infrastructures which are essential especially for MU (e.g. CTA, Auger, KATRIN…). Please also focus on the many (national and international) users from universities and other research centers who use the infrastructures and services provided.

Strategy Paper: Chapter 5.4

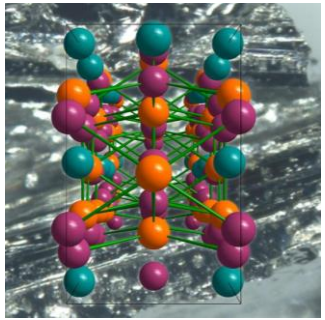
Internal and External Cooperations

- ½ pages
- The three programs should work closely together here to avoid writing the same and to present a complete and clear picture. Some examples could be very helpful.
- Aus dem Protokoll der MB-Sitzung am 13.12.2023: “Neben der externen Kooperationsstrategie auch darstellen, warum die drei Programme MU, MT, und MML im FB Materie gemeinsam verortet sind”

Strategy Paper: Chapter 5.5

Cross-cutting topics

- ½ page
- Aus dem Protokoll der MB-Sitzung am 13.12.2023: “Beschreibung der beiden Helmholtz-weiten Querschnittsthemen Quantum und Klima mit Fokus auf die Schnittstellen zu anderen”



Strategy Paper: Chapter 5.6

Commitment to strengthening and advancing our workforce and infrastructures

- 1½ page
- Strategies on center-related (research) policy and/or structural topics such as **innovation and transfer, talent management, sustainability, parity (equal opportunities), diversity, digitalization**, etc.
- A list of all centers and their activities should be avoided. Rather general (and Research Field-wide) aspects could be described first, which are then substantiated with one or two best-practice examples.
- The centers should be in close exchange to fine-tune the examples and ensure that a diverse picture of the activities of the centers of the Research Field is be shown here. In addition, the overarching Matter-perspective should always be considered (and could at best relate to the “grand challenges” of the Research Field Matter in a way).