

KONTAKT

Outreach and recruitment of young talent for
particle, hadron and nuclear physics

PANDA Collaboration Meeting 19/2

Darmstadt | 24.6.2019 | Uta Bilow, TU Dresden



Outreach within the BMBF framework program ErUM



- ErUM: Exploration of the Universe and Matter
- Timeframe: 2017 – 2027
- Current funding period 2019 - 2021
- 4 fields of action within ErUM

- Large-scale facilities
- Networking
- STEM Young Scientists
- Transfer & Participation



MINT-Nachwuchs

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



Transfer und Partizipation

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

■ Goals of Outreach

- Communicate the attractiveness and importance of research
- Ensure social acceptance and support
- Recruit young talents

→ **Outreach is an integral component of research**

KONTAKT

Kommunikation, **N**achwuchsgewinnung und **T**eilhabe der **A**llgemeinheit an Erkenntnissen auf dem Gebiet der **K**leinsten **T**eilchen

- Build on existing structures (**Netzwerk Teilchenwelt + Weltmaschine**)



RECFA evaluation 2014 for Germany

„The Committee considers that the German activities are exemplary and constitute a highly professional way of raising public interest in science and would like to congratulate the German community on its achievements in this regard.“

- Extend frameworks and programs
- Intensify cooperation with other professional players in the areas of communication, participation and recruitment of new talents
- Reach out to other target groups
- More topics/contents from other fields of physics of the smallest particles
- 1,25% of total funding for „Physics of the Smallest Particles“

**Hadrons and Nuclei,
e.g. PANDA**

Weltmaschine

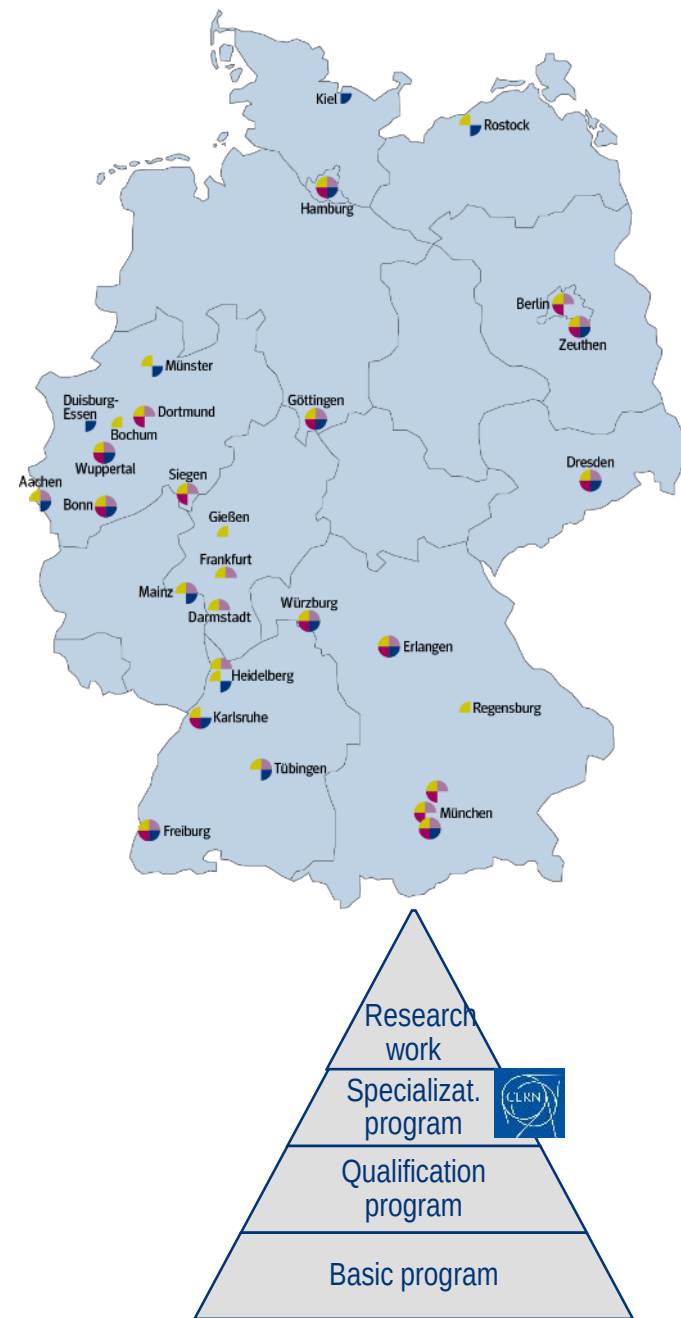
www.weltmaschine.de

- Central information point for the public and media since 2008
- Excellent contact to the press
 - Press material, media library
 - Facts and figures
- Central event organization
 - Journalist Days, Press Spokesperson Day
 - Tag der Weltmaschine
 - Media training for scientists
- Mobile exhibition
 - [Shown in 43 research labs](#)



Netzwerk Teilchenwelt

- ▶ 30 universities/research labs + CERN
- ▶ Aims at high school students (15-19 y.) and teachers
- ▶ Multi-stage program, per year working with original data and/or particle detectors
 - 3500 high school students
 - 250 in advanced levels
 - 60 at CERN workshops
 - 15 research projects at CERN or research labs
 - 150 teachers (training, CERN summer school, teaching material)
- ▶ Project team: TU Dresden / DESY at Zeuthen / CERN (started in 2010)



Offers for High School Students

www.teilchenwelt.de/mitmachen/jugendliche

Basic program

- ▶ Masterclasses: Measurements with real data
 - LHC Experiments ATLAS, CMS, LHCb, ALICE, ALICE
 - Pierre-Auger-Observatorium
 - IceCube
 - Cosmic@Web with 8 experiments
- ▶ Own measurements with particle detectors
 - Scintillation counter (CosMO)
 - Cherenkov counter (Kamiokannen)
 - Various research tasks: Detector understanding, investigation of physical phenomena
- ▶ Each research lab focuses on its experiments and activities



Advanced program: CERN and research work

- ▶ High school students are brought into contact with research at qualification levels
- ▶ 60 students in two annual workshops (4 days) <https://indico.cern.ch/event/762375/>
- ▶ 10 students in project weeks (2 weeks) <https://indico.cern.ch/event/775569/>
 - own research projects, e.g. Medipix detector, CLOUD, ATLAS trigger system, lifetime of the B-meson, search for supersymmetry and dark matter, NA62, CP violation, beam simulation...



Young Scientists as Key Players

- ▶ ~ 180 Facilitators (Vermittler/innen)
- ▶ PhD and Master students
- ▶ Guiding Masterclasses
- ▶ Supervision of student research projects
- ▶ Reimbursement of expenses + travel costs
- ▶ 2-day advanced training in science communication, didactics, and presentation techniques
- ▶ Practice in communication techniques as a "soft skill" for own career



Promoting Young Talents through the Fellow Program

- ▶ Alumni of NTW, mainly alumni of CERN workshops
 - Now often studying physics or shortly before that
 - Interested in particle and astroparticle physics
- ▶ Fellow program launched in 2017
- ▶ Currently about 150 people
- ▶ Aim: increase connection with local research groups



Fellow Meeting 2017 Hamburg



Fellow Meeting 2018 Dresden

Win-win-Situation

► Research labs

- Highly motivated students interested in particle physics as future members of the research groups
- Support for scientific activities (SHK, conferences)
- Support for outreach activities (Long Night of Science, exhibitions, Open Day, Masterclasses, etc.)

► Fellows

- Close connection to research groups
- Further technical training, e.g. Fellow Physics School in March 2019
- Networking beyond local university



TeVPA Conference 2018 Berlin

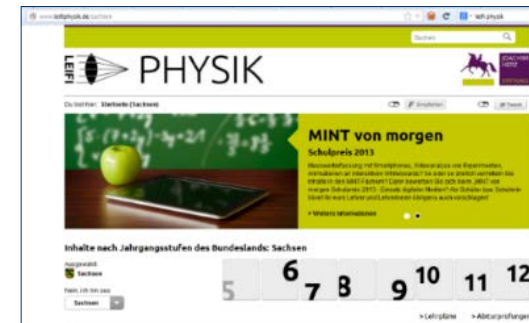


Dark Matter Day 2017 RWTH Aachen

Teachers as multipliers

► Development of material

- Teaching material for schools (4 volumes)
www.teilchenwelt.de/tp
- Portal Leifi Physik: Chapter on particle physics
www.leifiphysik.de/themenbereiche/teilchenphysik
- Particle profile cards
- Context material
- > 100 detectors for Cosmic Ray measurements
- DIY Cloud Chamber sets
- GeoGebra Analysis of Bubble Chamber images



Teacher Training

Teacher training at universities and research labs, e.g. KIT, DESY ...

Forschung trifft Schule
funded by:



- ▶ 2-day training for teachers
 - Introduction to particle physics, 6 trainings p.a.
- ▶ Summer School at CERN
 - 6 days, once per year

www.teilchenwelt.de/angebote/lehrerfortbildungen-forschung-trifft-schule/



KONTAKT Work Packages 1 - 3

→ General Public

- Long Night of Science, Open Days, Highlights der Physik usw.
- Mobile exhibition module
- Virtual Reality Systems

NEW

NEW

→ High school students

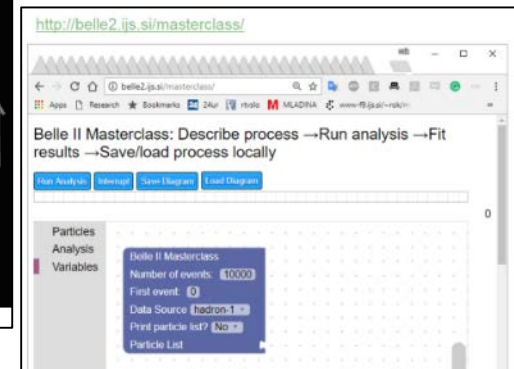
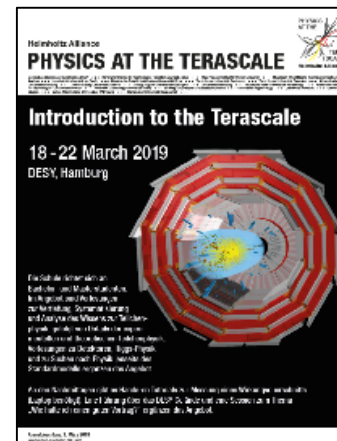
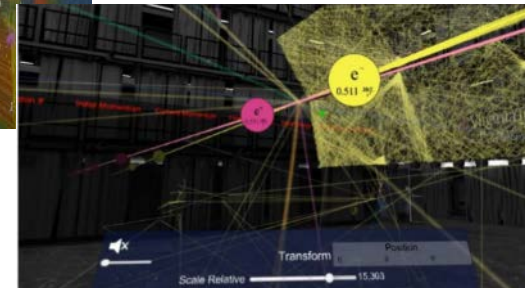
- Data analysis and detectors (Masterclasses, CERN programs, research projects)
- Nuclear and hadron physics

NEW

→ Students/Fellows

- Internships, SHK, hospitations, regulars' tables, Fellow meeting
- Fellow School

NEW



KONTAKT Work Packages 4 - 6

→ Scientists

- Training in science communication (Workshop z. Vermittlung von HEP)
- Portraits „Teilchenjäger“
- Media training

NEW

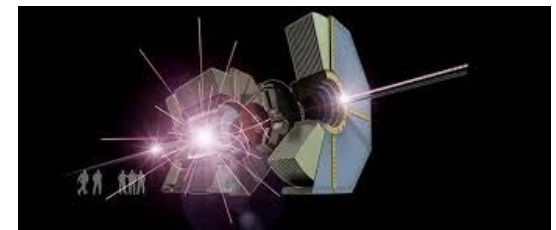
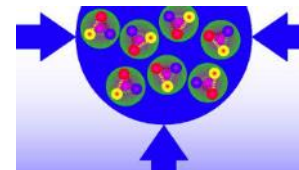
→ Journalists

- Support for press offices of the institutes
- Expanding media work
- Journalist trip to CERN

NEW

→ Project team and institutes

- Wiki, data base, materials
- Internal and external communication
- Integration of new groups / sites



Existing Offers in Hadron and Nuclear Physics

→ High school students

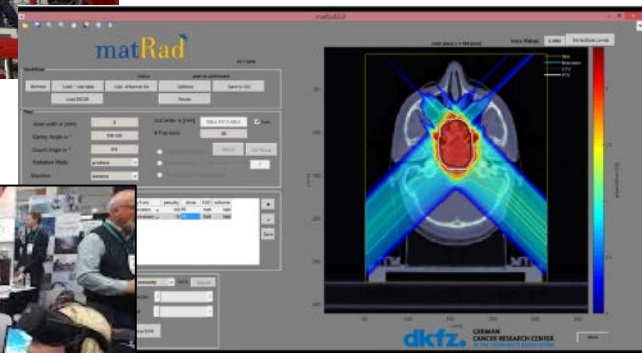
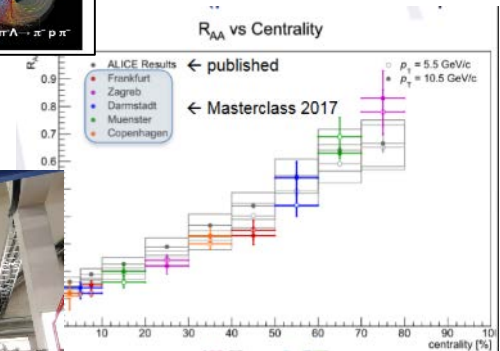
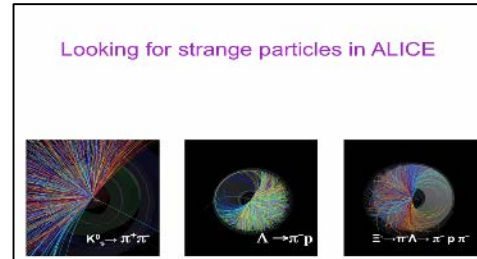
- two ALICE Masterclasses
- Teilchenphysik-Akademie Mainz
- MAMI Masterclass (concept)
- Belle II Masterclass
- Hadron therapy Masterclass
- PANDA Masterclass (concept)
- ...

→ General public

- VR for ALICE and Belle II
- ...

Plus more local activities

- PANDA meets Art
5.7.2019, LMU summer party
- ...



Existing and New Structures

Netzwerk Teilchenwelt

30 universities/research labs

🚩 = PANDA groups

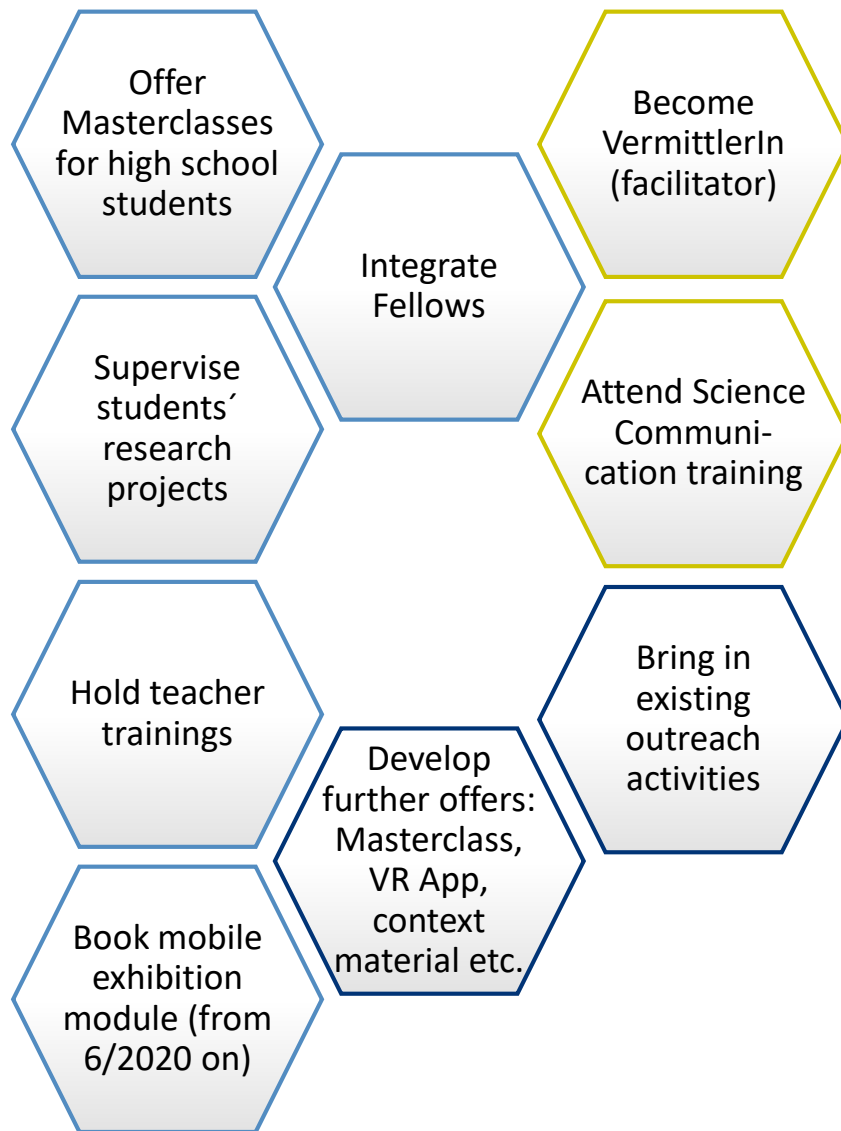
KONTAKT-Knotenpunkte (hubs)

Mainz / Münster / Bonn

- to foster integration of new topics, e.g. from hadron and nuclear physics
- for regional support
- 0.5 FTE
- start in fall/winter 2019



How you can contribute



How you can profit

- Talented and motivated students for your research group
- Contact to high schools, students, and teachers via data base
- Connection to event calendar from Welt der Physik
- Wiki with valuable information and materials
- Enhanced visibility for your research activities
- Master and PhD students: Improved communication skills

Thank you!

More Information: mail@teilchenwelt.de

PROJEKTLEITUNG



PARTNER



SCHIRMHERRSCHAFT



FÖRDERER

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung



DR. HANS RIEGEL-STIFTUNG

