



Coordinated Outreach and Promoting Young Talents in Netzwerk Teilchenwelt

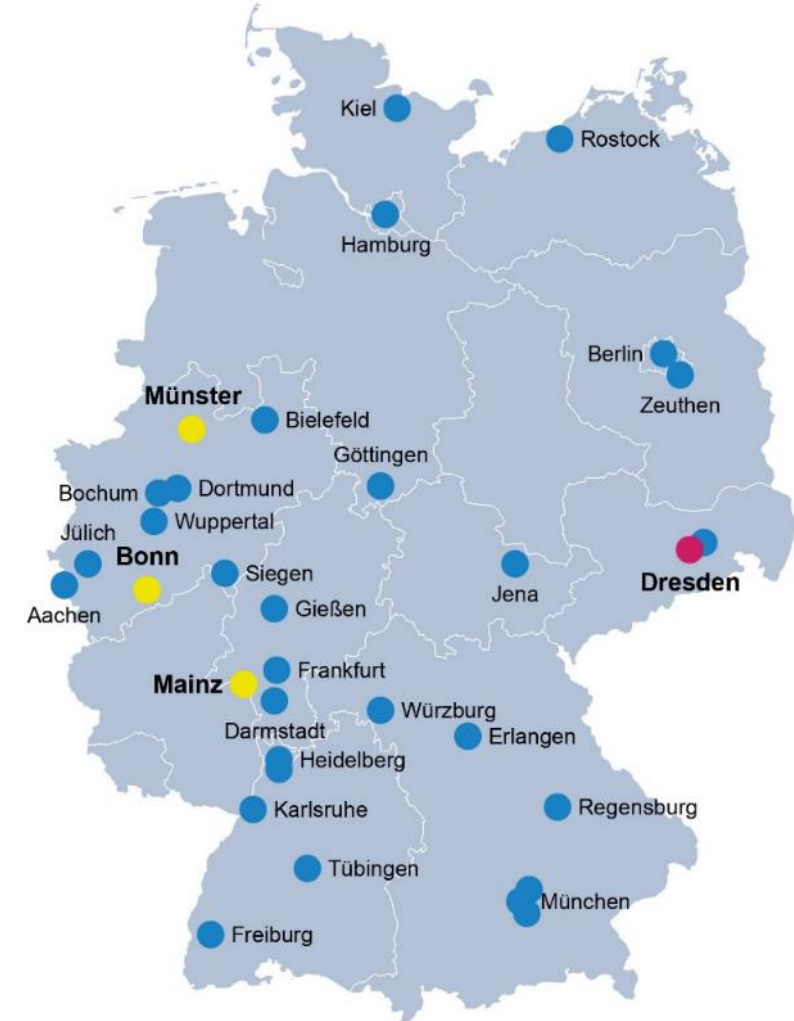
FSP LHCb Annual Meeting
Freiburg, 10.-11.9.2025
Uta Bilow, TU Dresden



NETZWERK
TEILCHENWELT

Netzwerk Teilchenwelt

- ▶ 34 universities/research labs
 - all LHCb institutes are present
 - Teilchenwelt contact person at each institute
- ▶ Joint outreach for Particle Physics since 2010
 - Bundle existing activities
 - Share structures and programs
 - Synergy effects
- ➔ High visibility and impact of outreach
- ▶ Target groups: high school students, young university students, teachers, broad public
- ▶ Project team: TU Dresden + hubs at Bonn, Mainz, Münster
- ▶ Collaboration with LHC ErUM-FSP office, Belle II-FSP office, ...



BMFTR Framework program ErUM Exploration of the Universe and Matter

- ▶ 4 Fields of action
 - Large Scale Facilities
 - Networking
 - STEM young scientists
 - Transfer & participation

- ▶ Netzwerk Teilchenwelt explicitly supported via KleT³ project

- KleT³: Kleinste Teilchen: Teilhabe und Talente (2024-27)
- 2018-2021: KONTAKT, 2021-2024: KONTAKT2

→ **Outreach** is integral part of research within the framework program ErUM

- ▶ More outreach via, LHC FSP office, Belle II FSP office, other funding sources (EXC, SFBs, etc.), ...



Vernetzung

- Kompetenzen von Hochschulen und Forschungsinstituten bündeln
- Forschung international vernetzen

MINT Nachwuchs

- Nachwuchs für MINT Fächer faszinieren
- Wissenschaftlichen Nachwuchs qualifizieren
- Karriereperspektiven schaffen

Transfer und Partizipation

- Wissenschaftstransfer von Forschung in Wirtschaft und Gesellschaft anregen
- Dialog zwischen Forschung und Bürgerinnen und Bürgern intensivieren

Public outreach

- ▶ Reach out to the people with our research topics, methods, technologies, and science in general

Goals

- ▶ Foster a connection between our community and the world outside
- ▶ Satisfy existing curiosity
- ▶ Spark interest in science
- ▶ Promote appreciation for fundamental research
- ▶ Stimulate to study STEM, attract new talents
- ▶ Build trust, create transparency, educate on Nature of Science



Pop-up exhibition Urknall unterwegs



Pub festival Beerology

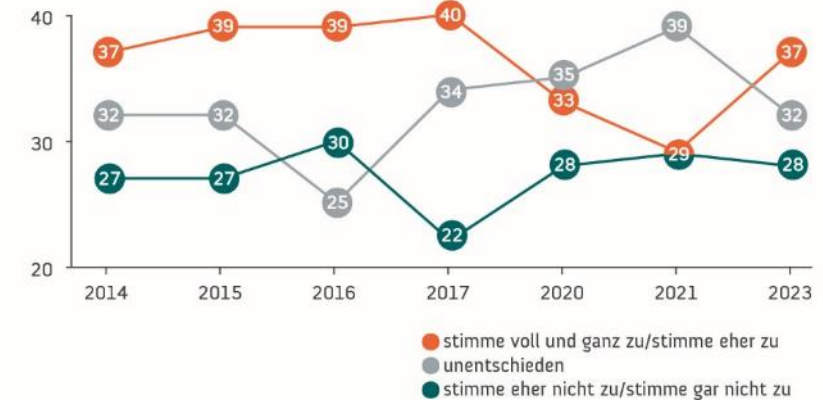
Public interest in science



- Communication of **own results** and **methods** highly requested
- Authenticity

Wissenschaftsbarometer 2022, Wissenschaft im Dialog/Kantar

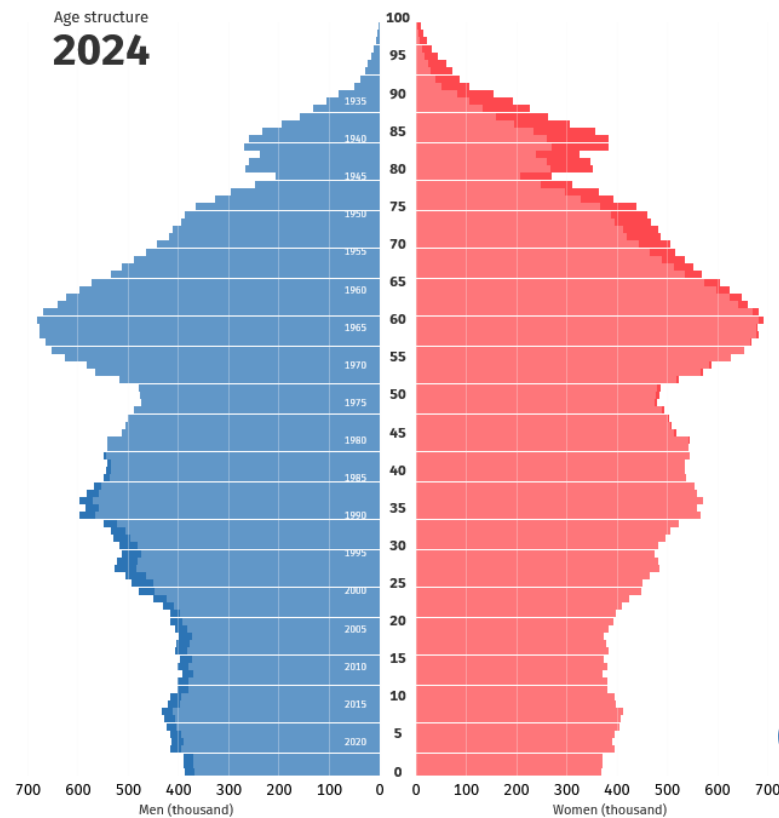
Zustimmung zu: "Wissenschaftler bemühen sich zu wenig, die Öffentlichkeit über ihre Arbeit zu informieren."



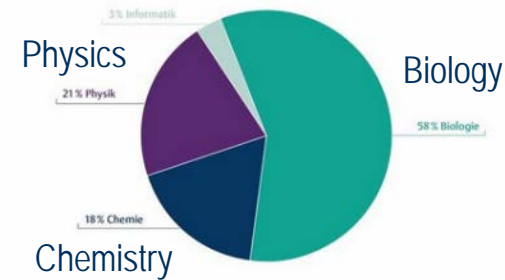
- Scientists make **too little effort** to inform the public about their work

Wissenschaftsbarometer 2023, Wissenschaft im Dialog/Kantar

German population and study choice

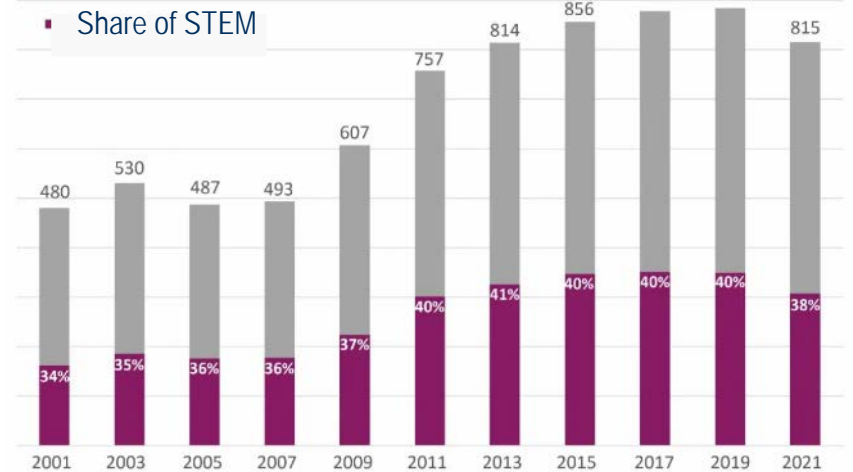


Statistisches Bundesamt



- Only 20% of high school students choose science on a higher level (advanced course or "Leistungskurs")
- Specialization decisive for choice of field of study and professional development
- Number of university students in STEM studies going down (share is stable)

First-year students (in thousands)



Core program: LHCb Masterclasses

- ▶ Project day in school or university or online
 - Special format: International Masterclasses
- ▶ Talks and Q&A with researchers
- ▶ Own measurements and analysis of original data
- ▶ Diverse set of Masterclasses
 - LHCb: D0 lifetime, Hadron Spectroscopy
 - ALICE, ATLAS, CMS, Belle II
 - Machine Learning, Theoretical Methods (Planetary Orbits)
 - Hadron Therapy
 - Nuclear Astrophysics
 - IceCube, Auger, Cosmic@Web
 - Neutrino experiments
 - ...



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✓ High school students do research supported by young scientists

Facilitators (Vermittler:innen)

- ▶ 150 PhD and Master students engaged
- ▶ guide Masterclasses, supervise students' research projects
- ▶ *receive remuneration + travel expenses**
- ▶ yearly science communication and outreach training
 - Next workshop: 2.-4.11.2025 in Bad Honnef (English)
 - Fully funded by Heraeus foundation, organized by Knotenpunkt Bonn
- ▶ Frequent (online) onboarding events for new PhD students and introduction to specific Masterclass
- ▶ Acquire soft skills, for personal and professional development. (Outreach is an integral component of research ... and increasingly important for your career – be it for scholarships, grant applications or appointments.)

@Students: Please join outreach efforts!
@Group leaders: Please support this important task!



Inspire the next generation of scientists



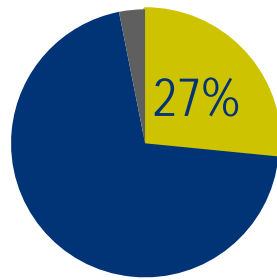
38% of PhD students
guiding Masterclasses
attended a Masterclass as
a high school student

Result from survey 2024

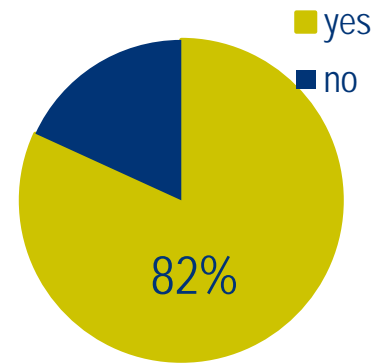
Survey among Doctoral Candidates (yHEP)

„During my own school years, I took part in activities offered by Netzwerk Teilchenwelt.“

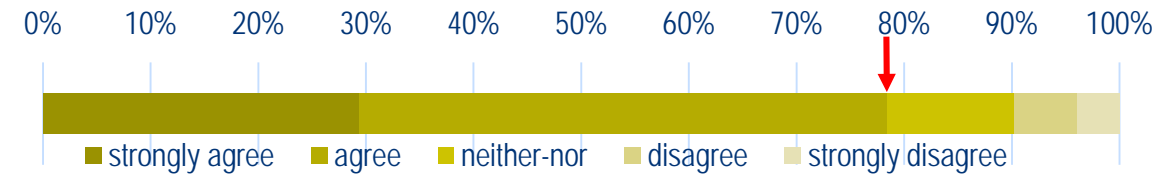
■ yes
■ no
■ I don't remember



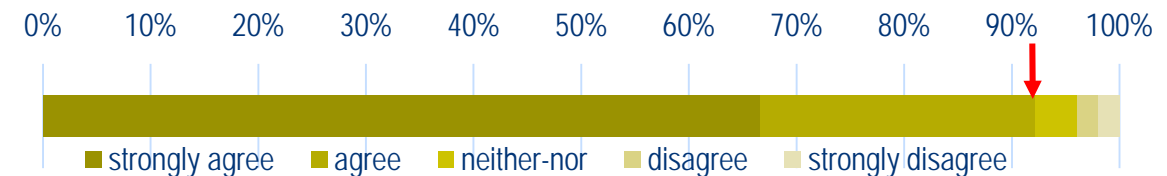
„I participate in outreach activities in my research field (and I took part in outreach activities during my own school years).“



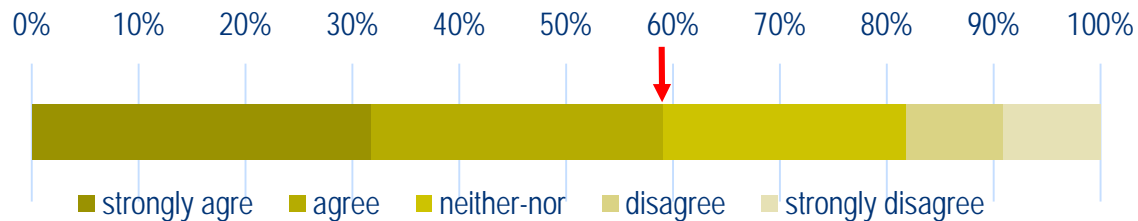
„My engagement in outreach is, in my opinion, useful for my professional career.“



„My engagement in outreach is, in my opinion, useful for personal development.“



„The activities contributed to my decision to study physics.“



ESPP update – document from German community (KET)

5.6 Outreach

Outreach and science communication are essential activities in particle physics, contributing in multiple ways to securing the field's future. Ongoing activities, such as "Netzwerk Teilchenwelt",⁹ have proven to be successful and require sustained and adequate financial support and commitment from the community. An integral part for the success of any future project will be uniting different efforts into a coordinated approach. Key components should be the already existing outreach networks, such as EPPCN (Communication), IPPOG (Outreach), and the Teacher and Student Forum (Education), and closer collaboration and communication of existing outreach organizations with the research community is desirable.

A major task is to inspire the general public and to raise interest in STEM disciplines. Early career physicists are especially valuable role models for inspiring young people to become scientists. Outreach efforts to all audiences should go beyond professional communicators, and commitment to outreach, education, communication, and transfer efforts should be acknowledged as part of a strong academic profile. Interdisciplinary collaboration to excite different communities should be supported.

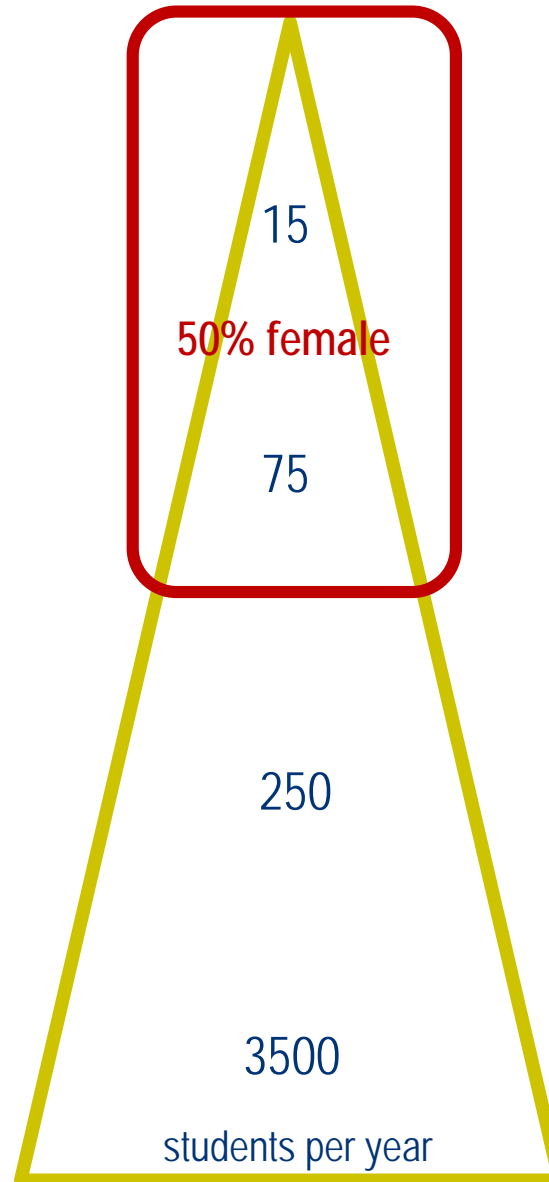
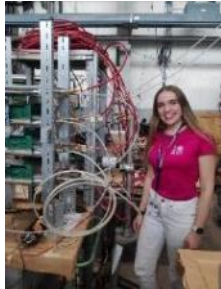
Masterclasses – first level of a multi-step program

*CERN project weeks**,
research projects at
institutes
List of 170 essays, incl.
52 awards

*CERN workshops**,
Particle physics
academy in Mainz
(report 2025)

Active engagement,
detector projects

Masterclasses

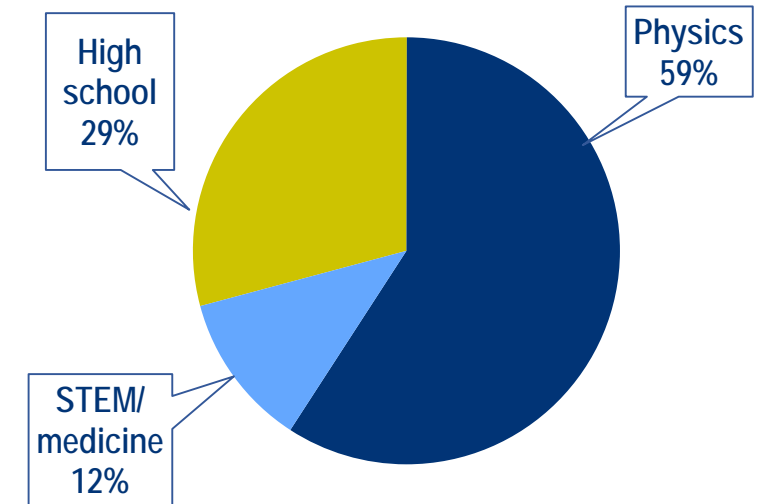
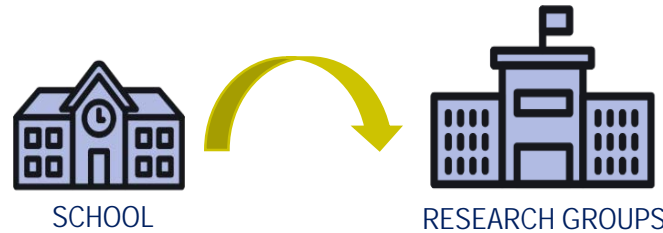


Female share in
physics exams 2023:

- 22% Bachelor
- 25% Master
- 22% PhD

- ✓ Sustainable staged program
- ✓ High proportion of women on higher levels

Fellow program



- ▶ ~140 people, >50% female
- ▶ Mainly alumni of CERN workshops
 - experienced talents, participated in several program levels, now studying physics or shortly before
- Foster connection between highly motivated students and research groups
- ▶ Central offers: yearly Fellow/Bachelor physics school, frequent online events Ask the expert (research highlights, career development)
- ▶ Local offers: internships, invitation to group events (scientific, outreach, social), excursions, colloquia, regulars' table etc.

- ✓ **Win for Fellows:** Close and early connection to research, extra training, networking
- ✓ **Win for groups:** Close connection to highly motivated, well trained students, support in science and outreach

Fellows in science and outreach



Fellow Julia Els in panel discussion at CERN70
[LinkedIn](#)



Fellows at CERN70 in Berlin helping as guides

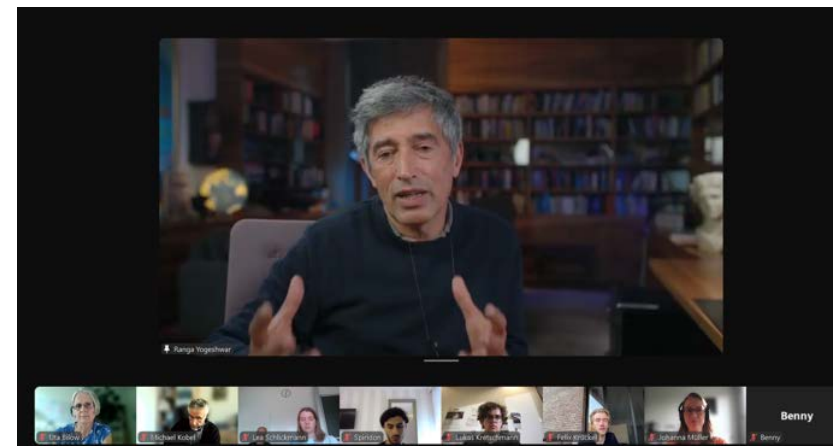


Uta Bilow, TU Dresden

School
Introduction to the
Terascale for
Fellows and
B.Sc.students



Fellow Lukas: From internship to authorship
[ATLAS blog](#)



Fellows invite prominent speakers for *Ask the expert*: Ranga Yogeshwar, Reinhard Genzel...

Urknall unterwegs



- ▶ Pop-up exhibition on particle physics
 - Tunnel: time travel through the history of the universe
 - Pavilion with games
- ▶ Target audience: general public, people with less affinity for science
- ▶ Goes to public places, pedestrian zone, festival, campus....
- ▶ 32 places visited since 2022 ([photo gallery](#))
- ▶ located at Uni Mainz, can be loan by institutes



You want to get (more) involved in outreach and promoting young talents?

- ▶ Become facilitator (Vermittler:in), guide Masterclasses, supervise high school students' research projects at institutes
- ▶ Attend communication and outreach training (2.5 days)
 - Next workshop: 2.-4.11.2025 in Bad Honnef (English)
- 👉 Meet local Netzwerk Teilchenwelt contact person at your university
- 👉 Get more information from project coordination! Scan →

Group leaders:

- ▶ Support your students to be active in outreach
- ▶ Involve the Fellows (young students) at your university



PROJEKTLEITUNG



PARTNER



SCHIRMHERRSCHAFT



FÖRDERER

