

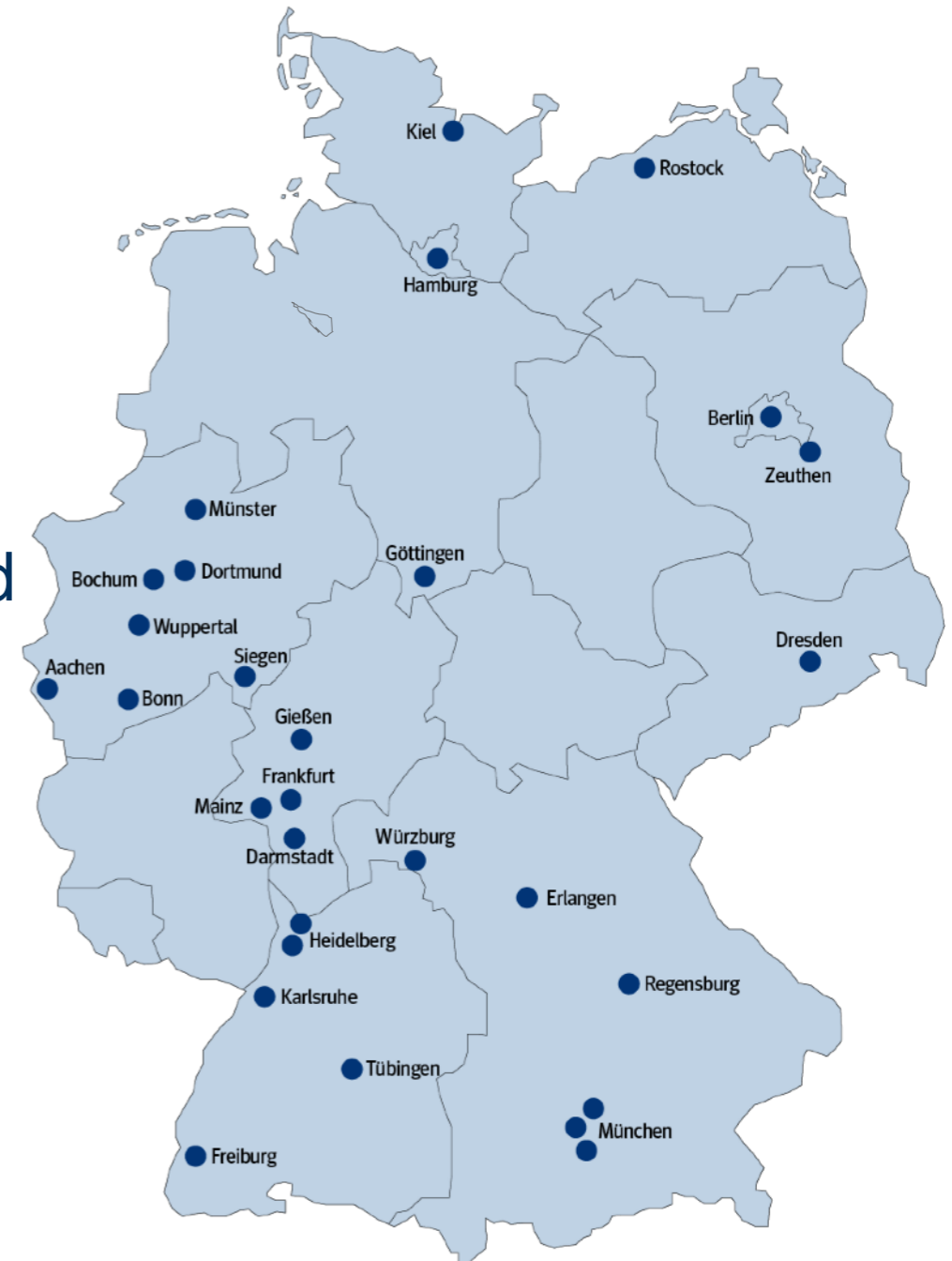
Netzwerk Teilchenwelt

Maike Hansen, Barbara Valeriani-Kaminski
25/11/2022

Netzwerk Teilchenwelt

- Funded as integral part of research by the German Ministry of Education and Research
- KONTAKT¹ project funded since 2018, ErUM²=supporting program
- Joint outreach in particle, astroparticle and hadron (since 2018) physics
 - Bundle existing activities
 - Share structures and programs

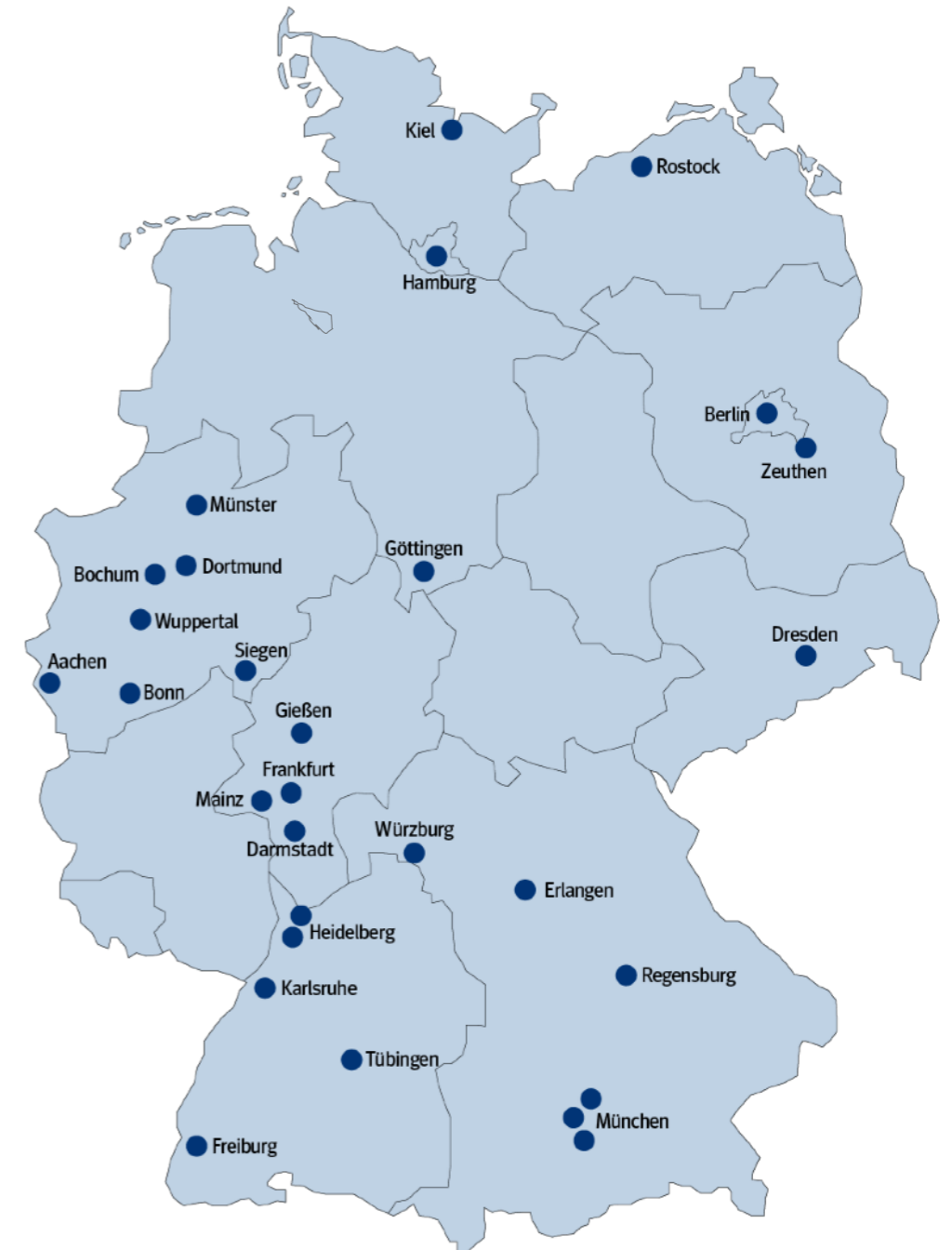
→ **High visibility and impact**



1) KONTAKT = Kommunikation, Nachwuchsgewinnung und Teilhabe der Allgemeinheit an Erkenntnissen auf dem Gebiet der Kleinsten Teilchen“
2) ERUM= Erforschung von Universum und Materie

Netzwerk Teilchenwelt

- **30 locations** (universities/ research labs + CERN)
- Science Communicators (~150 PhD + Master students)
- „Site contact“
 - Your local contact person
 - Organises Masterclasses/ Workshops
 - Maintains contact to schools & high school students



Netzwerk Teilchenwelt

- Project coordination at TU Dresden (+ DESY / CERN)
- Team = project coordination + 3 hubs in Bonn, Mainz & Münster



Science Communicators



- ~ 150 PhD and Master students
- Guide Masterclasses, supervise students' research projects
- Influence students' career-related aspirations and choices
- Reimbursement of expenses and travel cost
- Get training courses on communication, didactics, and presentation techniques



Core: Multi-step Program for High School Students



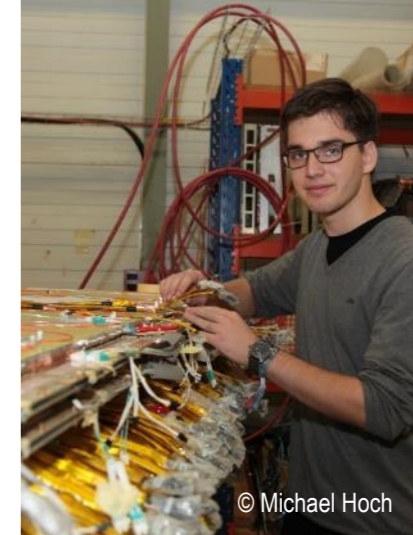
Masterclasses in schools or museums



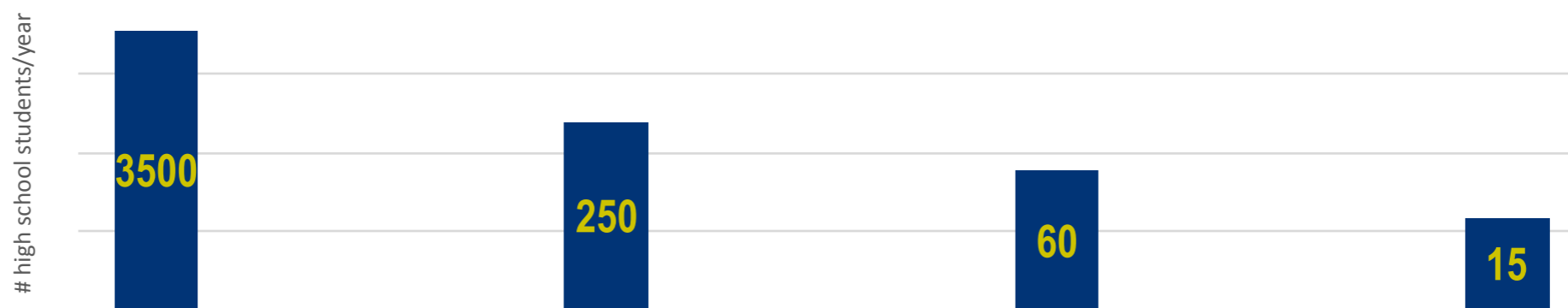
Engagement, Detector-Projects



4 days Workshops CERN u. Mainz



Research projects



Core: Multi-step Program for High School Students



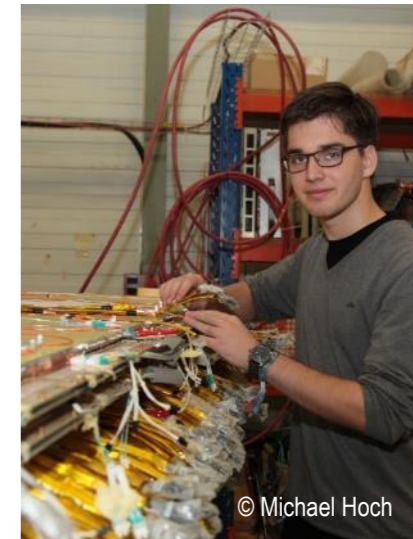
Masterclasses in schools or museums



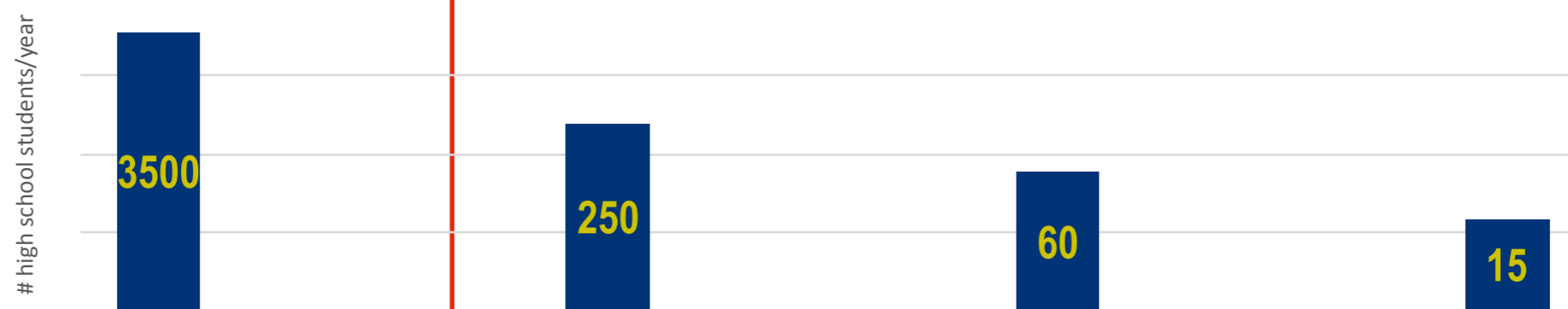
Engagement, Detector-Projects



4 days Workshops CERN u. Mainz



Research projects



Mediated by Science Communicators

Masterclasses

- ▶ 1-Day event in **Schools, in Student labs, museums or research institutes** (or online as Masterclass@home)
- ▶ Introductory talk
- ▶ Hands-on with real data from (Astro-)particle physics experiments
 - Visual analysis of event displays
- ▶ Results answers initial research question & brings knowledge gain
- ▶ Optional: Videoconference with other groups, moderated by someone at CERN, KEK, ... (for IMC only)



MASTERCLASS@HOME
2x 20./21. und 29./30. Juli

JETZT ANMELDEN
LINK IN DER BIO

Foto: CERN

The Idea behind Masterclasses

Act as a "scientist for a day"

- Close to current research
- Own "hands-on" activities (listen = forget, see = remember, do = understand)

Get insight into the research process

- Use of relevant methods and tools
- Comparisons between experiment and theory

Authentic experiences

- Analysis of real scientific data
- Meeting and discussion with scientists



Why “Masterclass”?



As in a Masterclass in the arts, students work with an expert

Expert = particle physicist

Violin = particle physics data analysis

Variety of subjects

► Masterclasses on

- all LHC experiments
- Astroparticle experiments
- Belle II
- Particletherapy
- more being developed



► For young students a MC...

- is a new Experience: Become a scientist for a day
- gives insight into research
- is a possibility to qualify for workshops (e.g. by tutoring other Masterclasses)



Sample Agenda (International Masterclass)

Local time

8:30 - 9:00

9:00 - 10:00
Physics

10:30 - 11:30

12:00 - 13:00

13:00 - 15:00

15:00 - 16:00
Discussion

16:00 - 17:00
conference

Activity

Registration & Welcome

Introduction to Particle

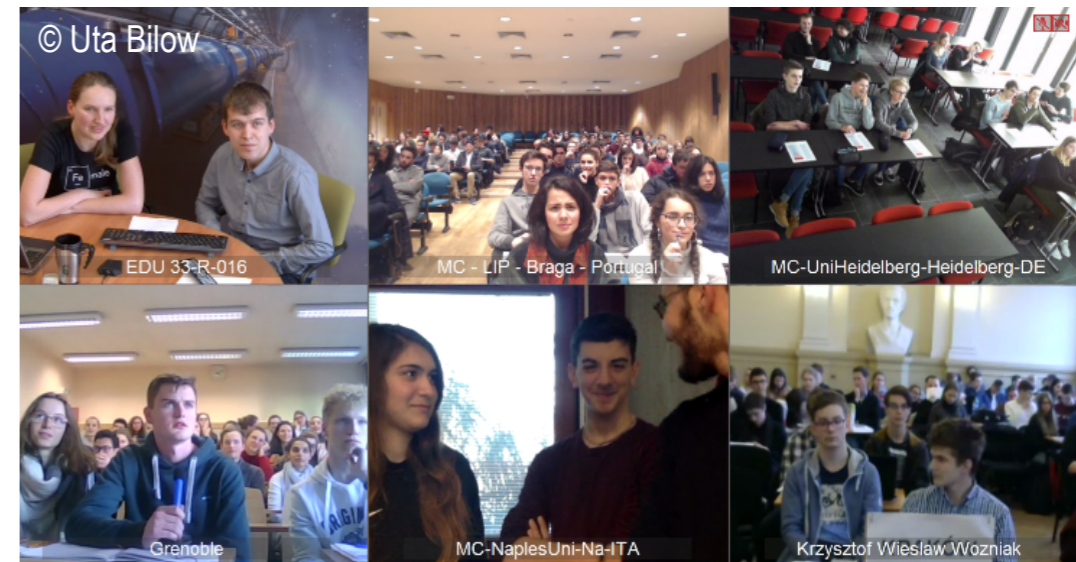
Second talk or tour

Lunch

Data analysis

Local combination +

International video

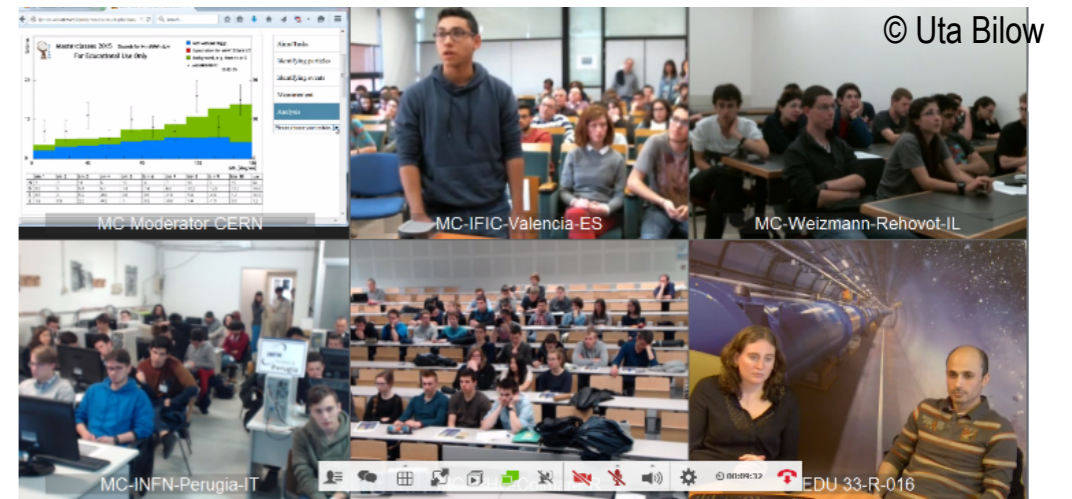


Video Conference

- 45-60 min
- 3-5 institutes, reflecting international collaboration
 - Same measurement, different data
- 2-3 Moderators (PhD students, Postdocs)
- Moderation centers: CERN, Fermilab, KEK, GSI, TRIUMF
- Agenda
 - Welcome
 - Combination and discussion of results
 - General Q & A
 - Quiz

You are welcome to join the community of moderators!

(see [list of CERN moderators for IMC 2022](#))



Multi-step Program for High School Students



Masterclasses in schools or museums



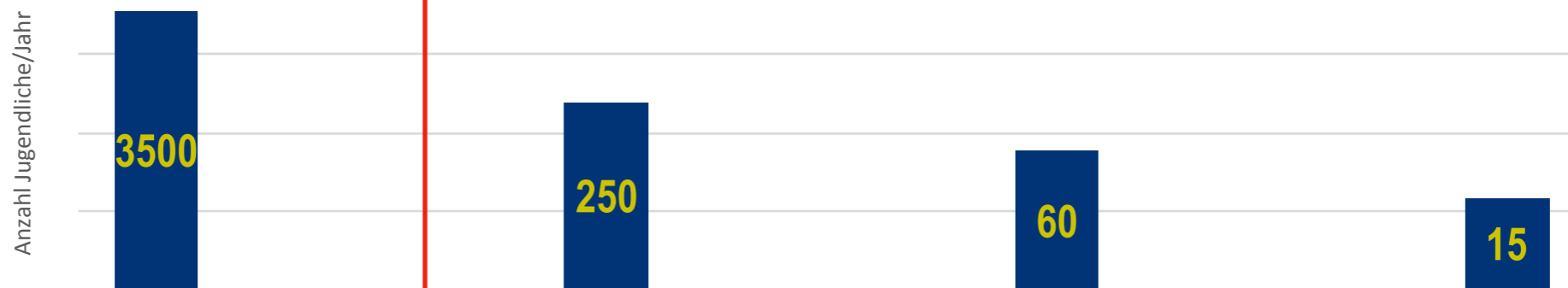
Engagement, Detector-Projects



4 days Workshops CERN u. Mainz



Research projects



You can also contribute to all other steps

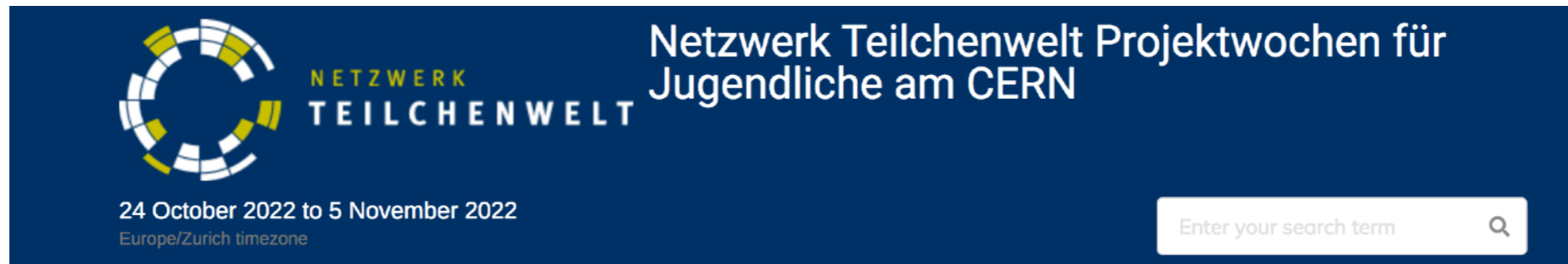
Student experiments on Astroparticle physics



- ▶ Experiments exist at many sites ([Wiki](#))
- ▶ Experiments can be used in Masterclasses or workshops
- ▶ Teachers can borrow experiments for school



CERN project weeks



The screenshot shows the header of the CERN project weeks website. On the left is the logo for 'Netzwerk Teilchenwelt', which consists of a circular arrangement of yellow and white segments. To the right of the logo, the text reads 'Netzwerk Teilchenwelt' in yellow and 'TEILCHENWELT' in white. Further right, the main title 'Netzwerk Teilchenwelt Projektwochen für Jugendliche am CERN' is displayed in white. Below the logo, the dates '24 October 2022 to 5 November 2022' and the time zone 'Europe/Zurich timezone' are listed. On the far right, there is a search bar with the placeholder text 'Enter your search term' and a magnifying glass icon.

Overview

Timetable

Contribution List

Registration

Jugendliche forschen am CERN - Projektwochen von Netzwerk Teilchenwelt

Vom **24. Oktober bis 05. November 2022** finden die zehnten Projektwochen von Netzwerk Teilchenwelt am CERN in Genf statt. Bis zu zehn Jugendliche erhalten die Chance, einmal selbst an aktueller Forschung teilzunehmen und ihre eigenen Projekte zu entwickeln.

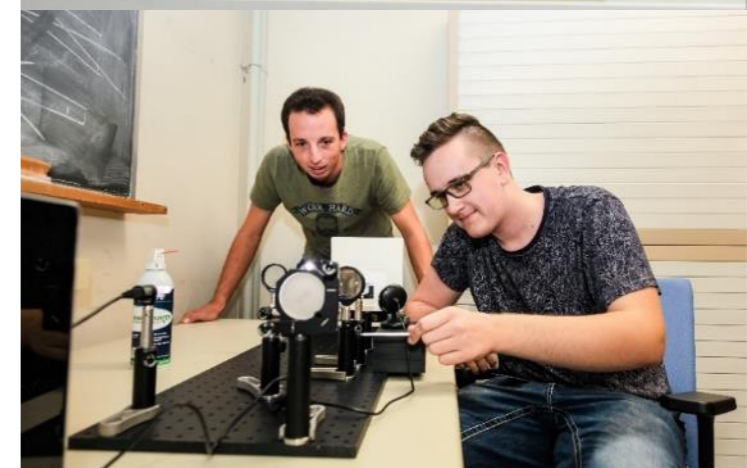
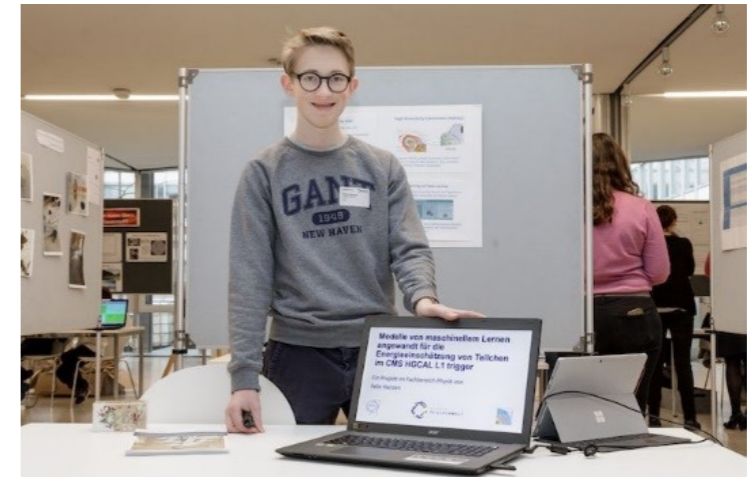
Das erwartet Euch bei den Projektwochen:

- Fundierter Einblick: zwei Wochen Forschung am CERN hautnah.
- Selber forschen: Arbeite in einer Arbeitsgruppe am CERN an Deinem eigenen Projekt.
- Lernen und staunen: Besichtigungen ausgewählter CERN-Forschungsbereiche.

- Students work within research group for two weeks on their own small research project
- Supervised by researcher located at CERN
- Often they write it up in „Facharbeit“ or sth. similar
- [Link](#) to this years project weeks

Student research projects

- ▶ **Examples**
 - ▶ Deep Learning Models for Energy Estimation in CMS HGCAL L1 Trigger (Felix Hansen)
 - ▶ First data classification at the InGrid detector at the CAST experiment using deep learning (Carolin Kohl)
 - ▶ The AWAKE experiment (Björn Dörschel)
 - ▶ The effects of radiation on the CMS pixel detector (Katharina Ploog)
 - ▶ Machine-learning based identification of highly collimated electron pairs from boosted Z boson decays (Sophia Veneris)
- ▶ **Science communicators can participate in supervision**
- ▶ **Possible to pay fee**



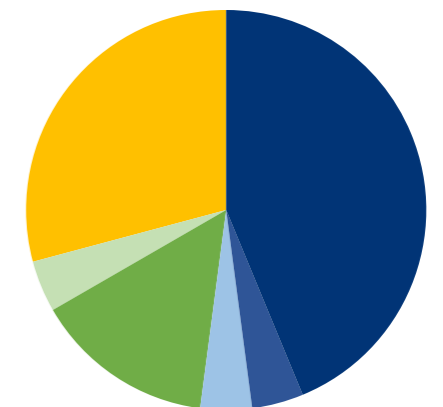
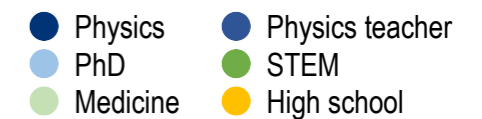
Fellow-Program



- ▶ Goal: Promotion of next generation scientists/STEM students
- ▶ 200 people, 50% female
- ▶ Mainly alumni of CERN workshops
 - Often studying physics or shortly before that
 - Close connection between highly motivated students and research groups

Central offers: Fellow physics schools (HEP, detectors), “Ask the expert” sessions (online), national physics conference attendance, etc.

Local offers: internships, excursions, invitation to outreach events, colloquia, regulars’ table, etc.



© DESY by Ashley Jones

Teachers as multipliers

- Development of material
 - [Teaching material for schools](#), 4 volumes (>20k printed, >35k downloaded)
 - [Portal Leifi Physik](#): Chapter on particle physics
 - [Particle profile cards](#)
 - [GeoGebra Analysis of Bubble Chamber images](#)
 - [Context material](#)
- [Teacher training „Forschung trifft Schule“](#), funded by:
 - 2-day training: Introduction to particle physics, 6 trainings p.a.
 - Summer School at CERN: 6 days, once per year



Big Bang on the road

- Interactive mobile exhibition modul on particle physics
 - Tunnel: time travel through the history of the universe
 - Columns: Interactions and particles, Research methods, spin-offs
 - Pavilion with games (Particle Twister, Particle Yenga)
- Target audience: general public, people with less affinity for science
- On the road since the end of July 2021
- Contact: lhc-kommunikation@desy.de

https://www.weltmaschine.de/service_material/mobile_ausstellungen/wanderausstellung_urknall_unterwegs_seit_2021/



Why join?

- Become a **science communicator**
- Perform **Masterclasses** or supervise research projects
 - Be a **role model**
 - Talk about your research
 - Acquire **soft skills**, for personal and professional development
 - Experience **interest in own research**
 - **Practice supervision**
 - You are **paid with a fee of 100€** (for a 1-day event) + travelling costs





How to join?

- ▶ Talk to your site contact-person ([Overview Sites](#))
- ▶ Register Database (Name, Adress, E-Mail, Site, Date of birth, ...) - Info necessary to pay Professional fees
- ▶ Slack-channel: teilchenwelt.slack.com
- ▶ [Register](#) on the Wiki page

Material for facilitators

- ▶ Teilchenwelt-Wiki page on Masterclasses
 - ▶ Material for the measurements NTW or IMC
 - Data
 - Event Displays
 - Handouts
 - Guide lines
 - ▶ Collections of slides (german) incl. interaktive elements
 - ▶ Guideline didactical concepts for Masterclasses
 - ▶ Online introduction course for particle physics Masterclasses (P-word: Teilchenphysik!)
 - Excercise sheet on the course
- English Version under development

Teilchenwelt-Wiki

► Teilchenwelt-Wiki

- Intern = Visible only to members of Netzwerk Teilchenwelt
- Registration

► Wiki-page for each measurement

- Timeline
- Software instructions
- **Exchange of slides & other material**

► Material for facilitators

- Collection of slides on particle physics
- Example talks on Astroparticle physics
- Quiz + solutions
- Didactical advices

The screenshot shows the main page of the Teilchenwelt-Wiki. The header includes the logo and the title 'Hauptseite'. Below the header is a welcome message: 'Herzlich willkommen auf dem Wiki des Netzwerk Teilchenwelt!'. The main content area is divided into three columns: 'Informationen für Vermittler' (with a photo of people working), 'Informationen für Standorte' (with a map of Germany), and 'Informationen für Fellows' (with a photo of two people). Below these columns are several tables and links. One table lists 'Materialien', 'Honorare', 'Aufgaben Standort', and 'Begriffe'. Another table lists 'Masterclasses', 'Vermittler-Workshop', 'Datenbank', and 'Terminmeldung'. A third table lists 'Experimente', 'Allgemein Vermittler', 'Standorttreffen', and 'Werbematerialien-Vorlagen'. Below the tables are sections for 'Masterclasses/ATLAS-Masterclasses' and 'Interaktive Elemente'. The 'Masterclasses' section includes a list of topics: 1 Konzept, 2 Take-Home-Message, 3 Ablauf der Masterclass, 4 ATLAS W-Pfad (with sub-items 4.1-4.5), 5 ATLAS Z-Pfad (with sub-items 5.1-5.4), and 6 Austausch zu Vorträgen etc. The 'Interaktive Elemente' section lists various activities: Quiz (Kahoot), Videos (Science Slam, Video des CERN), Übungsaufgaben, Online-Spiele oder Übungen (Mainzer Teilchenspiele, die Göttinger Spurdetektion, A-Z-Spiel, Particle Clicker), Umfragen (Zoom, BigBlueButton, Mentimeter), and a VirtueLLer Pausenraum.

Particle profile cards

- ▶ Increase Activity
- ▶ Sort, discuss, get familiar to the particle quantities
- ▶ appeal to other senses

<https://www.teilchenwelt.de/material/materialien-fuer-lehrkraefte/teilchensteckbriefe/>

Instruction, concept and ideas



Promotion material

- ▶ **Various promotion materials available**
 - Flyer, pens, post-cards
 - particle profile cards
 - fleece-bags, pens, particle-zoo buttons
- ▶ **T-Shirts for science communicators**
 - women S-XL
 - men S-XXL
- ▶ **Ask your NTW contact on-site**



Workshops for facilitators

The Basics 1x1 - On-boarding for new science communicators

- Regular format every three month
- Next date: Spring 2023 10:00 - 11:00 am
- <https://indico.cern.ch/event/1200379/>

Spotlight On - Introduction into one example Masterclass

- Regular format (always subsequent to on boarding event) with alternating topics
- Spring 2023 11:00 - 12:00

Workshop on science communication & Masterclasses (in german):

- Facilitator's workshop, once per year, introduction to didactics, science communication & interactive methods for Masterclasses
- 20. - 22. Februar 2023 Fulda

Workshop on science communication & Masterclasses (in english):

- 19.-21. April 2023 Bad Honnef

STERN
TELECHENWELT

Das kleine 1x1

Info für...





Fees are paid ...

- ▶ ...for **Masterclasses, cloud-chamber workshops, teacher trainings**
 - 1-day event: 100€ + Travelling costs per Masterclass/Workshop with ≤ 19 participants
 - 2-day events (also remotely): 150€ + Travelling costs
 - Exception: No fees paid for International Masterclasses
- ▶ ...for **supervision of student research projects**
- ▶ ...if you are a **PhD or Masterstudent from (Astro-) particle- or hadron physics**
- ▶ ... if they have been requested ≤ 2 weeks before the event by your local NTW contact person



Taxation of fees

- ▶ None of the NTW activities are subject to compulsory insurance or employee relationships (like SHK jobs) → No social security contributions or taxes paid by TU Dresden
- ▶ Paid **fees** count as "Übungsleiterpauschale" and **are tax free up to** in total **3000€/year since 2021**
- ▶ Nonetheless it counts as **income from independent work and has to be indicated as such in your tax declaration**

<https://wiki.teilchenwelt.de/index.php?title=Honorare>

Our Website

- ▶ Overview of sites & offers
- ▶ Kalender von Netzwerk Teilchenwelt,
 - Displays all events (incl. MCs) at all sites
 - Event is displayed automatically if entered in database (Anleitung)

Termine

Auswahl einschränken

Kategorien

- Fortbildung
- Workshop
- Masterclass

Zielgruppen

- Lehrkräfte
- Studierende
- Vermittler
- Wissenschaftler
- Jugendliche

Entfernung

September 2022

26.09.2022 13:00-17:00
Fortbildung für Lehrkräfte zur Astroteilchenphysik in Bonn
Rheinische Friedrich-Wilhelms-Universität Bonn Nußallee 12, Bonn, Nordrhein-Westfalen

Woraus besteht kosmische Strahlung? Wie und wo wird sie erzeugt? Wie können kosmische Teilchen erforscht und gemessen werden? Dies sind nicht nur für Wissenschaftler der Astroteilchenphysik spannende Fragen, sondern beschäftigen [...]

27.09.2022 09:00-14:00
ForschungTrifftSchule@home: Astroteilchenphysik

Wir laden Sie ein, mit uns einen Vormittag lang (9 – 14 Uhr) in die Astro(teilchen)physik einzutauchen. Wissenschaftler und Didaktiker geben Ihnen einen Einblick in die Grundlagen der Astrophysik, erläutern [...]

Standort-Datenbank

VERANSTALTUNGEN | INSTITUTIONEN | PERSONEN | BENUTZER | SESSION LEEREN | LOGOUT

Hallo hansen.

Veranstaltungen

Datenbank-Standard

Beginn Tag	Titel	Ort	Veranstalter	NTW-Vertragsstatus	1 - 20 / 1561
[▼] abste	sortieren...	sortieren...	sortieren...	sortieren...	Anzahl:
Suchen nach	Suchen nach...	Suchen nach...	Suchen nach...	Suchen nach...	20

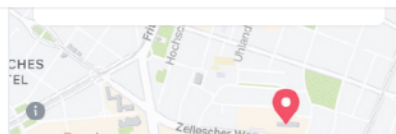
Contact & social media

Website

Magazin „teilchenwelten“ 3 x per year (Abo)

YouTube-Videos „Netzwerk Teilchenwelt mit Moritz“

Facebook



- Netzwerk Teilchenwelt ist das deutsche Teilchenphysiknetzwerk für Jugendliche und Lehrkräfte!
- 994 Personen gefällt das, darunter 14 deiner Freunde
- 1.108 Personen haben das abonniert
- <http://www.teilchenwelt.de/>
- 0351 46333769
- Nachricht senden
- mail@teilchenwelt.de
- Hochschule und Universität
- Impressum
- Datenrichtlinie
- [netzwerk_teilchenwelt](#)

Netzwerk Teilchenwelt
★ Favoriten · 8. Februar um 16:16 · 🌐

Diese Woche feiern wir den "Internationalen Tag der Mädchen und Frauen in der Wissenschaft" mit der ersten Folge unserer neuen Q&A Serie auf [#Instagram](#) [#TeilchenTalk](#) - das Netzwerk im Gespräch! 🗣️ 👩‍🔬

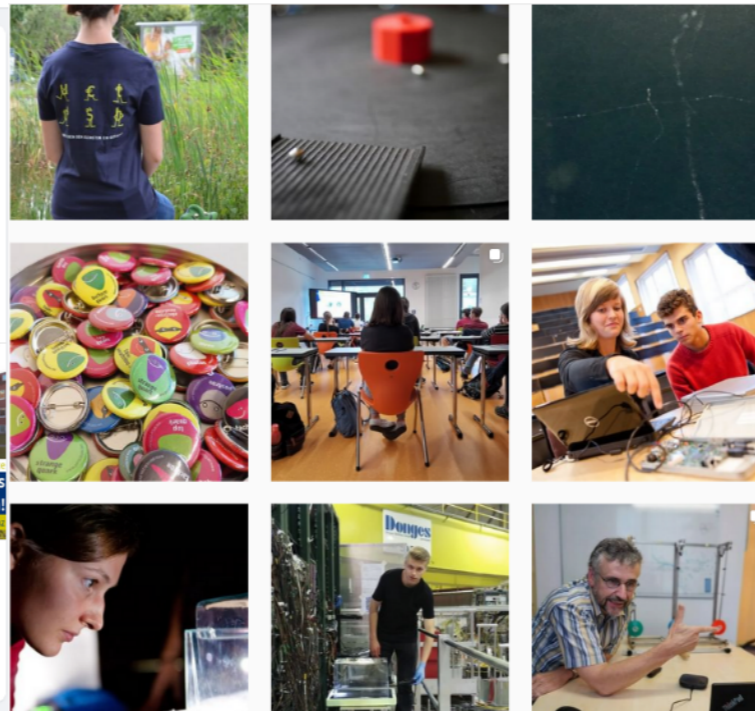
Dazu haben wir uns zwei wunderbare und talentierte Physikstudentinnen eingeladen, die bei uns im [#NetzwerkTeilchenwelt](#) schon lange als Vermittlerinnen tätig sind.

In zwei [#QandA](#) Sessions erzählen Ida und Saskia über ihr Leben als Frauen im Physikstudium. Ihr könnt ... [Mehr ansehen](#)

6 👍 1 Mal geteilt

Gefällt mir · Kommentieren · Teilen

Gib einen Kommentar ein ...



Instagram

Besuchen Sie hier die [Webversion](#).

teilchenwelten  **NETZWERK TEILCHENWELT**
AUSGABE 22 | OKTOBER 2020



Die Woche der Teilchenwelt findet statt vom 02. bis 08. November 2020.

Editorial

Liebe Teilchenphysik-Begeisterte, kreativ in der Krise: Trotz der andauernden Corona-Pandemie findet im Netzwerk





Take part!

- ▶ Become active in the Netzwerk Teilchenwelt outreach activities at your site
- ▶ Document new developments & give **Feedback to structures, format, content, ... in Teilchenwelt-Wiki**
- ▶ Add missing **Informationen/materials** (e.g. best-practice slides, interaktive elements, quiz etc.)
- ▶ Share new material/concepts with other facilitators & sites
- ▶ **Exchange & Communicate** across all locations e.g. using slack



What's next?

- ▶ Today "**Spotlight On** the CMS Masterclass with Ralf Schmieder (KIT)
- ▶ **Onboarding & Spotlight On** will be repeated in 2023 every 3-4 month, next time in Spring 2023
- ▶ Learn more about science communication in **Workshops on science communication & Masterclasses**
 - 20. - 22. Februar 2023 (Fulda, in german)
 - 19.-21. April 2023 (Bad Honnef, in englisch)

Questions?

- ▶ [Netzwerk Teilchenwelt Webseite](#)
- ▶ [Teilchenwelt-Wiki](#)

 <https://www.instagram.com/netzwerkteilchenwelt>

 <https://www.facebook.com/netzwerkteilchenwelt>

 mail@teilchenwelt.de

www.teilchenwelt.de