



Oliver Witzel



TP1 Theoretical
Particle Physics
CPPS Center for Particle
Physics Siegen

July 11, 2025



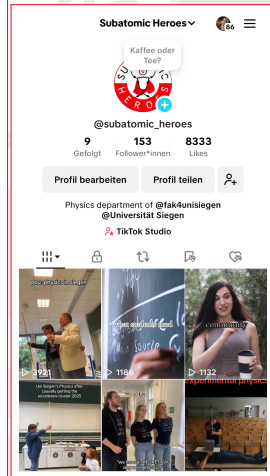
Motivation

- ▶ Attract students to study physics in Siegen
 - Low number of Bachelor and Master students
 - Strong research
 - Excellent staff-student ratio
- ▶ Spark pupils interest in (particle) physics
 - Inspire prospective students of tomorrow
 - Early on reach out to all genders and all backgrounds
- ▶ Education for the general public
 - Communicate what we are doing and why it is important



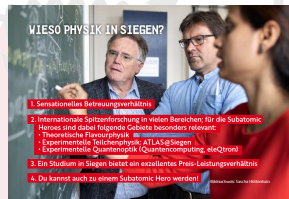
Instagram channel

- ▶ Channel about physics and life in academia
 - Academic and outreach events in Siegen
 - News from conferences and workshops
 - Physics highlights
- ▶ Target younger generations
 - (Prospective) students
- ▶ Group of PhD students and PostDocs takes weekly turns in producing new posts
- ▶ 475 followers (before this presentation)
- ▶ **New:** Bachelor students run a TikTok channel



Brochure

- ▶ Explain particle physics in layman terms
 - What is the Standard Model?
 - How do we obtain our knowledge?
 - Which open questions are driving our research?
- ▶ Expertise of the groups in Siegen
 - Methods we use to tackle these questions
 - Advantage of studying physics in Siegen



Video



- ▶ Highlight studying/working as physicist/researcher in Siegen
- ▶ [Link to the video](#)

Podcasts

- ▶ Strange & Charming ([link to podcasts](#))
 - Physicist talk about their experiences
 - Why did they study physics?
 - Which obstacles did they overcome?
 - What is “daily life” of a physicist?
 - Initiated by Robert Harlander (RWTH Aachen U)
 - Produced by members of the CRC TRR 257
 - Languages: English or German
- ▶ University of Siegen science podcast (in German)



Rent a Prof

- ▶ Visit primary and high schools in the vicinity of Siegen
- ▶ Engage with kids from broad social background
- ▶ Organized by Thomas Reppel, Faculty IV



High-school students

► Internships

- Typically 2 weeks for 15 year-old high-school students
- Visit different groups for 2 days
- Experience University life, attend a lecture or tutorial
- MC Integration, complex numbers, academic careers, SRT, particle physics, programming, ...

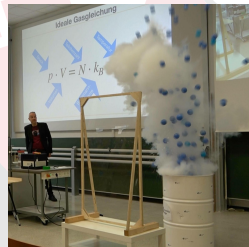


► Masterclasses

- Students analyze data from CERN experiments

► Dedicated lectures and University for kids

- Topical lectures with show elements (age 15+)
- Fascinate pupils (age 8–12) with lectures and experiments on detectors and particle physics



CERN 70 year anniversary

- ▶ Spark interest of high-school students for the research done at CERN
- ▶ Create a short video to win 3-day trip to CERN
- ▶ Link to winning videos
 1. Das Higgs-Boson
 2. Antimaterie
 3. Fabiola Gianotti

Schüler-Wettbewerb

Wann & Wo?
20. September 2024, 9:00-12:30 Uhr
Im Emmy-Noether-Campus
Saal ENC D-114

Was?
Präsentiert als Gruppe von bis zu vier Personen ein Poster oder Kurzvideo über das CERN

Kontakt
Wir würden uns freuen, von euch zu hören! Wenn ihr an unserer Feier teilnehmen möchtet oder Fragen habt, zögert nicht, uns zu kontaktieren unter
alexander.lenz@uni-siegen.de
Wir laden euch auch herzlich ein uns auf **Instagram** zu folgen. Scannt einfach den **QR-Code** unten, um in Verbindung zu bleiben und die neuesten Updates zu erhalten!

Follow us:
@subatomic_heroes

Weitere Informationen

Gewinnt tolle Preise
Preise für alle Teilnehmer
Hauptpreis: Gruppenreise nach Genf zum CERN mit Unterbringung

Erfahrt über das CERN aus erster Hand
Live Vortrag am CERN
Q&A mit einem Wissenschaftler

Discover the scientist in YOU

Mögliche Themen könnten sein:

- Geschichte des CERN
- Zukunft des CERN
- Aufbau eines Detektors
- Antimaterie
- Entdeckung des Higgs
- Dunkle Materie
- CERN und der Urknall
- CERN und das Internet
- Frauen in der Teilchenphysik

Ihr seid herzlich eingeladen eure eigenen brillanten Ideen zu entwickeln und uns mit eurer Kreativität zu überraschen!

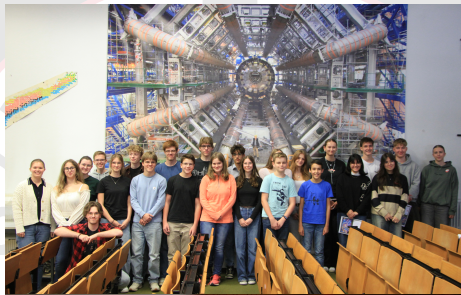
Vorläufiger Zeitplan

- 9:00 Begrüßung
- 9:15 Poster- und Kurzvideo-Wettbewerb
- 10:45 Kurze Einführung durch Prof. Dr. Lenz
- 11:00 Virtueller Vortrag am CERN
- 12:15 Wettbewerbsprämierung
- 12:30 Ende

Universität Siegen / **CPPS** Center for Particle Physics Siegen

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 1. Das Higgs-Boson
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- ▶ January 2025: Visiting CERN



ENC
Siegen



CERN
Geneva

Physik im Apollo

- ▶ Apollo theater Siegen: 550 seats
- ▶ Educate general public on the principles of quantum physics with the help of acrobats and musicians
- ▶ Watch a highlight from 2024



Physik im Apollo

Freitag 12.4.2024, 19:00 Uhr
Apollo Theater Siegen
Freier Eintritt, Karte erforderlich
<https://www.apollosiegen.de/spielplan/714-physik-im-apollo>

Dr. Heike Riel

Künstlerisches Rahmenprogramm
Klavier, Gesang, E-Gitarre

$$i\hbar \frac{\partial \psi}{\partial t} = \left[\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} + V(x) \right] \psi$$

Quantenphysik

Universität Siegen

Quantencomputing

Künstlerisches Rahmenprogramm
Akrobatik

Physik im Apollo

- ▶ Apollo theater Siegen: 550 seats
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- ▶ **2025: Save the dates!**



Urknall Unterwegs (big bang on the road)

- ▶ Highly visible exhibition at the Open University
 - Modules explaining the Universe evolution and the connection to particle physics
- ▶ Organization [Netzwerk Teilchenwelt](#)
- ▶ Activities for kids (of any age)
 - Make your own (particle) badge (cf. [DESY Teilchenzoo](#))
 - Stick-on tattoos with SM Lagrangian, colorful Feynman diagrams, ...
 - Mechanical scattering experiment, cosmic can
 - MINT-Rally: motivate guests to visit exhibitions from colleagues



“Hadronic Ice Cream”

- ▶ Make the general public approach you to learn about particle physics
- ▶ Hand out free ice cream: each scoop represents a quark flavor
- ▶ Sprinkles turn a quark into its anti-quark
- ▶ But quarks occur only as confined hadrons: Order mesons or baryons!



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- ▶ The official menu
→ Secret menu (PDG)

Universität Siegen / TP1 Theoretical Particle Physics Center for Particle Physics Siegen

Unsere Eiskarte

Zutaten

Charming Flavour

Up Charm Top

Down Strange Beauty

Antiteilchen

Baryonen

Proton (p^+): Up Up Down

Neutron (n): Up Down Down

Lambda (Λ^0): Up Down Strange

Lambda (Λ_c): Up Down Charm

Sigma (Σ_c^{++}): Up Up Charm

Xi (Ξ_c^+): Up Strange Charm

Lambda (Λ_b): Up Down Beauty

Sigma (Σ_b^-): Down Down Beauty

Xi (Ξ_b^0): Up Strange Beauty

Omega (Ω^-): Strange Strange Strange

Omega (Ω_{cc}^+): Strange Charm Charm

Mesonen

Kaon (K^+): Up Strange

Kaon (K^0): Down Strange

D-Meson (D^+): Charm Down

D-Meson (D^0): Charm Up

D-Meson (D_s^+): Charm Strange

J/Psi (J/ψ): Charm Charm

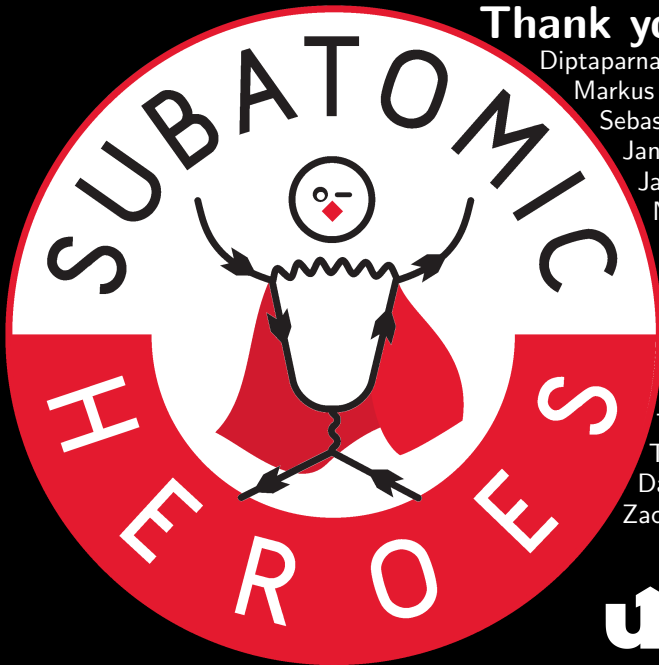
B-Meson (B^+): Up Beauty

B-Meson (B^0): Down Beauty

B-Meson (B_s^0): Strange Beauty

B-Meson (B_c^+): Charm Beauty

Upsilon (Υ): Beauty Beauty



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Tom Tong · Jette Vedder · Katharina Voß ·
Daniel Vladimirov · Wolfgang Walkowiak ·
Zachary Wüthrich · Michael Ziolkowski



Watch the video



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