



Coordinated Outreach and Promoting Young Talents in Netzwerk Teilchenwelt

FSP ATLAS-D Annual Meeting

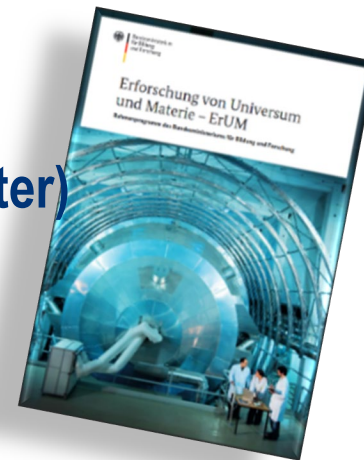
Wuppertal, 18.09.2024

Michael Kobel, TU Dresden



NETZWERK
TEILCHENWELT

BMBF Framework program ErUM (Exploration of the Universe and Matter)



► 4 Fields of action

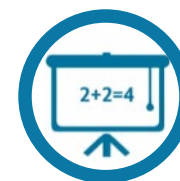
- Large Scale Facilities
- **Networking**
- **STEM young scientists**
- **Transfer & participation**

► Explicitly supported via KleT³ project

- **KleT³: K**leinste 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 ErUM-FSP office, and other large funding structures (SFBs, EXC etc.), ...



MINT Nachwuchs

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

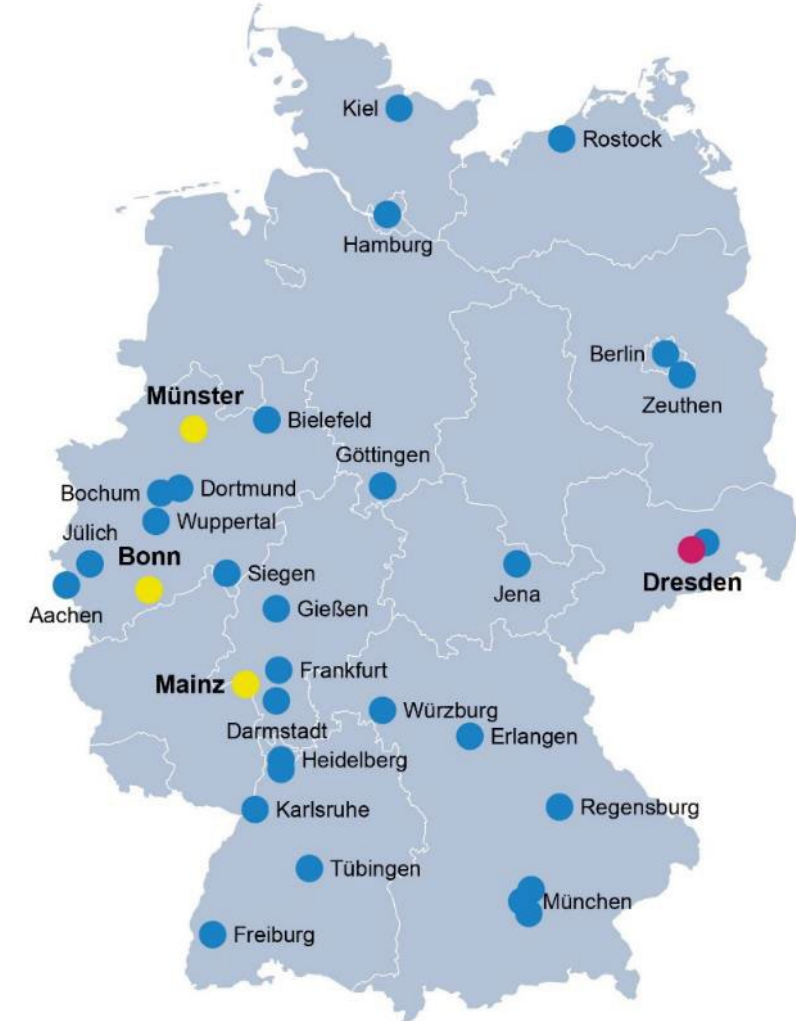


Transfer und Partizipation

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

Netzwerk Teilchenwelt

- ▶ 34 universities/research labs
 - covering both Particle Physics and Hadrons&Nuclei (since 2018)
 - Teilchenwelt contact person at each institute
 - Synergy: share structures and material, bundle activities
 - ▶ Project team: TU Dresden + hubs at Bonn, Mainz, Münster
 - ▶ Collaboration with LHC ErUM-FSP office, Belle II-FSP office, ...
 - ▶ Target groups:
 - high school students, young university students, teachers, broad public
 - ▶ **unique “selling” points**
 - **Nationwide** outreach, including countryside
 - **Authentic** research data, tools, methods and facilitators
 - **Continuity** on different levels (> 1 day)
 - **Guidance** of young talents all along their way (r,t)
 - **Win⁴** for all sides: students, facilitators, teachers, research groups
- High visibility and impact of outreach



Basic Level: Masterclasses

- ▶ Project day in school or university or online
 - additional special format 1x / year: International Masterclasses
- ▶ Talks and Q&A with researchers
- ▶ Own measurements and analysis of original data
- ▶ Diverse and very broad range
 - ATLAS: W-path (3D), Z-Path
 - LHCb , ALICE, CMS, Belle II
 - Machine Learning, Theoretical Methods
 - Hadron Therapy
 - CB-ELSA, Nuclear Astrophysics
 - IceCube, Auger, Cosmic@Web, LAT-Fermi



✓ High school students do research supported by young scientists as role models

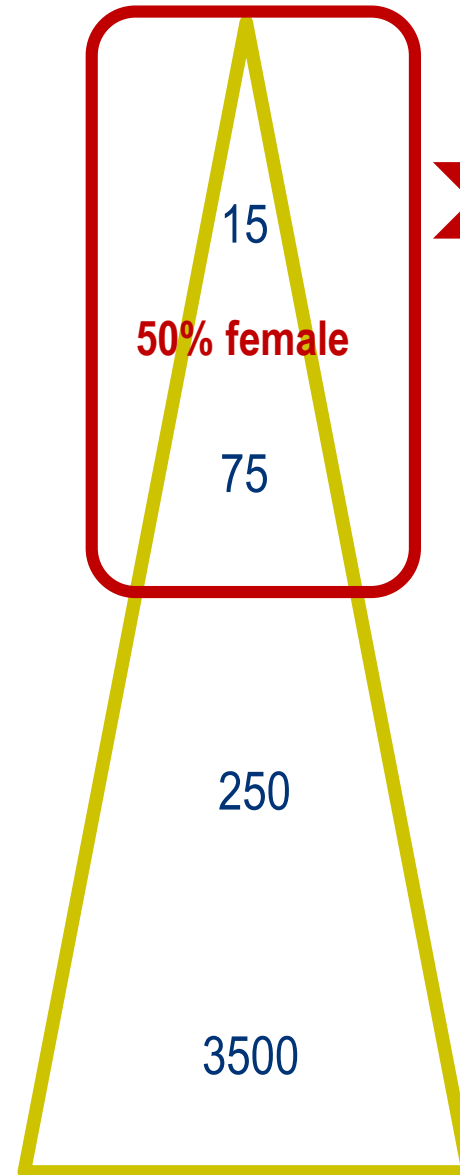
Masterclasses – first level of a multi-step program

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

*CERN workshops**,
Particle physics
academy in Mainz

Active engagement,
detector projects

Masterclasses



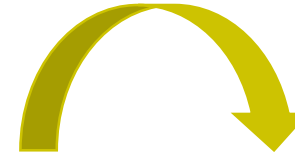
Number of students per year



150 Fellows, 50% female
experienced talents,
mainly studying physics or shortly before



SCHOOL



RESEARCH GROUPS

✓ **High proportion
of women on
higher levels**

Female share in
physics exams 2023:

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

* currently suspended due to funding cuts. Workaround: foundations. Next CERN workshop in Oct 2025

Fellows in science and outreach

- ▶ **Central offers:** yearly Fellow physics school, frequent online events Ask the expert (research highlights, career development), *yearly Fellow meeting**, *invitation to national physics conferences**
- ▶ **Local offers:** internships, invitation to group events (scientific, outreach, social), ..

* currently suspended due to funding cuts



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



Fellow Lukas: From
internship to authorship
ATLAS blog



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



Fellow Julia Els
in panel discussion
at CERN70
LinkedIn



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

Inspiration since 2010

- ▶ **Talent pipeline:** next generation for research
- ▶ **50% female** participants on upper levels (CERN workshop and beyond) and in Fellow program
- ▶ **strengthens study decision and self-concept**
- ▶ **Sustainable program:** 38% facilitators have participated in a Masterclass as high school student
(data from May 2024)

RECFA visit 2022: „impressive and well-structured outreach”

ESPP update 2025: German contribution, Chapter 5.6

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 ...

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.

Michael Kobel, TU Dresden



Maria M., PostDoc at Berkeley Lab.
ATLAS thesis award 2022
CERN workshop & project weeks in 2013

*„Netzwerk Teilchenwelt has **changed my study plans** in particular and given me the opportunity to get to know modern research."*



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](#))
- ▶ now located at Uni Mainz, ready for loan (paid) by institutes



Facilitators (Vermittler:innen)

- ▶ ~140 PhD and some Master students from all institutes engaged
- ▶ guide Masterclasses, supervise students' research projects
- ▶ *central reimbursement of expenses suspended due to budget cuts*
→ **Usage of Overhead recommended** (handout for group leaders)
- ▶ yearly science communication and outreach training
 - Next workshop: 2.-4.11.2025 in Bad Honnef (English)
 - Fully funded by Heraeus foundation (w/ limit on travel costs)
- ▶ Frequent (online) onboarding events for new facilitators 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.



ATLAS Masterclass in Bonn



Outreach workshop in Fulda

@Students: Please join outreach efforts!

@Group leaders: Please support this important task!

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



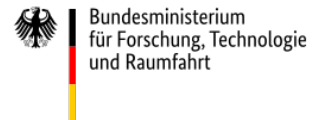
PARTNER



SCHIRMHERRSCHAFT



FÖRDERER



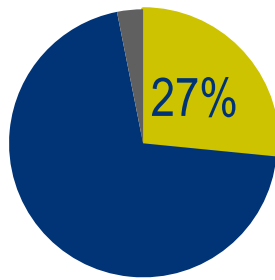


BACKUP

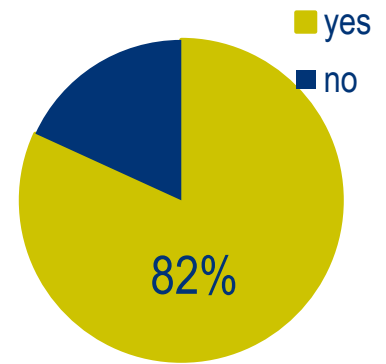
Survey among Doctoral Candidates (yHEP)

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

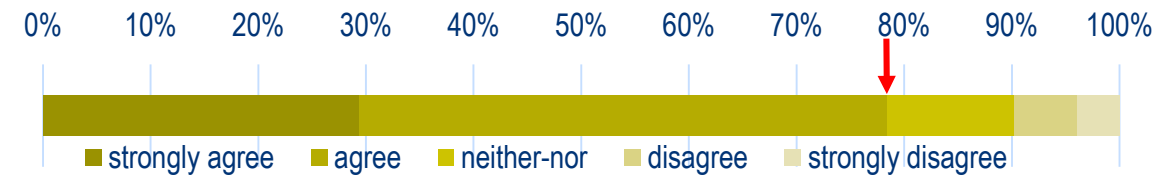
■ yes
■ no
■ I don't remember



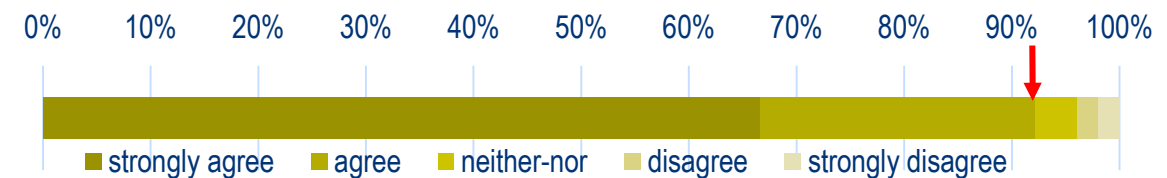
„I participate in outreach activities in my research field (and I took part in outreach activities during my own school years).“



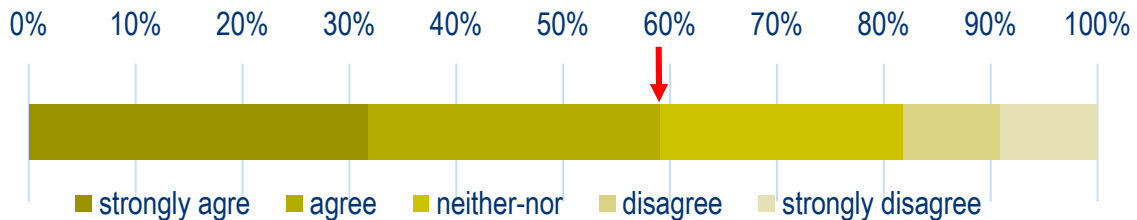
„My engagement in outreach is, in my opinion, useful for my **professional career**.“



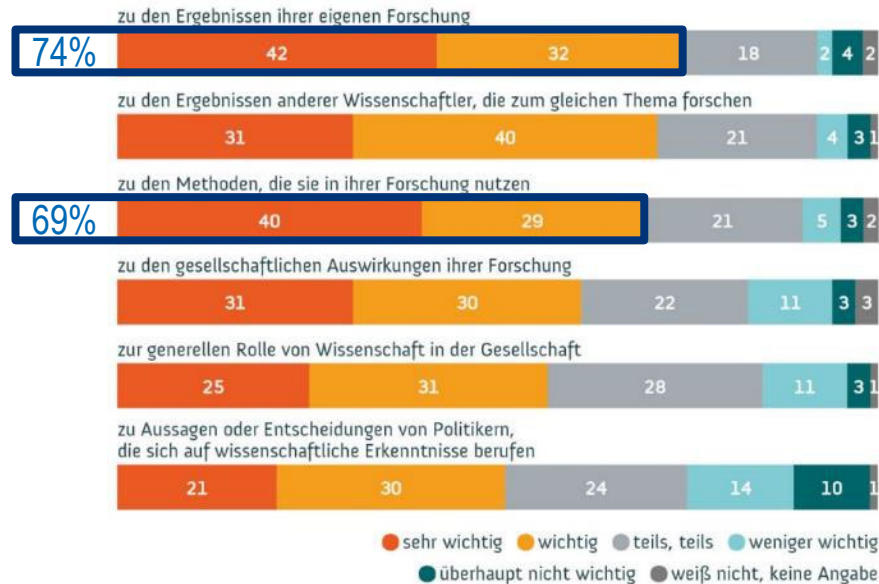
„My engagement in outreach is, in my opinion, useful for **personal development**.“



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



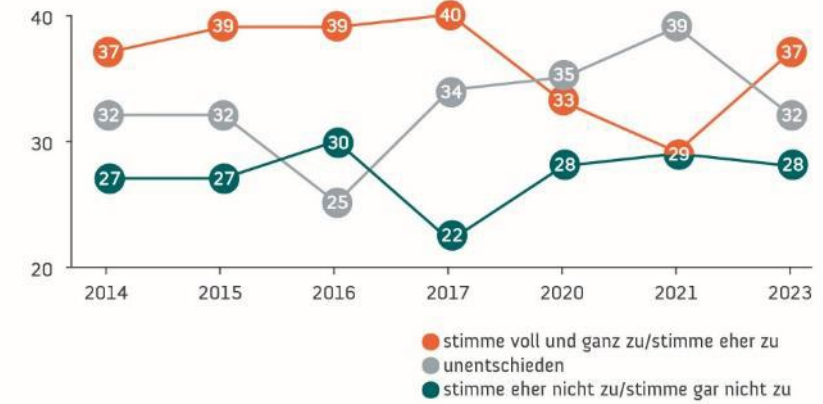
Public interest in science



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

Wissenschaftsbarometer 2022, Wissenschaft im Dialog/Kantar

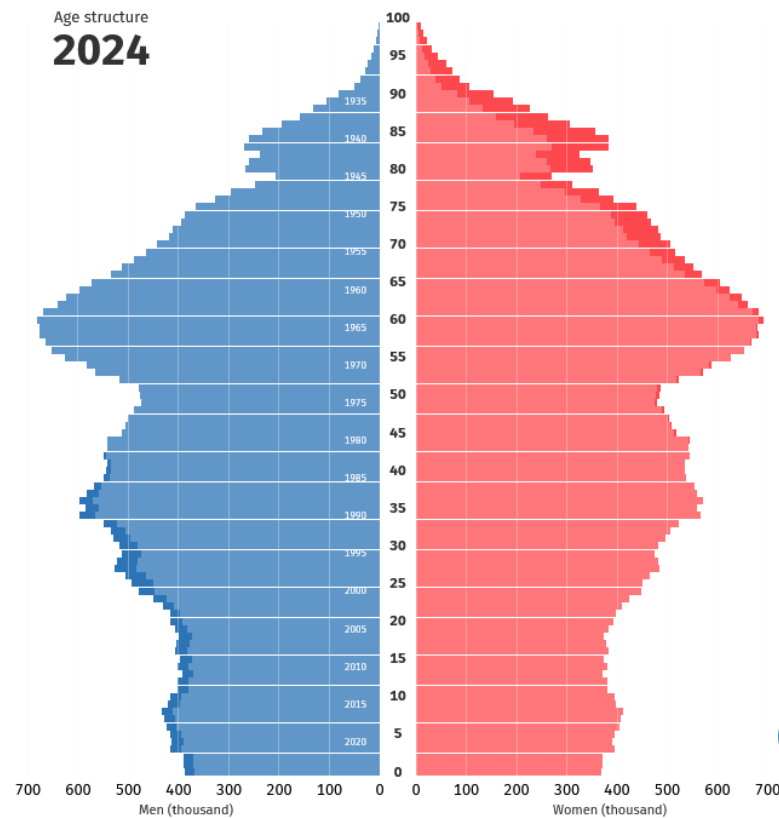
Zustimmung zu: "Wissenschaftler bemühen sich zu wenig, die Öffentlichkeit über ihre Arbeit zu informieren."



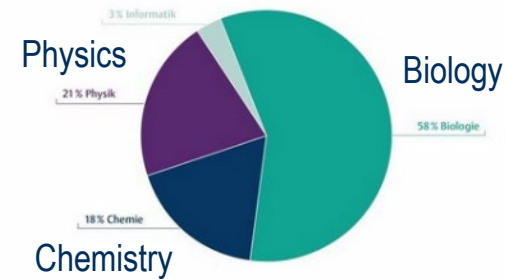
- Scientists make **too little effort** to inform the public about their work

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)

