

Outreach for Belle II Germany

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ErUM-FSP Belle II

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10.09.2025 | Belle II Germany Meeting | Bonn



Federal Ministry
of Research, Technology
and Space



Belle II



Federal Ministry
of Research, Technology
and Space

Uni Göttingen

Uni Bonn

JLU Gießen

JGU Mainz

KIT Karlsruhe

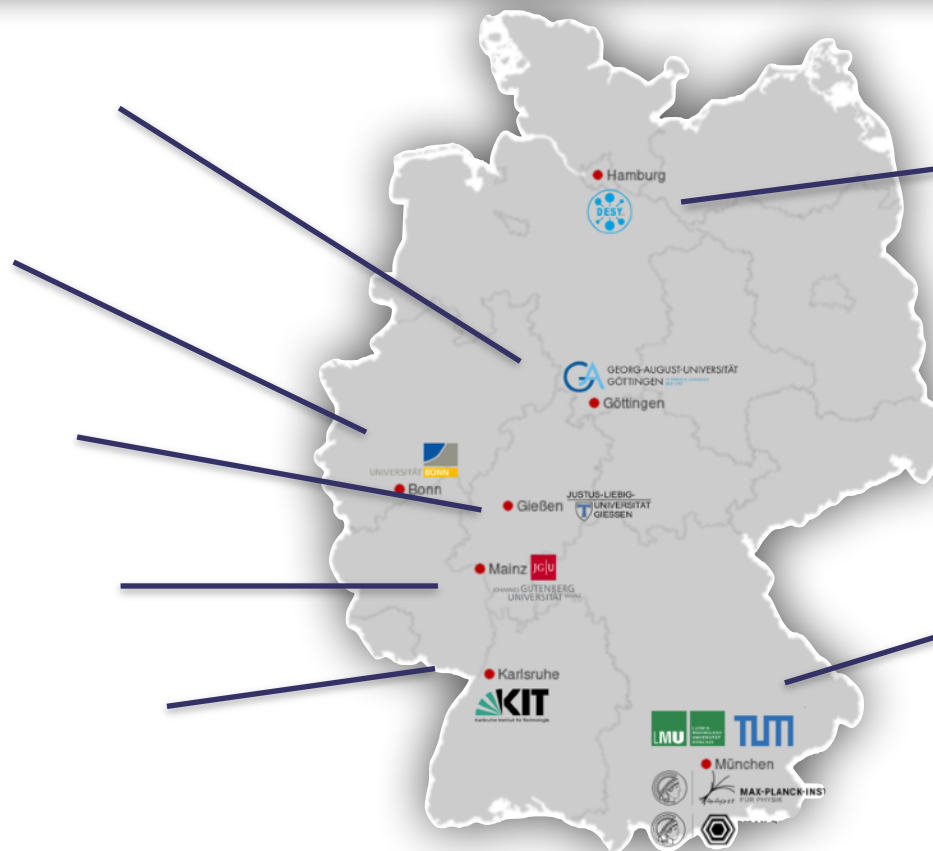
DESY Hamburg

LMU München

TU München

Max-Planck-Institut für
Physik

Max Planck
Halbleiterlabor





Federal Ministry
of Research, Technology
and Space

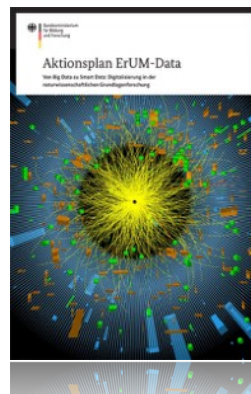
Funding and strategy for fundamental research

4 focus areas:

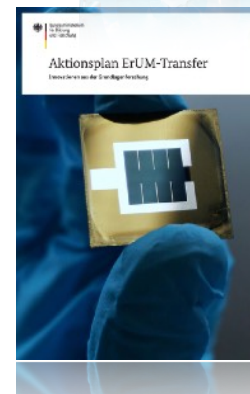
- big experiments
- STEM early career support
- Networking
- Transfer and Participation



ErUM Pro



ErUM Data



ErUM Transfer

KAT

Astroteilchenphysik



KET

Elementarteilchenphysik



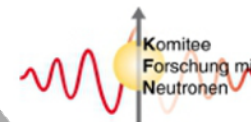
KfB

Beschleunigerphysik



KFN

Forschung mit Neutronen



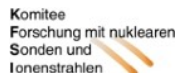
KFS

Forschung mit
Synchrotronstrahlung



KFSI

Forschung mit nuklearen
Sonden und Ionenstrahlen



KHuK

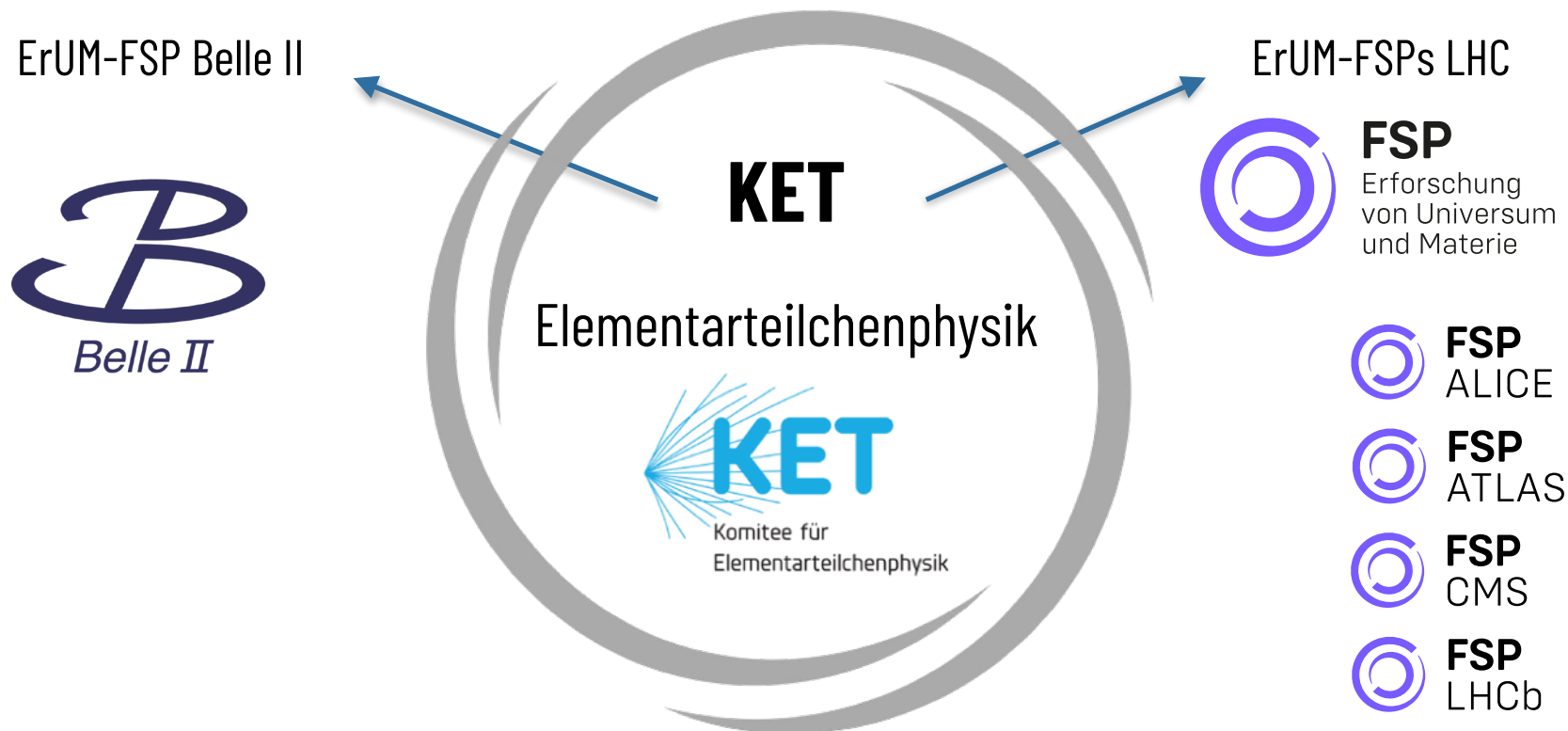
Hadronen-
und Kernphysik



RDS

Rat Deutscher
Sternwarten







Veronika Kratzer

2012 - 2015

Audio Visual Media Designer

Apprenticeship

Bayerischer Rundfunk



2016 - 2025

Physics B.Sc. and M.Sc.

LMU Munich



Now

Outreach for **Belle II Germany**

and

Science Communication for **science birds GmbH**



We are Digital Knowledge Agent for ErUM-Data:

The Central Networking and Transfer Office for Digital Transformation in Research on Universe and Matter

The ErUM-Data Hub: an established Team working close with the community

- Advancing digital transformation in basic research
- Enabling networking between ErUM communities
- Identifying and exploiting synergies in ErUM-Data
- Communicating research results to specific target groups
- Transferring knowledge and innovation

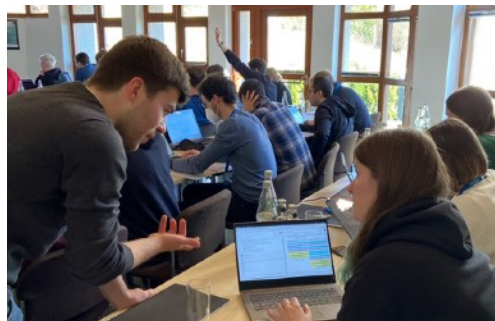


Advancing Digital Transformation in Germany by training ErUM-Scientists

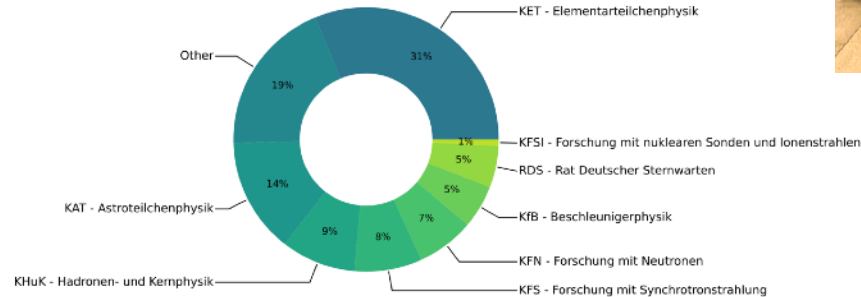
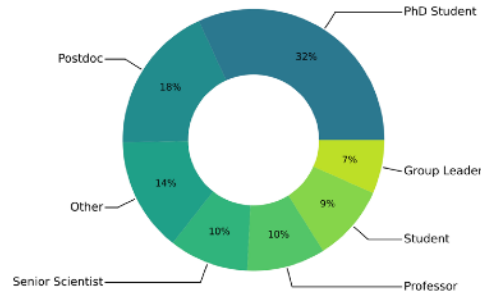
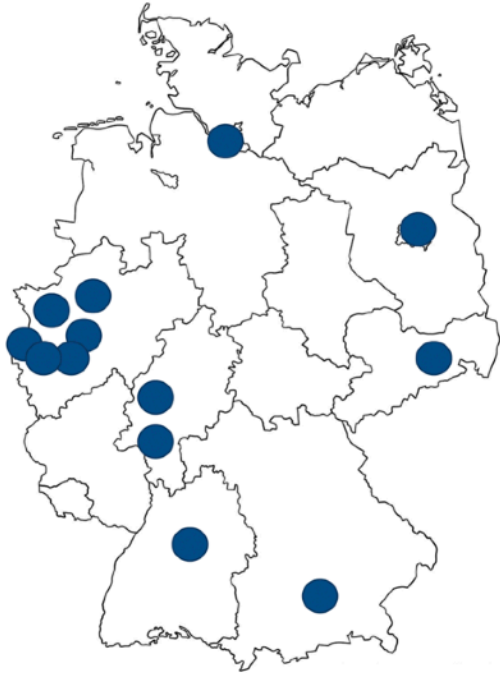
Join our events:

<https://erumdatahub.de/veranstaltungen/>

<https://indico.desy.de/category/984/>



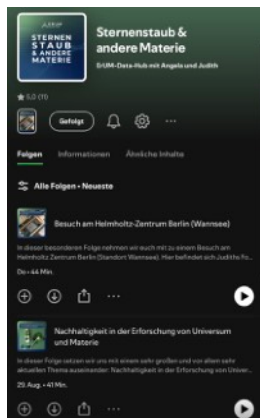
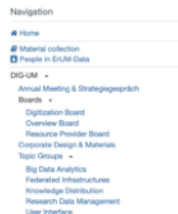
Disseminating digital competencies to a broad ErUM audience: 1.200 ErUM-Scientists reached in person since 2022



Providing high-quality contents for ErUM-Scientists:

<https://wiki.erumdatahub.de/bin/view/Main/>

Knowledge Database including
„Material Collection“ & „Contacts in ErUM-Data“



All links:
<https://erumdatahub.de/>

Material Collection

Last modified by [Judith Hübner](#) on 2024/10/08 08:43

Learning and Teaching Materials for ErUM-Data-Scientist

Are you an ErUM-Data-Scientist who wants to expand your digital skills or do you want to support young/interdisciplinary ErUM-Scientists in pursuing digital transformation?

With our material collection we want to provide an overview of existing materials and contacts by outlining where to find what.

The collection of existing materials thrives on being filled and is complemented by our own materials which include for example videos and slides from various workshops and schools organized by the ErUM-Data-Hub in collaboration with DIG-UM with which we reached over 800 participants so far.

If you want to be subscribed or unsubscribe from this list please contact: judith.huebner@erumdatahub.de

✓ Our collection of materials covers many different topics. You can click on one or more tags to filter the list.

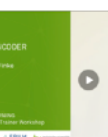
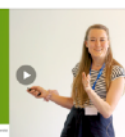
Click on one or more tags to filter the list and click again on a tag to cancel the filter.

Atmospheric Neutrino Spectra autoencoder Basics Bayesian big data analytics c++ CERN ChatGPT CHEP CI C/CO cmake conference convolutional neural networks course deep learning diffusion models docker essentials exercise expert workshop generative models git GPU graph neural networks hackathon hands-on HEP information field theory Interferometric Imaging Interpretable Data Analysis inverse problems Julia lecture machine learning Mers mastering model building mezzanine neural network building blocks neural networks normalizing flows sparql paper particle grow programming school pyqt pyqt python real-time machine learning REANA recurrent neural networks research data management root singularity software optimization solution SD4 sustainability sustainable computing sustainable datacenter talk task train-the-trainer transformers tutorial video VSP4 w-nry

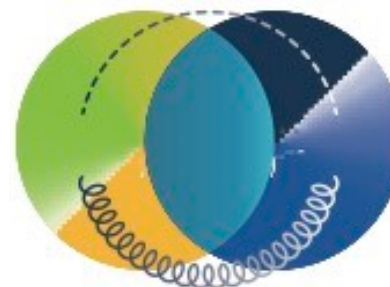
Results 1 - 25 out of 263 per page of [25]

Page 1 2 3 4 5 6 7 8 9 10

Title	Type	Tags	Date	Author
Online Course / #spawelt	course	root	10/2024	HGF - HEP Software Foundation
Online Course / # Software Engineering for Scientific Computing	course	CI, pytest	10/2024	Henry Schreiner, Romain Beyerle et al.
Online Course / # Multiphysics for HEP	course	HEP, mezzanine	10/2024	HGF - HEP Software Foundation
Online Course / # LHCb Analysis Essentials	course	essentials	10/2024	HGF - HEP Software Foundation
Online Course / # Docker and Podman	course	docker	10/2024	HGF - HEP Software Foundation



2 Excellence Clusters with Belle II involvement



color
meets
flavor





Coordinated Outreach and Promoting Young Talents in **Netzwerk Teilchenwelt**

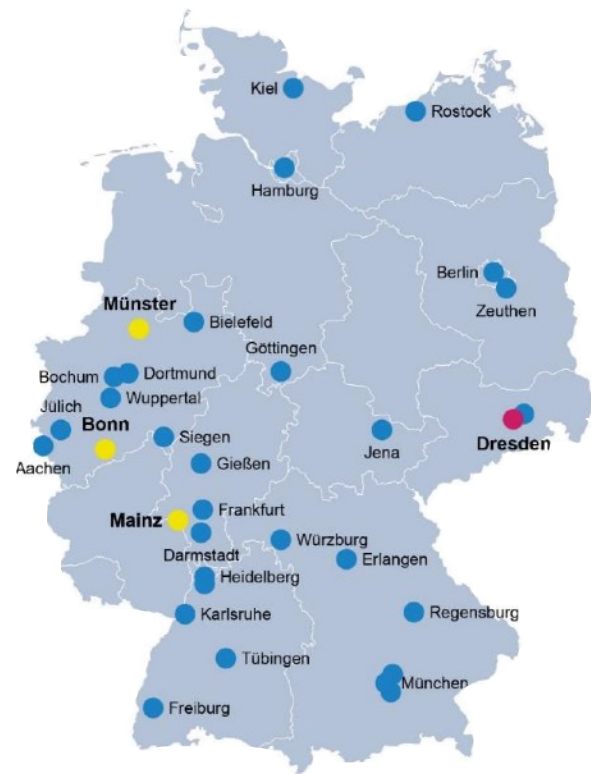
FSP Belle II Annual Meeting
Bonn, 8.-10.9.2025



NETZWERK
TEILCHENWELT

Netzwerk Teilchenwelt

- ▶ 34 universities/research labs
 - all Belle II 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**

► 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 Belle II FSP office, LHC office, other funding sources (SFBs, EXC 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

Core program: Belle II 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
 - Belle II
 - ALICE, ATLAS, CMS, LHCb,
 - Machine Learning, Theoretical Methods (Planetary Orbits)
 - Hadron Therapy
 - Nuclear Astrophysics
 - IceCube, Auger, Cosmic@Web
 - Neutrino experiments
 - ...



✓ 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!

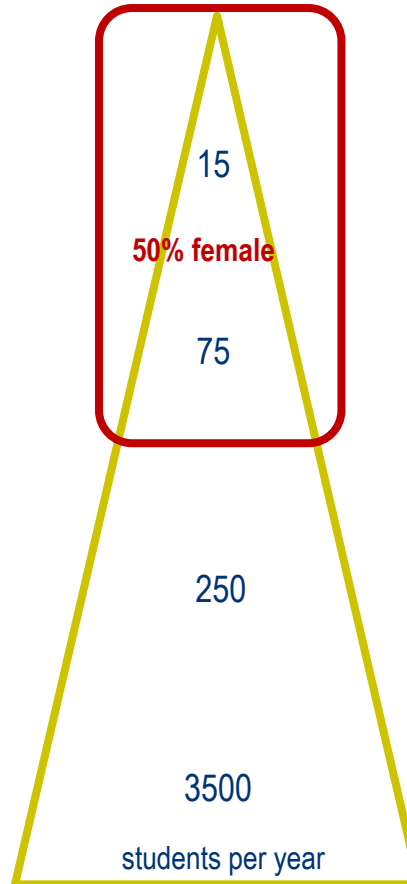
Masterclasses – first level of a multi-step program

*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

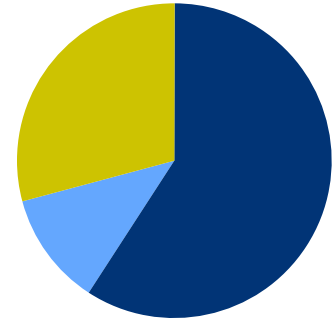
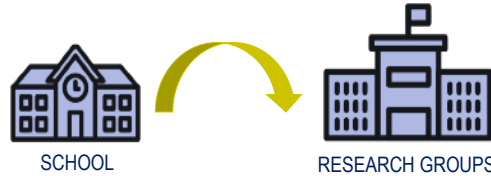


Female share in
physics exams 2023:

- 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

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



ErUM FSP 09 - Belle II

(That's us)

- DESY Hamburg
- Uni Göttingen
- Uni Bonn
- JLU Gießen
- JGU Mainz
- KIT Karlsruhe
- LMU München
- MPP München
- Max-Planck HLL
- TU München



Partners

- ErUM Data Hub



- Excellence Cluster

- Origins



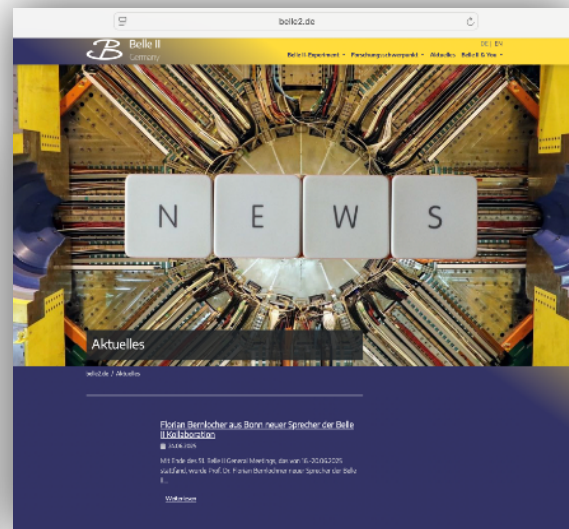
- Color Meets Flavor



- Netzwerk Teilchenwelt



Website: belle2.de



Have some news?
Contact me!

Website: belle2.de

Revival?!

Want to participate?

Gesichter

belle2.de / Forschungsschwerpunkt / FSP-Gesichter

Die Forscher*innen des FSP-Belle II stellen sich vor: Hier können Sie mehr über die Persönlichkeiten erfahren, die hinter dem B und prägnante Profile über unsere Forscher*innen und Doktorand*innen aus verschiedenen Bereichen erstellt.

Alexander Heidelberg
Karlsruhe Institute of Technology



Alexander Heidelberg ist PhD am KIT in Karlsruhe und arbeitet an der Suche nach einer neuen Physik jenseits des Standardmodells.

Yaroslav Kulii
LMU München



Yaroslav ist Doktorand an der LMU und beschäftigt sich mit der physikalischen Analyse des mysteriösen Teilchens X(3915).

Thomas Ametsbichler
LMU München



Thomas studiert im Master Physik und arbeitet neben dem Studium an einem Belle II-Schülerprojekt zur CP-Asymmetrie.

Matthias Schnepf
Karlsruhe Institute of Technology



Caspar Schmitt
LMU München



Isabel Haide
Karlsruhe Institute of Technology





Belle II Germany

Belle II-Experiment • Forschungsschwerpunkt • Aktuelles Belle II & You •

Torben Ferber

Wo kommst Du her, Torben?
Seit etwa einem halben Jahr lebe ich jetzt in Karlsruhe - davor in Hamburg, Vancouver, und Heidelberg.

Wie bist Du zur Teilchenphysik und zu Belle II gekommen?
Meine Doktorarbeit habe ich in der Neutronenphysik geschrieben weil ich eine spannende Vorlesung dazu gehört hatte. Danach wollte ich aber das Feld wechseln aber in Hamburg bleiben. Und so kam ich am DESY zunächst zum Belle Experiment und dann zu Belle II.

In welchem Gebiet arbeitest Du genau und was motiviert Dich dazu? (Hier kann gerne auch etwas zur eigenen Doktorarbeit gesagt werden, wenn das noch passt)
Meine Physikinteressen sind Sachen nach dunkler Materie, insbesondere in der Verbindung von Dunkler Materie mit Flavorphysik. In den letzten Jahren ist das Interesse daran unglaublich gewachsen - für mich gibt es in der Teilchenphysik derzeit keinen spannenderen Hinweis auf neue Physik als dunkle Materie. Diese Analysen stellen hohe Herausforderungen an das Triggersystem, das Kalorimeter, und das Finden von Spuren die nicht aus dem gemessenen Interaktionspunkt kommen - hier engagiert sich meine Gruppe sehr stark im Bereich der Softwareentwicklung und künstlerischer Intelligenz.

Wardst Du schon in Japan bei Belle II? Wenn ja, was hat am meisten Eindruck hinterlassen?
Ich bin normalerweise mehrere Male pro Jahr in Japan - am meisten Eindruck hat wahrscheinlich Tokyo zur Rush-Hour hinterlassen. Am meisten vermisse ich aber die gemeinsamen Abende im KDF-Gästehaus mit Kolleg*innen nach langen Meetings.

Was sind Deine Pläne für die nächsten Jahre?
Mit meinem Team werden wir die Suche nach dunkler Materie bei Belle II aber auch an anderen spezialisierten Experimenten mit meinen Kolleg*innen am KIT verstärken. Für mich ist es keine Frage ob, sondern wann, wir die dunkle Materie im Labor nachweisen.

Was machst Du am liebsten, wenn Du gerade nicht mit Belle II beschäftigt bist?
Am liebsten bin ich dann unter Wasser. Beim Tauchen in Höhlen in der Schweiz und Frankreich oder in verlassenen Bergseen im Saualand - und natürlich auch mal in einem der Seen rund um Karlsruhe nach Felsenbündel - kann ich wunderbar abschalten.

Was würdest Du jemandem erzählen, der noch ganz am Anfang steht und in das Belle II-Projekt einsteigen will?
Seid neugierig und hochmotiviert! Moderne Teilchenphysik braucht viel Wissen in Statistik, Datenanalyse, aber auch in den Bereichen Softwareentwicklung und moderner Elektronik - ein Physikstudium legt dafür den Grundstein. Nehmt Kontakt zu Forscher*innen an eurer Uni auf und versucht so früh wie möglich in kleinen Projekten mitzuarbeiten. Das klappt oft schon während des Studiums.



Instagram: @belle2germany

- Run by FSP-Office (Veronika) and KIT (Torben, Isabel)
- Content:
 - Everything that's going on e.g. (outreach) events, meetings, conferences, new papers, talks, awards, group outings, announcements, ...



Something going on?

Take pictures, write a nice and descriptive caption, send it to me!

Open Days/Campus Days etc.

- | | |
|------------|-----------------------------|
| 03.10.2024 | Campus Garching/Maustag |
| 17.05.2025 | KIT |
| 14.06.2025 | JLU Gießen; Open Campus Day |



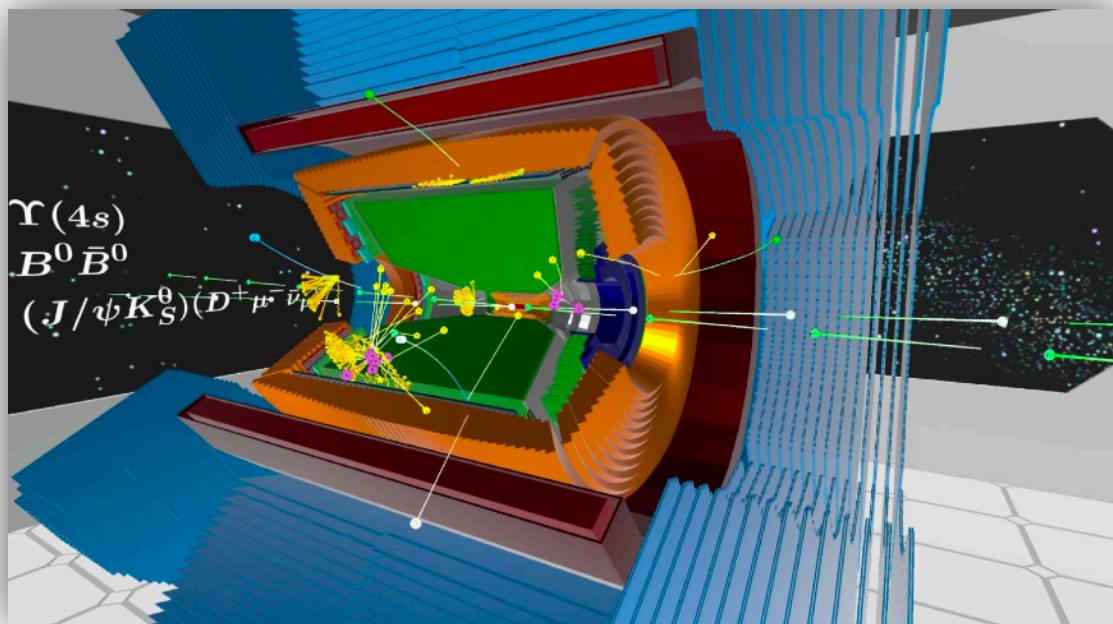
Planning something?
Contact me!



Upcoming:

- | | |
|------------|---|
| 04.11.2025 | Visit: Class of Physics Lab Technicians, Munich |
| 08.11.2025 | Tag der Quantenphysik, LMU |

Belle II Virtual Reality



Want to borrow it?
Contact me!

(International) Masterclasses



NETZWERK
TEILCHENWELT

Planning one? Have a request?
Contact me, if you need help!

Belle II Germany Meeting

- Every Year
- Members from German Belle II groups
- From student to PI



Belle II Academy

- For students, Ph.D. students, young researchers
- 1 week
- Workshops on physics topics, soft skills and social activities
- Next in 2026 (date and place tbd)



2022 | Bonn

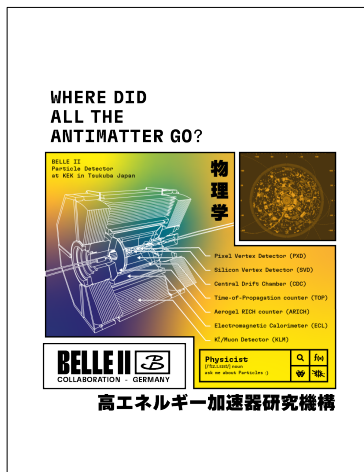


T-Shirts and Hoodies

B2 Merch
13.02.2025



003 Belle II T-Shirts - White



Designed by Amanda Cloth

Cups

Stickers

Flyers

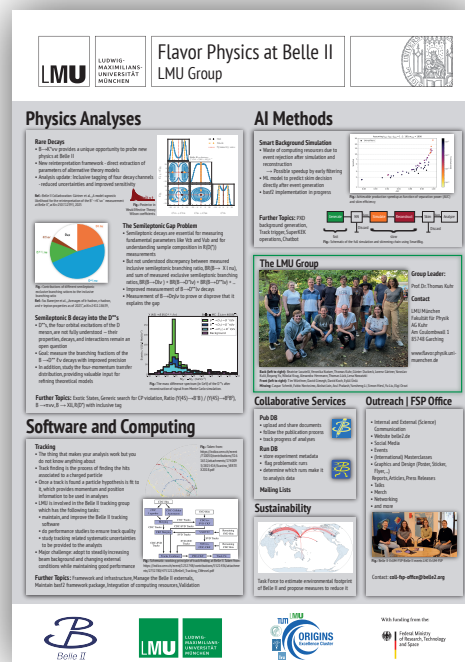
Pins

Lego-Detector Sets

...

Need something?
Contact me!

Poster for Belle II Germany Meeting (LMU Group)



32

Belle II FSP meets LHC FSP

08/2025 in Hamburg



Netzwerk Teilchenwelt Standorttreffen

05/2025 in Mainz



How can we work together?



How can I help you?

How can you help me?

- What outreach do you do? How regular?
- What stops you from doing outreach? E.g. not knowing where to start, lack of ideas, ..?
- Do you even enjoy doing outreach?
- How can we improve communication and collaboration?
 - What do you need from me to help you with your outreach topics?
 - How do I get informed about any outreach activities that are going on in your city?
- Can we define one person responsible for outreach in each group? (Not necessarily group leader)
- Are you interested in regular outreach meetings?
- Are you interested in a regular outreach newsletter?
- Maybe summarize this questions in a survey?

Belle II-FSP Office

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GERMANY

coll-fsp-office@belle2.org

Veronika Kratzer

Kratzer.Ve@campus.lmu.de

Thank you !