

# Netzwerk Teilchenwelt

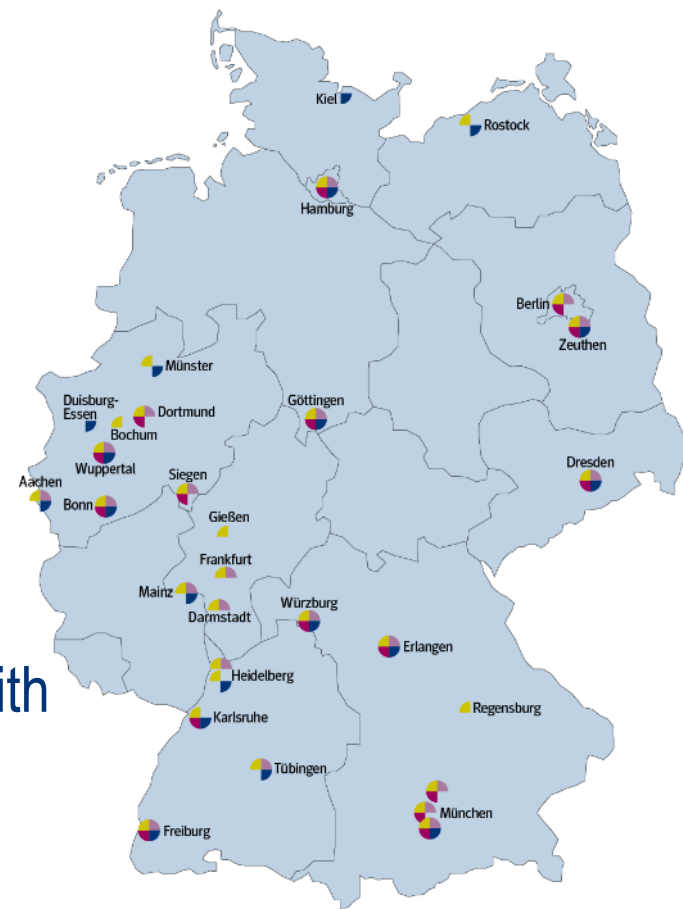
Where High School Students Participate in HEP  
Research and Young Talents are Promoted

?



# Netzwerk Teilchenwelt

- ▶ High school students (15-19 y.)
  - experience HEP research
  - participate in HEP research
- ▶ 30 universities/research labs + CERN
- ▶ 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
- ▶ Project team: TU Dresden / DESY at Zeuthen / CERN (started in 2010)



# Offers for High School Students

[www.teilchenwelt.de/mitmachen/jugendliche](http://www.teilchenwelt.de/mitmachen/jugendliche)

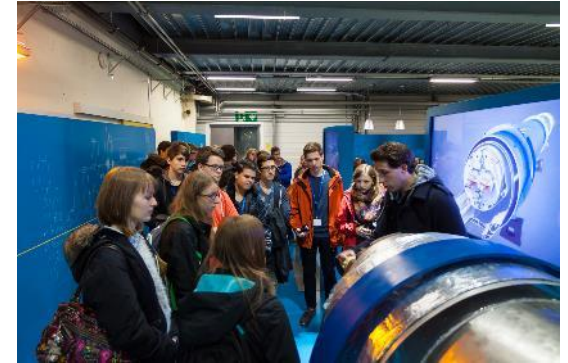
## Basic program

- ▶ 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/university focuses on their 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...
  - Often prize-winning



# 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 (through internships, regulars' table etc.)



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

# 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





# Teachers as multipliers

## ► Development of material

- Teaching material for schools (4 volumes)  
[www.teilchenwelt.de/tp](http://www.teilchenwelt.de/tp)
- Portal Leifi Physik: Chapter on particle physics  
[www.leifiphysik.de/themenbereiche/teilchenphysik](http://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/](http://www.teilchenwelt.de/angebote/lehrerfortbildungen-forschung-trifft-schule/)



# KONTAKT

**K**ommunikation, **N**achwuchsgewinnung und **T**eilhabe der **A**llgemeinheit an Erkenntnissen auf dem Gebiet der **K**leinsten **T**eilchen (2019 – 2021)

- ▶ Build on existing structures **Netzwerk Teilchenwelt + Weltmaschine**
- ▶ Extend frameworks and programs
- ▶ Intensify cooperation with other professional players in the areas of communication, participation, recruitment of new talents
- ▶ Reach out to other target groups
- ▶ More topics/contents from other fields of physics of the smallest particles
- ▶ Funded as integral part of research within the German research framework program ErUM: Exploration of the Universe and Matter



Thank you!

More Information: [mail@teilchenwelt.de](mailto:mail@teilchenwelt.de)

And: **Booth in the coffee break area on Mon&Tue!**



PROJEKTLEITUNG



PARTNER



SCHIRMHERRSCHAFT



FÖRDERER

GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung



DR. HANS RIEGEL-STIFTUNG



NETZWERK  
TEILCHENWELT

# 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

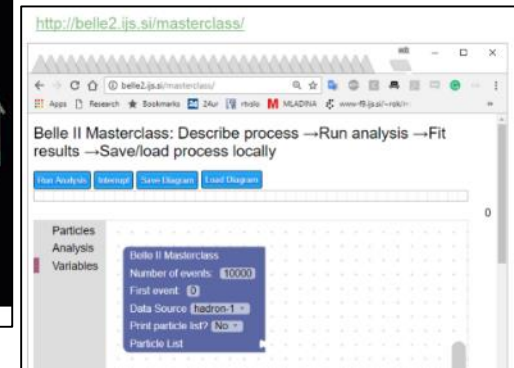
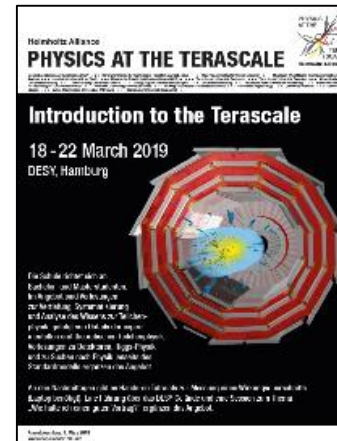
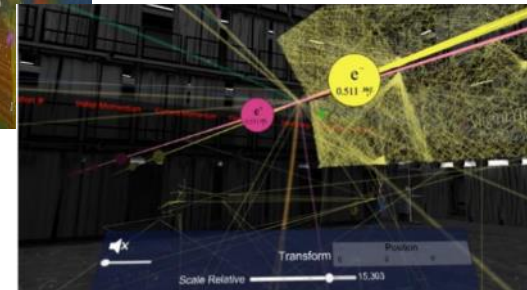
- Data analysis and detectors (Masterclasses, CERN programs, research projects)
- Nuclear and hadron physics

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

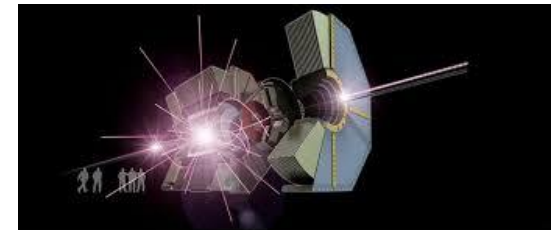
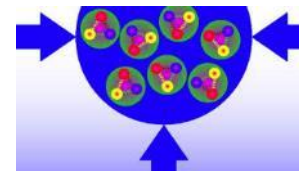
## → Journalists

- 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



# Weltmaschine

[www.weltmaschine.de](http://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

