Deutsche Physikerinnentagung 2025

Wednesday 17 September 2025 - Sunday 21 September 2025

Kiel

Book of Abstracts

The German Conference of Women in Physics (Deutsche Physikerinnentagung) has taken place annually since 1997. The conference is supported by the Working Group on Equal Opportunities (AKC) of the Deutsche Physikalische Gesellschaft (DPG). This year's conference will be hosted by the Christian-Albrechts-Universität Kiel.

The DPT 25 is taking place under the patronage of Karin Prien, the Federal Minister for Education, Family Affairs, Seniors, Women and Youth (BMBFSFJ).

Figure 1: Karin Prien, the Federal Minister for Education, Family Affairs, Seniors, Women and Youth (BMBFSFJ) (Bildnachweis: Dominik Butzmann)

Federal Ministry
for Education, Family Affairs, Senior Citizens,
Women and Youth

Foreword

by the Federal Minister for Education, Family Affairs, Senior Citizens, Women and Youth,

Karin Prien,

for the conference booklet of the German Conference of Women in Physics 2025

Dear Readers,

Physicists shape and influence our world – thanks to their research findings, technological innovations and courage to dare to try out something new and unknown.

"Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less."

These words by Marie Curie, who was awarded the Nobel Prize twice and who has been a shining example for generations, describe an important mindset. We need more research – and I believe: We also need more brave and successful women in science.

Women are still under-represented in physics. That is why the German Conference of Women in Physics 2025 is all the more important as it focuses on the expertise, ideas and perspectives of women physicists – visibly, audibly, effectively.

I am very pleased to assume the patronage of this conference. It is a place of empowerment, inspiration and visibility of women in science. It provides a space for female students, young female scientists and experienced women researchers to meet on an equal footing, present their scientific work and empower each other. Especially in a traditionally male-dominated discipline like physics, such safe spaces are crucial to openly discuss exclusion mechanisms, share experiences and build new networks and mentoring relationships.

I am particularly impressed by the way the Conference of Women in Physics succeeds in consistently involving young women: At the conference, female students and PhD students will see that they are not the only ones with questions and doubts – they will experience

community, encouragement and get to know role models. With the “Spirit” programme, focused on female schoolchildren, the conference takes it a level further and even gives young girls an idea of how exciting, diverse and meaningful a career in physics can be.

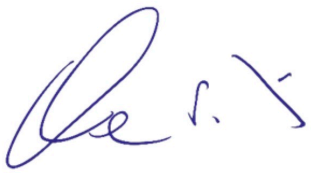
Moreover, the keynotes impressively demonstrate the broad range of career prospects for people with a degree in physics – from basic research to IT professions to leadership positions in business and science. This message is important: Physics empowers everyone who wants to shape it. By continuing the Women Professors Programme, I am committed to increasing the share of women in scientific leadership positions.

As women physicists, you not only have in-depth expert knowledge, but you also assume responsibility: for innovation, progress and the future of our society.
This year’s theme “Women in Physics – from Insight to Impact” gets to the heart of this aspiration. It pays tribute to the journey from scientific insight to the societal impact – and highlights the role women play in this.

The German Conference of Women in Physics thus also sends out a strong message in favour of gender equality in science. Gender equality must be practiced consciously. Institutions of higher education, funding institutions and also we as policy makers need to ensure that gender equality in science is shaped, promoted and required.

I thank all organisations and those involved for their commitment and wish you an inspiring, invigorating and effective conference.

Yours sincerely,



Karin Prien
Federal Minister for Education, Family Affairs, Senior Citizens, Women and Youth

We would like to express our sincere thanks to our sponsors. Without their support, we would not have been able to offer such low conference fees, especially for female students. The free workshops offered by external speakers could only be made possible with sponsorship funds.

We would also like to commend the AKC and jDPG for their moral support and active participation in the LOC. Both are working groups of the German Physical Society (Deutsche Physikalische Gesellschaft e.V.).

CAU research focus: KiNSIS "Kiel Nano, Surface and Interface Science" (unrestricted donation).

The Equal Opportunities Officer at CAU, as part of the Program for Women Professors (Professorinnenprogramm 2030) by the BMBF (student scholarships and the workshop "Do universities need a new enlightenment?").

The Equal Opportunities Officer of the Faculty of Mathematics and Natural Sciences from the equal opportunities budget (unrestricted donation).

Collaborative Research Center 1261, "Magnetoelectric Sensors: From Composite Materials to Biomagnetic Diagnostics" (unrestricted donation).

DAPHNE 4NFDI (data from photons and neutrons, experiments) (invited speaker and unrestricted donation)

Forschungszentrum Jülich (coffee breaks and unrestricted donation).

European X-Ray Free-Electron Laser Facility, Hamburg (coffee breaks and unrestricted donation)

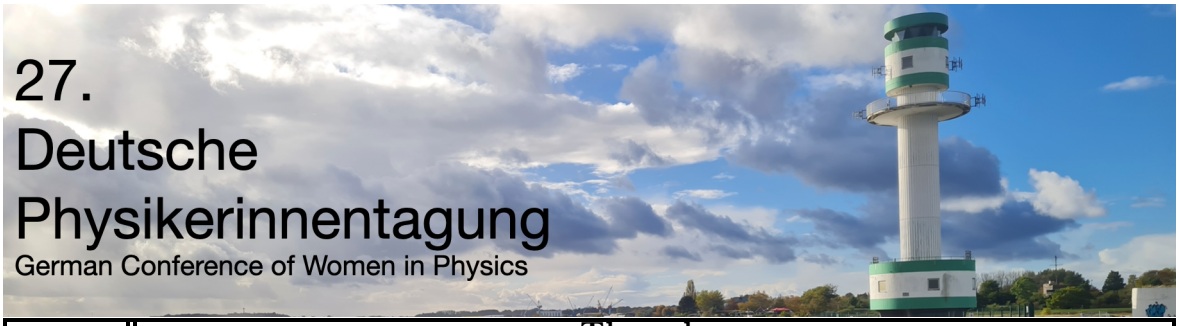
Deutsches Elektronen-Synchrotron DESY (student scholarships)

Cluster of Excellence Quantum Universe, University of Hamburg: workshops "Vocal Power: Speak with Confidence and Clarity" and "Physical Presence: Own the Room with Confidence"

Geomar Kiel: "Enabling Entrepreneurship: From Science to Practice"

D-Fine (unrestricted donation)

Tiller Alpha (unrestricted donation)



Thursday

Zeit	HGS	MPH	LS13-15	LS11-61	LS11-108
09:00-09:30	Welcome				
09:30-10:30	Science for Society				
10:50-12:30	Physics & Profession	P1: Equity	WS1	WS2	WS3
14:00-15:00	Plasma Catalysis				
15:00-16:30	Research ... at large Facilities	P2: Astro	WS1	WS2	WS3
17:00-18:30	Market place	Poster			
18:30-20:00					

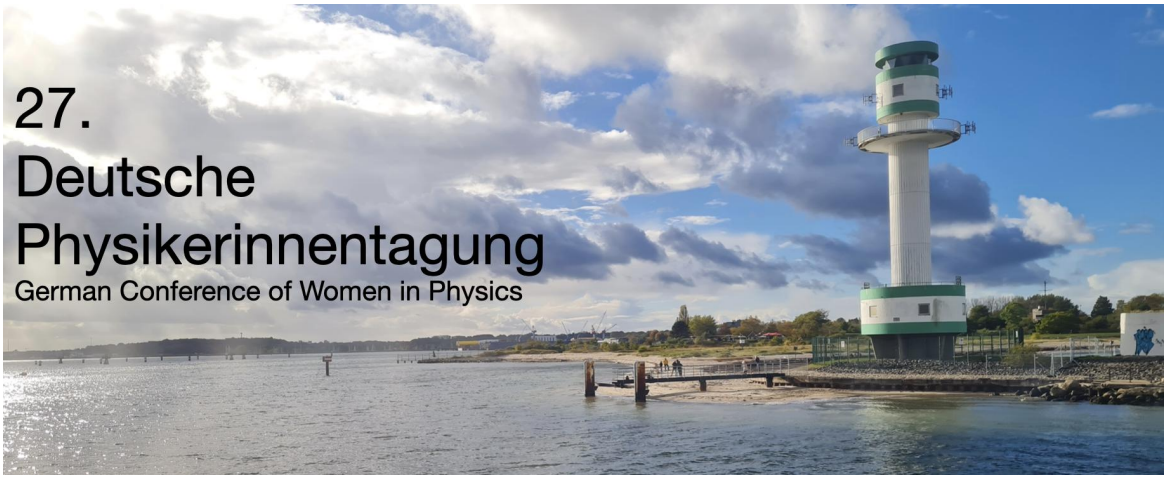
Friday

Zeit	HGS	MPH	LS11-109	LS11-309	LS13-15	LS13-60	LS19-514	labs
09:00-10:00	Unethical Behavior							
10:30-12:00	Quantum2025	P1: Equity	WS5	P3: Quantum/Material	WS1	P4: Fusion	WS6	lab visits
12:00-12:20								
13:30-14:30	Quantum computing							
14:30-15:30	Top quark							
15:30-16:00			WS5		WS1		WS6	
16:00-17:00		P6: Geophysics, ...						
17:00-18:00	Science Communication							
18:00-18:30								

Saturday

Zeit	HGS	MPH	LS11-109	LS13-60	LS13-61
09:00-10:00	Searching for Long-Lived Particles at the LHC and Beyond		Schülerinnenprogramm		
10:00-12:00	Panel discussion: Physics Careers: Stories of Challenge & Change				
13:00-14:00					WS 7
14:00-16:00	Info und Mitgliederversammlung des Arbeitskreis Chancengleichheit	P8: Mixed		P7: Micro-/Nanophysics	
16:00-17:00	Closing words & Poster Prize				

WS1 Enabling Entrepreneurship: From Science to Practice
WS2 Do universities need a new enlightenment?
WS3 Machine Learning in Physics
WS4 cancelled: Becoming appointable
WS5 Science Slam Workshop
WS6 Science Communication
WS7 Vocal Power – Speak with Confidence and Clarity/ Physical Presence – Own the Room with Confidence
P1 Equity, ethics, and empowerment
P2 Astrophysics & Particle Physics
P3 Quantum Effects, Materials Physics and others
P4 Plasma fusion
P5 Professional Development for the Productive Use of Digital Data Acquisition in the Physics Classroom
P6 Geophysics, Integrated Systems and Photonic
P7 Micro-/Nanophysics
P8 Mixed Session



Code of Conduct & Accessibility Statement

Creating a Safe, Respectful, and Inclusive Event for Everyone

We are dedicated to making this event a welcoming, inclusive, and safe space for all participants regardless of gender identity, sexual orientation, age, physical ability, appearance, body size, race, ethnicity, religion (or lack thereof), or technological preferences.

We value diversity in all its forms and are committed to fostering an atmosphere of mutual respect and openness. Everyone attending this event has the right to feel safe, heard, and included.

Respectful Behaviour is Expected from All Participants

To ensure a positive experience for everyone, we ask that all participants:

- Treat each other with respect, empathy, and professionalism
- Communicate in a constructive and inclusive manner
- Refrain from behaviour that could be perceived as harassment, bullying, or discrimination
- Respect personal boundaries and be mindful of different comfort levels
- Avoid disruptive, aggressive, or exclusionary conduct

Harassment of any kind will not be tolerated. This includes (but is not limited to) offensive verbal comments, intimidation, unwanted attention, inappropriate physical contact, sexual language or imagery, and disruption of talks or activities.

If you are asked to stop any behaviour that makes others uncomfortable, you are expected to comply immediately.

Accessibility & Inclusion

We believe that everyone should be able to fully participate in this event, regardless of physical, sensory, mental, or social circumstances. We are actively working to identify and remove barriers that could limit access or engagement.

Contents

Welcome Session

Opening words from the organizers, Karin Prien (Federal Minister of Education, Family Affairs, Senior Citizens, Women and Youth), Prof. Regina Scherließ (Dean of the Faculty of Mathematics and Natural Sciences), Prof. Nahid Talebi (GVM IEAP), the IPN, followed by organisational information. The welcome is accompanied by music by "Das Leise Trio".

Keynote talk / **116**

Science for Society: Connecting Physics, Education, and Communication Research

Author: Melanie M. Keller[1]

[1] *IPN Leibniz-Institute for Science and Mathematics Education, Kiel, Germany*

Corresponding Author: keller@ipn.uni-kiel.de

Physicists may not be exceptional –but they are the exception. Most people do not have an academic background in science beyond their school years. Yet, science plays a vital role in all our lives. As scientists, we depend on public support to fund research, and as a society, we depend on scientific knowledge to address complex, so-called "wicked problems"like climate change or pandemics and public health crises. This means that communicating the value and relevance of science, and enabling people to engage with it meaningfully, is not a side task. It is essential to science itself.
In schools, science education lays the groundwork for scientific literacy. But what does meaning-ful science education look like, what do students need to know about science in general and physics in particular? How do students learn science, and how can teaching adapt to diverse backgrounds and needs? These are questions science education research seeks to answer.
Fostering and applying scientific literacy, however, is a lifelong process –it doesn't end with school. How can we present scientific information so that it is accessible, relevant, and usable in everyday life? How do scientists contribute to informed public discourse, especially in the face of misinformation, polarization, or science denial? These are questions science communication re-search seeks to answer.
In this talk, I will argue why physics and science more broadly needs science education and communication research. I will focus on emotions as a boundary concept that connects these fields. Emotions shape, for instance, how we learn, what we value, whether we trust science, scientists or scientific institutions, how we assess risks, and how we make decisions. A deeper understanding of emotional processes not only helps us reach people more effectively; it helps us respect their perspectives and support their agency. In this way, emotions are not obstacles to science, but essential to making science matter.

Workshops / **38**

Enabling Entrepreneurship: From Science to Practice (Part 1)

The workshop aims to introduce interested individuals and researchers to entrepreneurial thinking and action, provide the basics of starting a business, strategic management, and corporate leadership, and offer the opportunity to enhance their own key qualifications and soft skills. In a blend of theory and practical work, a learning and working atmosphere will be created where new ideas can emerge, and where the research projects/results and ideas of the participants can find a path toward a potential future in entrepreneurship.

Physics and Profession / **97**

Career paths in science: Prospects at Forschungszentrum Jülich

Forschungszentrum Jülich is one of Europe's largest interdisciplinary research centres and is committed to excellence in science, innovation, and promoting young talent. In our presentation, we will provide an insight into the diverse work and research opportunities for physicists at FZJ –from scientific focus areas and individual career paths to framework conditions such as funding, networking, and work-life balance.

Workshops / **103**

Machine Learning in Physics

Corresponding Author: heidrich@physik.uni-kiel.de

Machine learning (ML) tools have been increasingly successful for a large variety of applications in recent years. However, not all ML methods are applicable to all tasks, in particular if the aim is to investigate and understand physical processes.
In this workshop, two different "ML in physics" applications are discussed. The aim of the workshop is an introduction to ML concepts and best practices, and uses a Jupyter notebook.

Parallel / **90**

Unethical Behaviour in Academia: Ain't Women of Color Women?

Author: Francine Uwera

Black US law professor Kimberlé Crenshaw coined the term intersectionality in 1989. Birthed from the Black Feminist movement, intersectional feminism aims to eliminate discrimination across the board, not just against women. Intersectionality describes simultaneous multiple discrimination on the basis of gender, race, ethnicity, age, class, and disability, making it a useful tool for analysing diverse realities. Koa Beck (2021) points out that white feminism did not emphasize these categories because it " […] focused on achieving gender equality, thereby emphasizing individual accumulation, capital, and individuality rather than the redistribution or reconsideration of power". Accordingly, "white feminism overlaps with white supremacy, classism, and transphobia."
It is common for women of color to experience racism and sexism simultaneously in their careers, as a result of racism and sexism intersecting. On the one hand, because patriarchy is based on masculinity and binary gender roles, it oppresses women and nonbinary people in general, denying them autonomy over their bodies and self-determination.
On the other hand, a white perspective and white experiences are typically reflected in the prevention, reporting, and sanctioning of sexual violence. Furthermore, women of color are underrepresented in university settings.
In light of these factors, we assess the specific impacts of unethical behavior in academia on women of color.

Parallel / **22**

What's wrong with me?

Author: Pauline Gagnon

Corresponding Author: pauline.gagnon@cern.ch

Why are sexism, homophobia and racism still so prevalent in physics? I start from my personal experience to demonstrate that in fact the personal is political. CERN, the largest physics laboratory in the world, welcomes scientists from 112 nationalities but still about 80% of them are white and 80% are male. I examine why people from so many various groups have been historically excluded from physics and suggest a series of easily applicable measures that could greatly improve diversity in physics. These measures would benefit all scientists, regardless of their gender, race, sexual orientation, physical ability or religion. It has been established that diversity benefits science by increasing the creativity potential, a key ingredient in scientific research.

Workshops / **33**

Do universities need a new enlightenment? (Part 1)

A common misconception about universities is that they are entirely objective and humanistic institutions. By establishing racial classifications and the basis of racism in modern science, the Enlightenment contributed significantly to the dehumanization of a large part of the human race while elevating another group. Furthermore, it was not originally intended that science and higher education would be accessible to everyone. While some progress has been made in inclusion and antiracism, universities remain challenged to overcome their racist history and heritage. Claims of "race neutrality" and colorblindness, meritocracy, research biases, publication database biases, and surprisingly, even an equal opportunity policy focusing on women overlook certain groups of individuals who struggle to achieve academic and professional success under extremely challenging circumstances. Regarding racism, the university does not sufficiently fulfill its knowledge transfer mission, both within its own institution and towards society. Recent developments in the USA are a reminder of how fragile antiracism policies at universities are, even after centuries.

The workshop will examine the interconnections between centuries-long postponements of frank debates on racism, power imbalances, and the impact of racism on society at large, and discuss recommendations for the future.

Physics and Profession / **98**

Working at the XFEL

Physics and Profession / Invited talk / **136**

Acoustic waves propagation, generation and abatement: a jolly mix of fluid and solid applications

Author: Claire Bourquard[1]

[1] *Eindhoven University of Technology*

This presentation will gives an overview of ongoing research into acoustic wave behaviour in both fluids and solids applications, highlighting their generation, propagation, and mitigation. From low-order modelling of aero- and hydroacoustic instabilities in piping systems, sonic cavitation and bubble dynamics to acoustic MEMS sensors, we will address the challenges of predicting and control-

ling acoustic behaviour in complex systems, through a combination of experimental techniques and modelling approaches. The talk will highlight the interplay between fluid dynamics, structural mechanics, and acoustics in engineering design.

Parallel / 46

Die Geschichte von AKC und DPT

Author: Agnes Sandner

Corresponding Author: agnes.sandner@icloud.com

Mit diesem Beitrag stellen wir Euch den Arbeitskreis Chancengleichheit (AKC) vor, eine fachübergreifende Vereinigung innerhalb der Deutschen Physikalischen Gesellschaft (DPG) mit über 850 Mitgliedern. Das Ziel des AKC ist die Verbesserung der Rahmenbedingungen und Strukturen für Frauen in der Physik zur Erreichung von Chancengleichheit in Ausbildung und Beruf. Hierzu gehört auch die jährlich stattfindende Physikerinnentagung. Die Tagung stellt eine Plattform zum Kennenlernen und Austausch dar, und sie erhöht so die Sichtbarkeit von Physikerinnen. Im Vortrag geben wir einen Überblick über die Geschichte des AKCs und der DPT von der Idee über die Gründung bis zum heutigen Zeitpunkt. Dabei zeigen wir zahlreiche Meilensteine auf, beginnend mit der Schaffung des AKCs und der DPT. Wir benennen die vielfältigen Aufgaben, die unsere Kommission und ihre Unterstützerinnen bearbeiten. Für die Gestaltung der Zukunft brauchen wir Euch, bitte teilt uns Eure Meinung, Wünsche und Ziele mit.

Parallel / 114

What theoretical physics can tell us about social interaction and politics

Author: Anne Forker

Anne Forker has studied physics from 2002-2010 and when she left, she thought it would be a goodbye for good. She spent her week days working in IT and her weekends learning about emergency medicine, reenacting accidents and volunteering with Red Cross and the German Agency for Technical Relief as well as a local mosque. However, the Corona pandemic brought an end to the membership at the German Agency for Technical Relief. This made her think about dynamics again - and she also learned about dynamics from a psychologist's view. This year we saw in Munich a celebration of Eid ul Fitr which largely exceeded the expected number of visitors which made her think about numbers again.
The talk will show how physics can be used to describe social dynamics. We will examine current events and even talk about politics.

Keynote talk / 24

A Physicist's Perspective on Plasma Catalysis: Applications, Challenges, and Opportunities

Author: Judith Golda[1]

[1] *Ruhr University Bochum*

In light of the current climate crisis, scientists around the world are searching for innovative solutions that could play a major role in the electrification of the industry. A new focus in this field is

the combination of plasmas with catalysis as a key process to store renewable energy in chemical resources. Plasma catalysis is an emerging interdisciplinary field at the intersection of plasma physics, surface science, and chemical engineering, offering novel pathways for driving chemical reactions under non-equilibrium conditions.
This talk will introduce the fundamental principles of plasma catalysis, focusing on how non-thermal plasmas interact with catalytic surfaces to enable and enhance chemical transformations that are otherwise challenging under conventional thermal conditions. We will explore the unique physical mechanisms at play, including the generation of reactive species, energy transfer processes, and the role of surface-plasma synergy. Recent experimental and theoretical advances will be highlighted, with particular attention to applications in sustainable energy, such as CO_2 conversion and ammonia synthesis. Throughout the talk, I will emphasize the open questions and opportunities for physicists to contribute to this rapidly developing field, from modeling plasma-surface interactions to designing new plasma reactor architectures. The goal is to provide a comprehensive overview that bridges fundamental plasma physics with real-world catalytic applications, inspiring further research and collaboration.
This research is funded by the German Research Foundation within CRC 1316.

Workshops / **35**

Enabling Entrepreneurship: From Science to Practice (Part 1)

The workshop aims to introduce interested individuals and researchers to entrepreneurial thinking and action, provide the basics of starting a business, strategic management, and corporate leadership, and offer the opportunity to enhance their own key qualifications and soft skills. In a blend of theory and practical work, a learning and working atmosphere will be created where new ideas can emerge, and where the research projects/results and ideas of the participants can find a path toward a potential future in entrepreneurship.

Workshops / **104**

Machine Learning in Physics

Corresponding Author: heidrich@physik.uni-kiel.de

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Quantum Universe Attract.Workshop

Author: Quantum Universe Excellence Cluster[1]

[1] *Universität Hamburg/DESY*

The Cluster of Excellence Quantum Universe at the University of Hamburg and DESY cordially invites final year Master students, doctoral researchers and postdoctoral researchers in particle physics, astroparticle physics, astrophysics and mathematical physics/mathematics to our Attract.Workshop. The Workshop gives you the chance to discover our labs. Meet our researchers. Explore your future. Take your chance to find out if you and Quantum Universe would be a perfect fit! We would be pleased to have female physicists participate in the workshop and therefore expressly invite them to apply!

More information: https://indico.desy.de/event/50023/

Parallel / 68

Simulation of heavy neutral lepton production and decays with the Sherpa event generator

Author: Antonia Bahr[1]

[1] *TU Dresden*

Corresponding Author: antonia.baehr@mailbox.tu-dresden.de

The Standard Model has been proven to be valuable theory for explaining the fundamental principles of particle physics, however, some open questions still remain. Amongst other things, these questions revolve around neutrinos, particularly why they are so much lighter than other leptons. Furthermore, the Standard Model only contains left-handed neutrinos, as right-handed ones, also known as sterile neutrinos, would not be affected by any of the fundamental forces, apart from gravity.
There are several theories trying to explain these phenomenons, one of them is the see-saw mechanism. There, right-handed neutrinos are introduced, resulting in the Lagrangian density not only containing a Dirac but also a Majorana mass term. Because of this, there are two neutrino mass eigenstates, a light and a heavy one. The light neutrino is expected be the one that has already been observed in numerous experiments while the heavy one would be a new kind of particle, a heavy neutral lepton.
Since the heavy neutral lepton would mostly be right-handed, it is not easily detectable. However, there are searches going on, for instance at the LHC. To achieve this and understand these processes better, we are simulating the production of heavy neutral leptons in proton-proton collisions and their decay using Sherpa, a Monte Carlo event generator for the simulation of high-energy reactions.
In this study, we will especially include the hadronic decays of the heavy neutral leptons and the vertex offsets, as heavy neutral leptons are relatively long lived particles and therefore do not decay immediately.
In this talk I will present the first results from these simulations in context of a typical LHC setup

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Do universities need a new enlightenment? (Part 2)

A common misconception about universities is that they are entirely objective and humanistic institutions. By establishing racial classifications and the basis of racism in modern science, the Enlightenment contributed significantly to the dehumanization of a large part of the human race while elevating another group. Furthermore, it was not originally intended that science and higher education would be accessible to everyone. While some progress has been made in inclusion and antiracism, universities remain challenged to overcome their racist history and heritage. Claims of "race neutrality" and colorblindness, meritocracy, research biases, publication database biases, and

surprisingly, even an equal opportunity policy focusing on women overlook certain groups of individuals who struggle to achieve academic and professional success under extremely challenging circumstances. Regarding racism, the university does not sufficiently fulfill its knowledge transfer mission, both within its own institution and towards society. Recent developments in the USA are a reminder of how fragile antiracism policies at universities are, even after centuries.

The workshop will examine the interconnections between centuries-long postponements of frank debates on racism, power imbalances, and the impact of racism on society at large, and discuss recommendations for the future.

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Laboratory Characterization of an Enhanced Lateral Drift (ELAD) Sensor Prototype

Author: Judith Schlaadt[1]

Co-authors: Anastasiia Velyka [1]; Doris Eckstein [1]; Gianpiero Vignola [1]; Simon Spannagel [1]

[1] *DESY*

Corresponding Author: judith.schlaadt@desy.de

The development of vertex and tracking detectors for future lepton colliders faces various challenges regarding time and position resolution while maintaining a low material budget and the capability to process high particle rates. In this context, one method to improve the position resolution of a sensor is to reduce the pitch size. This approach also allows to maintain a small position resolution while reducing the material budget. This is especially relevant for vertex detectors as the reduced sensor thickness in this case results in reduced charge sharing between neighbouring pixels, which otherwise would negatively affect the position resolution. On the other hand, reducing the pitch size results in a higher number of pixels, thus an increased readout bandwidth would be required. In addition, the pitch size is mechanically limited due to bump bonding.
The enhanced lateral drift (ELAD) sensor prototype addresses the aforementioned requirements for applications in future lepton colliders while avoiding the disadvantages of a reduced pixel pitch by featuring a multiple-layer design, which allows for the precise tracking of charged particles. The different layers of this silicon sensor include buried doping implants to locally modify the electric field. Due to this, the drift path of charge carriers in the sensor volume is altered, thus allowing for position-dependent charge sharing between neighbouring pixels, which results in an improved interpolation of the impact position. This talk presents preliminary results of the laboratory characterisation of an ELAD sensor prototype.

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Research with Synchrotron Radiation, Neutrons and Ion Beams at Large Facilities

Author: Karin Griewatsch[1]

[1] *Hereon*

Corresponding Author: info@sni-portal.de

Understanding and controlling the properties of materials at the atomic level is the basis for modern, sustainable technologies. We therefore need methods that provide precise insights into the structure and dynamics of matter - e.g. synchrotron radiation, neutrons and ion beams, which are available in large-scale research facilities. Research highlights show the potential of these probes.

Access to these methods may not be as easy as working in your own lab, but it offers great advantages: Once your proposal is accepted, you will have access to a wide range of infrastructure, from support labs to beamline scientists who can advise you, as well as software and data repositories that you can use. You will be part of a vibrant community that is excited by the possibilities of large-scale instrumentation research.

To realise the full potential, the elected interest groups Committee for Research with Synchrotron Radiation (KFS), Neutrons (KFN), Nuclear Probes and Ion Beams (KFSI) and Accelerator Physics (KfB) coordinate the use of these complementary methods and promote their synergies. They work for the users, but the users should also support them - by taking part in the elections and possibly also standing as a candidate and becoming a member of the committee. I will give some insight into the committee's work.

Did you know that you don't have to be a professor to search for BMFTR funding in ErUM-Pro? Would you be interested in leading a BMBFT-funded junior research group? Did you know that the committees award prestigious prizes to young researchers working with neutrons and synchrotron radiation? Would you like to attend the German Conference on Research with Synchrotron Radiation, Neutrons and Ion Beams at Large Facilities (SNI2026, Hamburg, 8-10 Sept. 2026) to learn more about the research field? We offer this kind of information when you subscribe to our newsletters. Take a look at https://www.sni-portal.de.

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Search for long-lived Axion-Like Particles in association with a top-quark pair with CMS

Authors: Freya Blekman[1]; Jeremi Niedziela[2]; Juliette Alimena[3]; Lovisa Rygaard[3]

[1] *DESY/University of Hamburg*

[2] *DESY*

[3] *CMS (CMS Fachgruppe Searches)*

Corresponding Author: lovisa.rygaard@desy.de

We are searching for long-lived Axion-Like Particles produced in association with a top-antiquark pair, in proton-proton collisions with the CMS detector at the LHC. Compared to inclusive searches for a displaced vertex, top quark-associated signals offer new trigger options and an extra handle to suppress background. The search strategy includes axion-like particle decays to a displaced dimuon vertex, which further contributes to the suppression of prompt background. The search is done using full CMS Run 2 data (2016-2018) and partial Run 3 data (2022-2023).
In this talk, we will present the ongoing efforts for the first CMS analysis searching for this signature.

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Jet performance and pileup mitigation in Run 3 in CMS

Author: Anna Benecke[1]

[1] *UCLouvain*

Corresponding Author: anna.benecke@desy.de

With the start of Run 3 data taking the standard pileup mitigation technique for the CMS Collaboration is the Pileup Per Particle Identification (PUPPI) algorithm. Recently, the track-vertex association in PUPPI was optimised in order to recover an inefficiency for hadronically decaying

 leptons at low transverse momentum ( ). The jet energy scale and resolution are sensitive to many different subdetector systems, making continuous monitoring crucial. It is shown that Run 3 promptly reconstructed data have an excellent jet energy resolution performance with respect to Run 2.

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FAIR data for better science from DAPHNE4NFDI

Author: Bridget M. Murphy

The main goal of DAPHNE4NFDI is to increase FAIRness of data for the Photon and Neutron (PaN) user community to increase the scientific impact gained from this valuable data. Aims include improving data reusability, for example by providing annotated datasets for training of Machine Learning (ML)–based analysis tools. Research in the PaN community is performed at large-scale research facilities, where user groups conduct specialised experiments after competitive peer review. This shared access point gives DAPHNE4NFDI a unique opportunity to inform users, promote, and distribute research data management tools, provide services and implement FAIR principles in the community.

In its first funding period, DAPHNE4NFDI established and validated demonstrator data pipelines and databases across the following topics: TA1: Managing Data Production focuses on metadata standardization and collection during experiments for the subsequent data processing and analysis. TA2: (Meta)data Repositories and Catalogues aims to improve findability and accessibility of data via federated metadata catalogues and open data repositories. TA3: Infrastructure for Data and Software Reuse focuses on FAIR scientific software and analysis tools.

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Solar Modulation of Galactic Cosmic Rays with the Alpha Magnetic Spectrometer

Author: Lisa Romaneehsen[1]

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The Earth is constantly hit by energetic particles originating from galactic sources. The flux of these particles is altered by the magnetized solar wind in the heliosphere. These modulation effects occur on different timescales: long-term variations are driven by the 11-year solar cycle, while short-term decreases are caused by transient structures such as Forbush decreases (FDs).

In this talk, we investigate the solar modulation of galactic cosmic rays (GCRs) using published high-precision daily fluxes from the Alpha Magnetic Spectrometer (AMS-02) onboard the International Space Station. AMS-02 is a state-of-the-art cosmic ray detector equipped with multiple subdetectors, enabling accurate charge and energy measurements from hundreds of MeV up to the TeV range. This enables detailed studies of both long-term solar cycle effects and short-term modulation events, with a focus on the charge-sign dependence predicted by drift models. The results help to characterize the role of solar magnetic polarity in cosmic ray modulation.

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Design, Fabrication, and Characterization of Ta/Si Multilayer X-ray Mirrors Based on Bragg Reflection

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Multilayer X-ray mirrors using Bragg reflection are essential for applications requiring enhanced reflectivity at higher grazing incidence angles, such as hard X-ray telescopes, synchrotron beamlines, and free-electron laser optics. These mirrors are constructed from periodic bilayers of high and low refractive index materials, enabling constructive interference of reflected X-rays at well-defined incident angles determined by Bragg's law.
In this work, we report on the design, fabrication, and structural characterization of a Ta/Si multilayer X-ray mirror. The mirror consists of 7 bilayers with a bilayer period of 14.5 nm, and a Si layer thickness ratio of 0.5. Tantalum (high-Z) serves as the reflecting layer, while Silicon acts as the low refractive index spacer. Deposition was carried out using Ion Beam Sputtering under optimized conditions to minimize roughness, control stress, and ensure good interfacial adhesion.
Characterization was performed using X-ray Reflectometry (XRR) with a Cu Kα source (λ = 1.541 Å). The sample exhibited a Bragg peak at 0.94°, corresponding to first-order constructive interference at an energy of 8.048 keV, and showed a maximum reflectivity of 13%. The reflectivity profile is consistent with simulation based on the designed periodicity and materials, confirming the structural integrity of the multilayer stack.
Challenges such as interfacial diffusion, roughness evolution, and mechanical stress were considered during the design process to improve mirror performance. The results validate the potential of Ta/Si multilayer systems for high-efficiency X-ray optics, enabling more compact and sensitive designs for high-energy photon instrumentation.

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Towards non-invasive quantification of intracellular activity

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To investigate intracellular activity and the associated deviations from thermodynamic equilibrium, we study the fluctuations of endogenous vesicles and phagocytosed beads in various cell types. Experimentally, we combine darkfield microscopy with high-speed imaging and advanced image post-processing techniques, enabling the acquisition of trajectories with spatial and temporal resolution in the order of nanometers and milliseconds, respectively.
We apply a novel observable, termed *Mean Back Relaxation* (MBR) [Münker et al., Nature materials, 2024], to these trajectories. The MBR quantifies non-equilibrium in confined systems by linking the fluctuations of intracellular particles to their effective energies. In doing so, we aim to extend the principles of passive microrheology to non-equilibrium environments. The MBR of our obtained trajectories exhibits pronounced anisotropies, which we seek to correlate to local cellular structures.

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Force optimization for novel stellarator-tokamak hybrid coils

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The novel perturbed tokamak concept seeks to leverage the strengths of both tokamaks and stellarators in a hybrid machine for magnetic confinement fusion. In recent work, S. Henneberg and G. Plunk (2024), as well as T. Schuett and S. Henneberg (2024) introduced a quasi-axisymmetric (QA) design that offers several advantages, including a low aspect ratio for a large plasma volume, fast particle confinement, and simple coil geometry. As a proof of principle, they developed an initial coil set using conventional poloidal and toroidal tokamak coils along with on single type of nonplanar stellarator coils. However, engineering constraints beyond simple geometrical measures were not considered in their design. This study focuses on optimizing the coils for different candidate configurations to closely match the plasma boundary and maintain the desired QA properties, while incorporating practical buildability limitations. To achieve this, we successfully employed a two-stage optimization process, utilizing a new method by S. Hurwitz et al. (2024) to calculate the forces acting on the coils.

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Modeling controlled sub-wavelength plasma formation in dielectrics

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Laser induced damage in dielectrics due to short pulse excitation plays a major role in a variety of scientific and industrial applications, such as the preparation of 3D structured evanescently coupled wave-guides 1 or nano-gratings 2. The corresponding irreversible material modifications predominantly originate from higher order nonlinearities like strong field ionization and plasma formation, which makes their consistent description imperative for any kind of theoretical modelling aiming at improving user control over these modifications. In particular the associated feedback effects on the field propagation can have drastic implications.

We developed and utilized a numerical model, that combines a local description of the plasma dynamics in terms of corresponding rate equations for ionization, collisions and heating with a fully electromagnetic field propagation via the Finite-Difference-Time-Domain method, adding self-consistent feedback effects like the sudden buildup of plasma mirrors. Here we present recent numerical results regarding the creation and control of sub-wavelength gratings formed at the rear side of pure and gold-coated fused silica films.

1 L. Englert et al, Opt. Express 15, 17855-17862 (2007)

2 M. Alameer et al, Opt. Lett. 43, 5757-5760 (2018)

Poster session / **47**

Finding the Right Funding Programme

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The German Research Foundation (DFG) is the central self-governing research funding organisation in Germany and the largest of its kind. Governed by the scientific community, the DFG supports outstanding research projects and promotes collaboration among researchers. It offers a wide array of funding opportunities —ranging from individual grants to large coordinated programmes. This poster provides an overview of individual funding schemes for researchers at various career stages, from the postdoctoral level to research group leaders and professorships.
Further information about other funding programmes, particularly coordinated initiatives, can be obtained during personal discussions.

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PHYSIKERINNEN: Zahlen und Fakten

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Aktuelle Daten zur Situation von Physikerinnen in Deutschland sowie deren Entwicklung in den letzten Jahren werden präsentiert. Während des Studiums und im Berufsleben treten immer wieder Fragen auf wie: „Werden Frauen immer noch benachteiligt?“oder „Gibt es mittlerweile genügend weibliche Vorbilder in der Physik –gerade auch in Bezug auf die Vereinbarkeit von Familie und Beruf?“und „Wie viele Physikerinnen gibt es eigentlich in Deutschland?“. Der Arbeitskreis Chancengleichheit (AKC) der Deutschen Physikalischen Gesellschaft (DPG) stellt solche Daten regelmäßig auf der Basis des Materials des statistischen Bundesamts zusammen und ergänzt sie durch eigene Erhebungen der DPG. Die aktuellen Daten werden vorgestellt und diskutiert.

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Investigating the Impact of Isotropy Assumptions in EPT Measurements Using STEP Observations: A Comparative Study of Solar Events

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The Energetic Particle Detector (EPD) onboard ESA’s Solar Orbiter spacecraft was developed and built by the Institute for Experimental and Applied Physics at the CAU Kiel. It includes several sensors designed to measure energetic particles in the heliosphere. Among these, STEP (Suprathermal Electron and Proton Telescope) and EPT (Electron Proton Telescope), both based on silicon solid-state detectors, are key instruments covering partially overlapping energy ranges.

EPT consist of four telescopes, orientated in the sunward, anti-sunward, northward and southward directions. It measures electrons in the energy range of 25 –475 keV and ions from 25 keV to 6.4 MeV. Due to its wide, non-segmented field of view, EPT assumes an isotropic particle distribution within each telescope’s view cone.

In contrast, STEP, which also points in the sunward direction provides a higher angular resolution of incoming particles through its segmented detector with 15 individual pixels and operates in the lower energy range of 2-80 keV.

Anisotropic behaviors have been observed in STEP data during solar events, highlighting the potential influence of directional particle distribution on measurement interpretation. Since STEP shares the field of view with the sunward-pointing EPT telescope and offers higher angular resolution, it presents a valuable opportunity to examine how EPT's assumption of isotropy affects its observations.

Solar events often show a clear velocity dispersion, where faster particles arrive before slower ones. This signature will be used to compare STEP and EPT measurements and evaluate how anisotropic distributions influence the interpretation of energetic particle data.

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Local differences in feature importance for the prediction of PM10, O3 and NOx using Dresden as example

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In 2022 over 360,000 premature deaths could be accounted to exposure to air pollutants in the EU member states according to the European Environment Agency (2024). The main pollutants are: Particulate Matter (PM), Ozone (O_3) and Nitrogen Oxides (NO_x $x \in 1, 2$).

To decrease causalities, there has been a great effort to model air pollutants with high spatio-temporal resolution. Physical models have the great advantage of high accuracy, are however computationally expensive. There as been an effort to use faster machine learning based models to predict air quality. In these models, meteorological data is commonly used to predict the air quality. The VAMOSlab provides traffic data in Dresden with high resolution, which is a promising feature since transportation contributed with 37% to the NO_x pollution in Germany in 2023 (Umweltbundesamt, 2025). Due to the availability of the traffic data, this study uses Dresden as a case study.

We use a time series of 2023 at three different measurement locations within Dresden: One station with high traffic volume, one with lower traffic volume, and one as a reference in the rural background. After preprocessing the data, we compute correlation coefficients, mutual information and perform a random forest based feature importance to identify the relevant features for prediction.

The traffic volume appears to be an important predictor for the air pollutants, especially NO_x. Additionally, the wind speed, which accounts for transportation effects and the humidity and temperature seem to be important predictors. The findings provide a robust foundation for the development of sophisticated spatio-temporal models aimed at enhancing air quality in urban environments.

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Plasma-enhanced atomic layer deposition of ultra-thin and conformal cobalt nitride catalyst layers

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Earth-abundant electrocatalysts—such as transition metal oxyhydroxides and oxides—have emerged as promising and cost-effective alternatives to noble metals for water-splitting applications. To be viable, these electrocatalysts must meet several critical criteria, including long-term chemical stability, adequate electronic conductivity to support efficient charge transfer, and high intrinsic catalytic activity. Recent research has focused on enhancing non-noble metal catalysts through material design and structural engineering. Disordered and porous architectures, in particular, offer improved activity due to a higher density of active sites and larger surface areas compared to crystalline materials. However, these structural advantages often come at the cost of reduced stability under operational conditions, frequently due to electrochemical degradation or insufficient adhesion to the supporting substrate. To address these challenges, strategies focusing on catalyst-support integration and interface engineering have become essential for achieving electrocatalytic layers that are not only highly active but also durable during long-term operation. To move beyond typically applied metal oxyhydroxides and oxides, we apply PE-ALD to grow cobalt nitride catalyst layers. Specifically, we employ $\mathrm{Co(DAD)_2}$ as a precursor and systematically explore the impact of deposition parameters on film composition, morphology, and catalytic activity. Reactants, plasma parameters, and substrate temperature are optimized for high Co and low oxygen and carbon content. Interfacing these conformal and ultra-thin catalytic layers with semiconductor light absorbers is a promising strategy to overcome the poor efficiency and material stability of the semiconductor photoelectrodes under harsh photoelectrochemical operating conditions.

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(Sub-)MM and infrared analysis of Vinyl Chloride

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Recently, methyl chloride ($\mathrm{CH_3Cl}$) was detected with ALMA toward the infant star system IRAS 16293–2422 and with the Rosetta space probe in the atmosphere of the comet 67P/C–G[1]. This gives rise to the question if vinyl chloride ($\mathrm{CH_2CHCl}$) might also be present in these or other astronomical sources. Previous laboratory millimeter and sub-millimeter ((sub-)mm) wave studies were limited in quantum number and frequency coverage[2] whereas previous infrared (IR) studies did not cover ν_9, the energetically-lowest fundamental[3]. Here, we report high-resolution (sub-)mm and IR investigations of vinyl chloride performed in Cologne and at the SOLEIL synchrotron, respectively. The rotational spectrum was recorded from 170 to 1100 GHz, which resulted in more than 3000 newly assigned transitions for the ground state of $\mathrm{C_2H_3^{35}Cl}$ while simultaneously reducing the RMS from 147 kHz to 47 kHz. In addition, the vibrational satellite spectrum of the energetically lowest deformation mode ν_9 has been assigned for the first time. The preceding rotational analysis of the ground vibrational state allowed us to speed up the analyses of the infrared bands using the Automated Spectral Assignment Procedure (ASAP)[4]. The two energetically lowest fundamentals ν_9 and ν_{12} can be readily assigned for both $\mathrm{C_2H_3}\ ^{35}\mathrm{Cl}$ and $\mathrm{C_2H_3}\ ^{37}\mathrm{Cl}$. These results will then greatly facilitate pure rotational analyses of the respective vibrational satellite spectra. Based on the new ground state rotational data, highly accurate frequency predictions enable astronomical searches of both isotopologues over a wide frequency and quantum number range.

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Investigating Transient Effects To Improve The Footprint In Magnetron Sputtering

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Precision in nanoscale material deposition is critical for advanced optical and semiconductor applications, where even slight thickness variations can degrade performance. Magnetron sputtering, a widely used plasma-based thin-film deposition technique, plays a central role in fabricating multilayer coatings for such applications. This work investigates position dependent thickness variations in Mo/Si multilayers critical components in extreme ultraviolet lithography (EUVL) to improve deposition uniformity and interface quality. In magnetron sputtering, deposition can occur under static or dynamic conditions. In the static mode, the substrate remains fixed beneath the target, allowing detailed analysis of localized deposition characteristics. In contrast, the dynamic mode involves substrate motion, which averages out spatial variations and enhances overall uniformity. Initial static deposition experiments on individual Mo and Si layers revealed a consistent increase in thickness with repeated runs. This was primarily attributed to oxidation during idle times and variability from repeated target ignition common issues in non continuous sputtering. To mitigate these effects, dynamic deposition with continuous target ignition and substrate rotation was introduced. The study was extended to full Mo/Si multilayer stacks under both static and dynamic conditions. Results showed significant interdiffusion between Mo and Si, leading to layer shrinkage with increasing periods, especially under static conditions. To address this, thin barrier layers were introduced at interfaces, effectively suppressing intermixing and enhancing structural stability and predictability in f ilm growth. Dynamic multilayer deposition with barrier layers demonstrated superior performance by minimizing oxidation, reducing ignition induced variability, and limiting interdiffusion, leading to significantly improved footprint uniformity. However, some degree of interdiffusion remained, indicating that barrier layers provide partial but not complete suppression. Despite the advantages of dynamic deposition in achieving uniform coatings, static sputtering remains crucial for studying intrinsic deposition characteristics. Because it directly reflects the target's emission profile, it allows for precise evaluation of thickness and local footprint errors. Comparative studies using Mo/Si bilayers with 10 and 20 periods further confirmed that oxidation and ignition effects lead to apparent thickness increases, while interfacial interdiffusion contributes to reductions. By decoupling these effects, the study provides a clearer understanding of how each mechanism impacts overall film quality. This work presents a comprehensive approach from identifying deposition errors to implementing material and process level improvements that enhances thin film growth dynamics and interface integrity. These f indings are particularly relevant to high precision multilayer applications such as EUV lithography mirrors, multilayer Bragg reflectors, and X-ray optics, where tight control of layer thickness and interface sharpness is critical. The strategies demonstrated here offer valuable guidance for optimizing magnetron sputtering processes to achieve reliable, scalable, and high-performance multilayer thin-film systems.

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Opinion Dynamics: A Review of Recent Trends and a Comparative Study of Classical Assumptions

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Opinion dynamics research investigates how individual opinions evolve through social interaction, producing collective patterns such as consensus, polarization, and dynamic disagreement. Classical models —including threshold, bounded confidence, averaging, and game-theoretic approaches — have provided foundational insights that continue to underpin the field. However, recent empirical findings and digital-era phenomena have highlighted the need to extend and refine these classical assumptions. This work presents a narrative review of developments in the field since 2017, identifying five key trends that build on and challenge the classical foundations: media and algorithmic influence, emotions and cognitive biases, dynamic and adaptive networks, multidimensional opinion spaces, and empirically calibrated models. Building on this synthesis, we implement a comparative simulation study of classical assumptions in an agent-based setting, to assess how well they account for observed phenomena. The results show that social influence and bounded confidence assumptions lead to sharp transitions between polarized, mixed, and consensus states, with outcomes fairly independent of initial conditions, network structure, and noise. In contrast, classical complex contagion threshold assumptions appear much more sensitive, producing outcomes that depend strongly on these initial conditions. These findings illustrate how classical assumptions remain valuable as a baseline while revealing their limitations in explaining the diversity of opinion dynamics observed today.

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Electronic structure of V-doped WSe_2

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Spintronics is an energy-efficient alternative to conventional electronics, with potential applications in areas such as classical and quantum computing. Vanadium-doped 2*H*-WSe_2, a layered transition metal dichalcogenide, is a possible candidate for achieving the desired magnetic semiconducting behavior at room temperature with gating tunability. We grew the material using chemical vapor transport with different vanadium doping concentrations and conducted a comprehensive electronic structure study using soft X-ray, VUV and 11 eV-laser angle-resolved photoelectron spectroscopy (ARPES). Our results demonstrate how low V doping concentrations influence the electronic structure of WSe_2.

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How important is atmospheric blocking for spring warm extremes in Europe?

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Spring in particular can carry impact-relevant extreme events over Europe, such as late frost or early summer heat. However, the dominating mechanisms and drivers of such temperature extremes in European springtime are still not fully understood. Across all seasons, one mechanism relevant for temperature extremes in Europe is atmospheric blocking. Unlike winter, where blocking is predominantly related to cold spells, and summer, where blocking is predominantly related to warm spells, spring is a transition period during which both cold and warm spells might be connected to blockings. Here we re-assess to what degree blocking can help to understand warm temperature extremes in the transition season spring.
While this transition has been statistically analysed before, available time series were limited, as was, in turn, the spatial analysis. Here, using ERA5 and E-OBS reanalysis data (1950-2023) with more than twice the amount of available years, we confirm existing literature on the statistics and the change of blocking patterns throughout the spring season, although our work indicates more early spring warm spells than previously found. The expanded data also enable a regional assessment: Comparing springtime occurrences of blocked and unblocked warm spell days shows that in Northern Europe, warm spells often occur simultaneously with blocking, whereas in Southern Europe, warm spells less frequently occur simultaneously with blocking. Based on these findings, we further explore the atmospheric conditions associated with spring warm spells, considering the spatial relationship between detected conditions and warm spells.

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Testing the Standard Model with the Neutron Decay Experiment PERKEO III

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Neutrons decay into protons via the weak interaction through the conversion of a down quark into an up quark, emitting an electron and an electron anti-neutrino. Measurements of the electron spectrum from free neutron decay enable a variety of tests of the Standard Model of particle physics. Observables of neutron decay are, among others, the β-asymmetry A and the Fierz interference term b. Through precision measurements of A, which describes the angular correlation between the neutron spin and the momentum of the emitted electron, we have access to the CKM matrix element V_{ud} . The CKM matrix describes the mixing between different quark flavors in weak interactions where V_{ud} represents the transition probability from up to down quarks. Precise measurements of V_{ud} are crucial to test the unitarity of the CKM matrix, predicted by the Standard Model. The Fierz term b is zero in the Standard Model. A non-zero b would modify the shape of the measured electron energy spectrum and would imply the existence of interactions beyond the predictions of the Standard Model.

PERKEO III was set up several times at the Insitut Laue Langevin in Grenoble, France. A beam of low energy neutrons, coming from the reactor, is guided into the 2 m long decay volume of the experiment, in which some of the neutrons decay. The charged particles from the decay follow the magnetic field toward one of two scintillation detectors with PMT readout.

Based on a measurement campaign in 2009, we obtained the currently most precise direct determinations of A and b from β-spectrum measurements, using a combined fit to the experimental β-asymmetry. A subsequent measurement campaign in 2019/20 aimed to measure the electron spectrum from unpolarized neutrons to extract an improved limit for the Fierz interference term b. This

method offers higher statistical sensitivity but is systematically challenging. We present experimental details and give insights into the ongoing analysis.

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Characterization of pure electron plasmas in a levitated dipole

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A Positron Electron eXperiment (APEX) collaboration seeks to produce and study electron-positron plasmas in toroidal traps. To understand these electron positron plasmas, a type of pair plasma, we also seek to study the separate non-neutral plasmas (NNP) that will eventually be combined.
Laboratory NNPs typically consist of only one species of charge. In this case, a pure electron plasma is studied. In a device with open magnetic field lines, such as a Penning trap, the trapped plasma can be ejected along the field lines and analyzed. When dealing with a toroidal device and closed magnetic field lines, such as APEX's compact levitating dipole (APEX-LD) 1, NNPs must be analyzed in a different, preferentially non-invasive manner.
Wall probes allow for non-invasive measurements of time-varying density perturbations present in a plasma 2. However density perturbations do not always exist, therefore additional diagnostics are required to establish the presence of a plasma and determine the confinement time.
In this contribution, the results of a new, non-destructive electron beam diagnostic are presented. Electrons are emitted onto open field line passing through the center of the floating coil and collected on the opposite side. When a NNP is trapped in the dipole, its space charge potential can reflect the electron beam; the collected current therefore provides a way to determine the potential of the trapped plasma as depending on the beam energy.
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Poster session / 78

Characterization of microfluidics for high-throughput field-resolved infrared spectroscopy of particles in flow

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In the last decade field-resolved infrared spectroscopy (FRS), a broadband, laser-based spectroscopic technique covering a vast part of the mid-infrared (mid-IR) range, has reached record detection sensitivities and dynamic range values 1. This makes FRS suitable for the investigation of biological samples with high water content and in their natural aqueous environment, despite the strong attenuation of mid-IR light by water 2. Combining FRS with flow cytometry enables the possibility for label-free investigation of a great number of individual cells in a short time, potentially exceeding thousands of cells per second 3. However, for a reliable FRS measurement of particles in flow it is essential that the particles pass through an IR-compatible microfluidic chip in a corridor of a certain width, the so-called lamella, in a highly repeatable manner.
Here we present the performance of a home-made IR-compatible microfluidic chip developed for FRS, in terms of the lamella width and its central position stability. The central position of the lamella should coincide with the center of the IR focus, should be constant, and the lamella should be narrow to ensure that all particles passing the microfluidic chip can be spectroscopically characterized.
Initial tests of lamella stability were performed using a dye solution to visualize and monitor the position of the dark band (i.e., lamella) in the center of the microfluidic channel. Subsequently, we introduced polystyrene bead suspensions in a density-matched buffer and THP-1 cell suspensions to track particles and their positions over time for the characterization of the temporal lamella stability. Once a stable lamella was confined within the typical width of an IR focus for FRS applications, we investigated how the concentration of the particle suspension impacts system throughput in terms of number of particles per second passing the microfluidic chip. Based on these characterization measurements we designed an approach for optimization of microfluidic parameters to obtain thin and stable lamella at a maximum throughput of 200 particles/s and typical root-mean-square lateral jitter values of 12 µm.

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Influence of Mo doping on charge density waves in 1T-TaS_2 studied via laser ARPES

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Controlling charge density waves (CDWs) in quantum materials enables the tuning of their electronic properties, offering potential for future electronic and optoelectronic applications. 1T-TaS_2 exhibits various temperature-dependent CDW phases, which we aim to modify through doping. We introduced molybdenum as a dopant during the crystal growth via the chemical vapor transport method. Using laser-based 11-eV ARPES, we investigated the differences in the electronic band

structure between doped and pristine TaS_2 crystals. Our results demonstrate that different CDW phases persist at low doping concentrations, albeit with modified transition temperatures.

Poster session / **76**

Spectroscopic Characterization of Conventional versus Alternative Divertor Configurations

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Addressing climate change requires sustainable, carbon-free energy sources.
A promising solution could be the use of fusion power, where electricity is generated from the heat released during nuclear fusion reactions.
For them to occur, the fuel, i.e. the hydrogen isotopes deuterium and tritium, must be in a state of plasma and exhibit sufficient temperature, density, and confinement time.
In magnetic confinement fusion devices, such as ASDEX Upgrade (AUG) in Garching, Germany, the plasma is confined by strong magnetic fields.
\\
Particles and heat escaping the confined region are diverted by a magnetic configuration, the so-called divertor, onto dedicated plasma-facing components.
While current devices operate within material limits, projections for next-step facilities indicate that heat fluxes to the divertor targets may exceed tolerable thresholds.
Therefore, operation in a detached regime is envisaged, where the electron temperature near the target is reduced (e.g. via impurity seeding), enabling volumetric energy and momentum losses primarily through radiation, charge exchange, and recombination before reaching the target plates.
\\
At AUG, two magnetic field coils were recently installed in the upper divertor with the aim of investigating alternative divertor configurations (ADCs) as a means of mitigating power exhaust\,\footnote{I. Zammuto et al. \textit{Fusion Eng. Des.} 2021. DOI: 10.1016/j.fusengdes.2021.112468}. To study the plasma parameters in the upper divertor volume, we present a spectroscopic technique that infers local electron densities from Stark broadening of high-n Balmer lines and electron temperatures from Saha equilibrium considerations. Furthermore, the diagnostic allows the measurement of the seeding impurity ion density.
\\
In this contribution, we present electron temperature profiles measured in both conventional and alternative divertor configurations. For each configuration, we determine the impurity seeding rates required to reach detachment, and we show that the detachment onset is achieved at lower seeding rates in the ADCs.

Poster session / **66**

Optimizing Fidelity in Fourier-Domain Filtering of HRTEM Images

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Image formation in high-resolution transmission electron microscopy (HRTEM) results in intensity projections of the interactions between the specimen and the electron beam. The recorded intensities are routinely used to reconstruct the exit wave function of the electrons, which can provide quantitative information that is otherwise not viably obtainable1. Prior to such analyses, it is often desirable to deconvolute the recorded signal, which is a process effectively performed in the Fourier domain of the image. However, applying a Fourier transformation and a filtering process introduces artifacts that can compromise the subsequent calculations. Hence, the transformation and filtering should be assessed, and the fidelity optimized, to ensure reliable intensity interpretation.

To evaluate the fidelity of the Fourier-domain filtering, a systematic investigation was conducted by varying padding sizes and applying different window functions to address the boundary effects introduced during transformation2. For the mask-based filtering itself, a range of strategies were applied, including low-pass, high-pass, band-pass, and Bragg spot-targeted masks, with varying degrees of edge smoothing. The accuracy of each approach was assessed using standard image similarity metrics such as mean squared error, peak signal-to-noise ratio, and structural similarity index. The findings indicate that an appropriate window function is the most effective process for reducing boundary-related artifacts, although the effects cannot be fully mitigated. Additionally, the shape and edge smoothing of the applied masks result in a nuanced balance between selectivity and signal preservation.

To support this analysis, a dedicated Python package was developed to enable systematic and controlled mask-based filtering in the Fourier domain. The tool facilitates reproducible workflows and provides a flexible framework for optimizing image processing strategies in HRTEM. Importantly, the approach is applicable to both periodic and non-periodic features in HRTEM images, supporting broader use cases such as the analysis of defects, interfaces, and amorphous regions3. Together, these efforts contribute to more robust and accurate quantitative interpretation of electron microscopy data.

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Poster session / 61

T_1 Relaxometry with NV Centers for the Detection of Paramagnetic Species

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Quantum sensing allows for the highly sensitive detection of physical and chemically relevant quantities such as local magnetic fields or the presence of paramagnetic molecules, while also providing spatial resolution on the nanometer scale. A particularly powerful platform for such measurements is provided by nitrogen-vacancy (NV) centers in diamond. These consist of a nitrogen atom adjacent to a lattice vacancy within the diamond crystal structure and form an electronic spin system that can be optically initialized, read out, and coherently manipulated. Due to their long spin relaxation times

at room temperature and their high sensitivity to magnetic fluctuations, NV centers are especially well suited for nanoscale sensing under realistic ambient conditions.

One well-established technique is T_1 relaxometry, in which the longitudinal spin relaxation time (T_1) of the NV center serves as a sensitive indicator of magnetic fluctuations in the local environment. Such fluctuations arise from unpaired electron spins of paramagnetic species, including free radicals. The characteristic magnetic noise generated by these species leads to a measurable reduction in the T_1 relaxation time. The passive and microwave-free nature of this measurement allows for a sensitive and non-invasive detection of free radicals with nanoscale spatial resolution.

In this study, we demonstrate the detection of this effect using the radical 2,2,6,6-Tetramethylpiperidinyloxyl (TEMPO) and investigate the extent to which these findings can be translated to quantum dot–based systems.

Poster session / **56**

Study of Quasi-Symmetry in Stellarator Designs: Impact of Coil Parameters on Device Robustness

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This study investigates the role of quasi-symmetry (QS) in plasma confinement in stellarators, focusing on its sensitivity to various design parameters. QS is crucial for confining trapped charged particles and plasma in toroidal magnetic fields, essential for stellarator operation. In a quasi-symmetric stellarator, although the magnetic field geometry may not be symmetric, the magnetic field strength can exhibit symmetry along a specific coordinate, providing the confinement of guiding center trajectories. The research analyzes three stellarator configurations and examines the impact of coil number (n), coil separation (d), coil complexity (regularization parameter, λ), and manufacturing imperfections (simulated as Gaussian perturbations with amplitude σ and characteristic length L) on QS. The stellarator equilibria analyzed include the APEX-EPOS configuration as well as reactor-sized designs with quasiaxisymmetry (QA) and quasihelical symmetry (QH) with precise quasisymmetry for plasma confinement. Using REGCOIL for coil design optimization and SIMSOPT for coil perturbations, we applied Gaussian perturbations to simulate realistic manufacturing conditions. Results show that QS decreases with increasing perturbations (σ), highlighting its sensitivity to manufacturing tolerances. This study also investigates how QS changes with varying coil numbers (n), explores the relationship between QS and coil separation, and examines the effect of coil complexity (λ) on QS. These findings provide critical insights into optimizing coil design, including performance of the field accuracy at reactor relevant dimensions. Overall, the work offers valuable guidelines for designing stellarators that balance high performance with practical feasibility.

Poster session / **54**

Lost in Terabytes of Simulations or Experiments? NOMAD can FAIRify the Chaos

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High-throughput simulations and data-intensive experimental measurements are now central to many branches of physics, from predicting materials to benchmarking force-field models and training machine-learning potentials. Modern studies can generate terabytes of heterogeneous output files, yet much of this valuable information remains locked inside program-specific log files, instrument formats, and binary blobs. The absence of a common, machine-readable description hinders reproducibility, slows cross-code comparison, and ultimately limits scientific reach.

The open-source **NOMAD** platform (nomad-lab.eu), developed within the German NFDI consortium **FAIRmat**, tackles this bottleneck by implementing the **FAIR** data principles **(Findable, Accessible, Interoperable, Re-usable)** for computational and experimental materials science.[1,2] Its plugin-based architecture lets researchers attach custom parsers, metadata schemas, and visualization widgets to a wide range of electronic-structure codes—Gaussian, VASP, FHI-aims, ORCA, and more—and to experimental techniques such as X-ray diffraction or photoelectron spectroscopy, transforming disparate outputs into a coherent, queryable database. Integrated notebooks, APIs, and workflow functionalities then make the curated data immediately available for statistical analyses, surrogate-model construction, or AI-driven discovery.

Poster session / **53**

Turbulance and MHD instability dynamics in tokamak edge plasmas

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One of the most pressing issues our society faces is the production and consumption of energy. The way how next generations will produce energy will significantly influence the environment and the future of our planet. In fusion research, our goal is to use the same physical process that powers the Sun, the fusion of light atomic nuclei to generate energy. For this, extremely high temperatures (100 million degrees Celsius) are required to overcome the electrostatic repulsion between positively charged nuclei. At these high temperatures, matter exists in a plasma state, where electrons are no longer bound to nuclei. Since a plasma consists of charged particles, it interacts with electromagnetic fields, allowing us to use strong magnetic fields to confine the plasma without touching the wall of a reactor. The tokamak is one of the most advanced and widely studied concepts in the field of magnetic fusion. It is a toroidal device that uses a combination of external magnetic coils and an internal plasma current to generate the magnetic fields needed to confine the plasma. Current experimental devices aim to study reactor-relevant conditions to improve our understanding of plasma behavior for the design of future fusion reactors. One such experiment is the ASDEX Upgrade tokamak, operated at the Max Planck Institute for Plasma Physics in Garching, Germany. This study analyzes plasma discharges from the ASDEX Upgrade tokamak with a particular focus on the plasma edge. This few centimeters wide region displays complex dynamics due to the interplay of turbulence and magnetohydrodynamic (MHD) instabilities driven by large temperature and density gradients. These phenomena occur on timescales ranging from milliseconds to hundreds of milliseconds, and they govern heat and particle transport, playing an important role in determining the overall behavior and global confinement of the plasma. This research focuses on understanding and characterizing these edge dynamics in tokamak plasmas. For this purpose, linear stability analysis against MHD instabilities is carried out using experimental edge profiles, aiming to validate theoretical models and improve predictions for future fusion reactors.

Poster session / **50**

Enabling Visibility –Strengthening Science Identity: Insights from Teacher Education for Gender-Sensitive Physics Teaching

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How can physics education be designed to increase the visibility of women physicists and support the development of a positive science identity among female students? In a higher education seminar for (prospective) physics teachers, theoretical foundations, teaching materials, and didactic strategies were explored and reflected upon with a focus on gender equity in physics. This poster presents the structure and core content of the seminar, showcases selected teaching resources, and highlights key reflections and perspectives shared by the participants. Central themes include the role of representation, the challenge of breaking down stereotypes, and practical ideas for classroom implementation. The poster aims to demonstrate the potential of teacher education for fostering a more inclusive and diversity-aware physics classroom –and invites further discussion on how to support science identity development for all learners.

Poster session / 100

NV-Demo Experiment

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This experiment is a simple and cost-effective setup designed to demonstrate the properties of nitrogen-vacancy (NV) centers in diamonds.
It allows for the detection of the fluorescence signal, the observation of fluorescence behavior under the influence of a microwave field, the investigation of how an external magnetic field affects the fluorescence, and the use of the system as a basic magnetic field sensor.
The design and assembly of the setup are based on the publication "Modular low-cost 3D printed setup for experiments with NV centers in diamond"by Jan Stegemann et al., 2023, European Journal of Physics, Volume 44, 035402.
In the experimental process, a laser with a wavelength of 532 nm is used to excite electrons from the ground state (^{3}A) to the excited state (^{3}E). Vibrations within the continuous vibronic sidebands lead to a loss of energy, which is subsequently emitted as photons in the form of red fluorescence. When a microwave field is applied, it induces a spin transition from the m_s = 0 to the m_s = ±1 level within the ground state. Electrons that do not participate in the radiative emission process instead have a higher probability of decaying through the non-radiative intermediate state (^{1}A) back to the ground state. As these electrons cannot be re-excited immediately, this results in a temporary reduction in fluorescence intensity. This reduction allows magnetic spin resonance to be detected optically through changes in the fluorescence signal.
The baseplate and cubes used in the setup are manufactured using 3D printing technology. The cubes are fixed onto the baseplate with four strong magnets which are attached to screws on the underside of each cube. Each cube is designed to contain a specific functional component. In the current version of the setup, these components include a laser with a radiant power of 1 mW and a central wavelength of 532 nm, an objective lens that focuses the laser beam onto the microdiamond sample and collects the emitted fluorescence, a dichroic mirror that reflects the laser beam toward the objective lens and transmits the NV fluorescence to the detector, and a photodetector that captures the transmitted fluorescence using a photodiode.
The most recent results obtained from this setup include the successful detection of red fluorescence when the laser is directed at the microdiamond, as well as a noticeable decrease in fluorescence intensity when the sample is subjected to a microwave field. Further work is currently in progress to integrate the remaining components and to conduct final experimental measurements.

Poster session / 101

Towards Observing Light-dressing Effects in Organic Molecular Crystals

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Quantum materials driven by strong laser fields can exhibit non-equilibrium electronic phases known as Floquet states, revealing a new domain of exciton light-matter interactions. By carefully designing the driver, it is possible to selectively excite or suppress Floquet modes, enabling enhanced control of the electronic dynamics. Floquet engineering has already been demonstrated in various non-organic systems, e.g. monolayer tungsten disulfide 1, black phosphorus 2, and cadmium selenide nanoplatelets 3. In this work, we aim to directly observe strong-field driven light-dressing effects in organic molecular crystals through transient absorption spectroscopy. A mid-infrared strong-field pump pulse induces light-dressing effects in the sample and the dynamic excitonic response is probed by a broadband femtosecond pulse in the UV-visible spectral region. To improve signal-to-noise ratio, a dual cam referencing system is employed for spectral detection. In the future, we aspire to observe and identify strong-field effects in pentacene molecular crystals in dependence of the driving field polarization.

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Poster session / 122

The impact of impurities on sintering behaviour and mechanical properties of cemented carbide

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This research was conducted as a Master's thesis for University of Luxembourg at CERATIZIT Group, Luxembourg. Within the course of this research, the impact of impurities on the mechanical properties of cemented carbides together with their sintering behaviour are studied. The material studied here consists of submicron-sized grains as the hard phase with 10.3wt% of metallic binder. The reference sample used for sake of comparing the results also includes some grain growth inhibitors.
Tests conducted on samples included the mechanical tests (transverse rupture strength, hardness and toughness), magnetic tests (magnetic saturation and coercivity), for which the samples are sintered under the same sintering program. Other series of tests included thermo-analytical tests; dilatometry test was performed on green cylindrical pieces with circular bases, but the thermogravimetry test was performed on mixed powders that were pressed manually.
The tests were evaluated through microstructural analysis, providing a visual understanding of the influence exerted by various additives on the samples' microstructure. Mixing additives with the reference sample was carried out during ball milling and included two types: transition metal cubic carbides and additives of metallic binder type. Except for Mo2C and Cr3C2 with two levels of addition, all the other additives were in three levels of content.
In all cases of Grain Growth Inhibitor (GGI) addition, the hardness increased, the toughness decreased, and the TRS values showed an initial increase followed by a sharp decline, which could be attributed to surpassing the solubility limits of these additives in the binder phase.
With all mechanical tests results considered, TiC was the most impactful GGI in terms of enhancing the hardness through reducing average WC grain size, diminishing the toughness and TRS through introducing defects and porosity, yet homogenising the microstructure which was reflected through Weibull analysis in TRS testing.

Poster session / 123

Lysozyme–Lipid Monolayer Interactions at the Air–Water Interface

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To achieve a deeper understanding of biological processes, including immune defense and membrane remodeling, it is most important to study the interaction between proteins and the membrane. In our study, we deal with lysozyme (LYZ), which is a cationic antimicrobial protein. We would like to show the mechanism of interaction with a cell membrane and how it influences the physical and chemical characteristics of a membrane. We performed Langmuir trough experiments in order to find out the surface pressure–area (π–A) isotherms of DPPC and POPC lipid monolayers. The monolayers were subsequently modified with incorporated cholesterol at 15 and 30 mol% concentrations to mimic different model membranes. Lysozyme was incorporated into the water subphase, beneath the monolayer at low concentrations of 1, 10, and 100 mg/L.
Our results show that lysozyme greatly modulates the lipid monolayer behavior even at very dilute concentrations of only a few millimolar. Langmuir isotherm studies show that lysozyme adsorption or partial insertion into the lipid interface is highly occupied by electrostatic attraction to polar headgroups. Adsorption is reduced when lysozyme is mixed with cholesterol. Lysozyme can interact with both fluid and condensed membrane environments. These observations confirm that lysozyme is highly surface active in membrane surfaces and demonstrate its role in membrane breakdown, microbial protection, and in identifying specific lipid types. The study simplifies understanding how small amounts of proteins can influence membrane structure at the molecular level.

Poster session / 125

Exploring iron precipitation for understanding phosphate removal from wastewater

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Phosphorus is a vital nutrient for agriculture and fertiliser production. However, it is in limited supply across Europe, resulting in heavy dependence on imports. Promising substitutes for phosphorus recovery have been found to be municipal sewage sludge and wastewater 1. But present techniques of removal mostly chemical precipitation with iron salts cause non-bioavailable iron phosphate species 2. The molecular mechanisms of the initial steps of phosphate fixation with iron salts remain unclear due to the complex nature of the process and the many possible nucleating species involved. It is evident that iron hydroxides ($Fe(OH)_x$) play a crucial role in the mechanisms of phosphorus adsorption and precipitation 3. Focussing on the early intermediates in iron hydroxide [4] precipitation and their reactivity towards phosphorus, this work seeks to clarify the molecular mechanisms underlying phosphorus fixation with iron salts during wastewater treatment. We examine the pH-dependent formation of iron hydroxide species and their subsequent conversion into iron phosphate compounds using 57Fe Mössbauer spectroscopy and density functional theory (DFT) calculations. DFT calculations have been performed with Gaussian 16 [5] to optimize the geometries

of the structures shown in Fig.1 using the B3LYP functional and the CEP-31G basis set. Mössbauer parameters for these structures have been calculated using ORCA 6.0. [6], by applying the B3LYP functional along with the CP(ppp) basis set to analyse the electronic properties of iron atoms. The calculation of partial density of states is ongoing, and latest results will be presented.

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Poster session / 131

Synchrotron-based Mössbauer spectroscopy of photo- and catalytically-active Iridium complexes

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Iridium complexes have highly interesting photochemical, photophysical and catalytic properties. They are used for example in organic light-emitting diodes (OLEDs), organic solar cells and automotive exhaust catalysts.[1,2,3] Iridium complexes have also been used to initiate "water oxidation reactions".[4,5] They also hold promise as photosensitisers and photocatalysts for directed photodynamic cancer therapy (PDT).[3,6] Recently nuclear forward scattering (NFS) on 193Ir at 73 keV has been established at beamline P01, PETRA III, DESY, Hamburg.[7] This technique can be regarded as Mössbauer spectroscopy in the time domain. We have applied 193Ir-NFS to yield information about the electronic properties of selected catalytically active Iridium complexes via the determination of Mössbauer parameters like the quadrupole splitting (ΔEQ) (Figure 1). We have also performed Density Functional Theory (DFT) calculations to calculate the Mössbauer parameters of the complexes under investigation.

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Poster session / 64

Elucidating the Exceptional Stability of Chromium-Oxide Double-Stacks by Tracing Internal Charge-Transfer Processes with STM

Spectroscopy and DFT Calculations

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The structural and electronic properties of CrOx/Pt(111) films were investigated by LEED, XPS and LT-STM in combination with DFT calculations performed via a genetic algorithm 1. Depending on the nominal Cr coverage and the oxygen-chemical potential during deposition, two unique oxide phases were identified. A ($\sqrt{3}\times\sqrt{3}$)R30° phase emerges at sub-monolayer Cr-exposure and O-rich oxidation conditions. It shows perfect agreement with a Cr3O6 trilayer modelled by DFT and comprises a mixture of Cr3+ and Cr4+ ions in the central cationic plane. At higher coverage or after vacuum-annealing, the ($\sqrt{3}\times\sqrt{3}$)R30° phase evolves to a (2×2) phase with increased topographic height. The latter was assigned to a Cr6O11 film, in which an O-Cr-O trilayer is capped by a Cr2O3 honeycomb plane.
To determine the inner electronic structure of the single- and double-stack CrOx/Pt(111) films and to identify underlying charge transfer processes, tunnelling spectroscopy was employed to measure the film workfunction ϕ with high spatial resolution. We find a drastic workfunction drop when going from Cr3O6 single-stacks ($\phi > 7.0$ eV) to Cr6O11 double-stacks ($\phi < 5.1$ eV). The underlying charge redistribution was elucidated by DFT, showing that the exceptionally high ϕ-value of Cr3O6 originates from a substantial electron transfer from the Pt substrate into empty Cr-states below the Pt Fermi level 2. The subsequent reduction of 2/3 of the Cr ions from their formal 4+ to a 3+ charge state is indeed confirmed by a specific film contrast in STM topographic images. The huge negative surface dipole of the trilayer dimin-ishes when growing a Cr2O3 honeycomb plane on top and forming a Cr6O11 double-stack. Now, the top-layer acts as electron donor, allowing the charge transfer from the Pt substrate to decrease substantially. In combination with interfacial hybridization effects, the modified charge distribution allows for a strong stabilization of the double-stack with respect to a single-stack geometry. By comparing the CrOx/Pt(111) behavior to that of hypothetical double-stack films, made of an interfacial TMO2 trilayer (TM = Ti, V, Mn, Fe) and a capping Cr-O honeycomb plane, the stability of metal-oxide double-stacks can directly be correlated with the charge exchange between the individual oxide layers and the substrate.

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Poster session / 135

Domain Structures in AlScN Thin Films

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Thin films of Aluminium-Scandium Nitride (AlScN) are used as central components in magneto-electric surface-acoustic wave sensors utilized extensively within the Collaborative Research Center 1261 “Biomagnetic Sensing”.

High resolution XRD experiments were conducted at microfocus beamline P10 at PETRA III. Bragg diffraction on AlScN thin films grown on GaN was investigated at the [0 0 0 2] and [0 0 0 4] reflections.
The material surface exhibits a domain structure on the nm scale, which can be associated with ferroelectric domains. In addition, an unexpected second lateral domain structure on the µm scale is observed, which is attributed either to Scandium-rich and Scandium-depleted regions or large ferroelectric domains.
Additional synchrotron experiments are in planning to further investigate AlScN, e.g. grazing incidence diffraction or absorption measurements around the Scandium K-edge.

Keynote talk / **11**

Unethical Behavior in Academia: Forms, Causes, and Countermeasures

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Recent years have seen a steady flow of media reports about cases of unethical behaviour in academia. Such behaviour seems to be surprisingly common, often cause great damage, and typically remain unsanctioned. In my talk, I will first introduce a number of concepts that are relevant to the discourse on this topic (e.g., power, abuse of power). Then I will discuss some key factors that may explain the emergence and the persistence of unethical behaviour in academia. Notably, some of these factors are properties of unethical actors themselves (e.g., psychopathic traits), some are properties of the people that surround unethical actors (e.g., fear), and some are properties of the organizational setup (e.g., incentives, hierarchies, lack of effective controls). Based on this analysis, I will present recommendations for reforms of the academic system that may help reduce the frequency and the severity of unethical behaviour in academia.

Workshops / **36**

Enabling Entrepreneurship: From Science to Practice (Part 2)

The workshop aims to introduce interested individuals and researchers to entrepreneurial thinking and action, provide the basics of starting a business, strategic management, and corporate leadership, and offer the opportunity to enhance their own key qualifications and soft skills. In a blend of theory and practical work, a learning and working atmosphere will be created where new ideas can emerge, and where the research projects/results and ideas of the participants can find a path toward a potential future in entrepreneurship.

Workshops / **41**

Science Slam Workshop (Part 1)

Want to make your research compelling and accessible to any audience? Whether for conferences, proposals, or industry collaborations, clear and concise communication is a vital skill for every scientist. In this workshop, you refine your presentation skills by teaching you how to distill complex

ideas into engaging narratives. Learn expert tips and tricks to captivate both specialists and laypeople.

Quantum2025 / 8

The tragic destiny of Mileva MariĆ Einstein

Author: Pauline Gagnon

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What were Albert Einstein's first wife's contributions to his extraordinary productivity in the first years of his career? A first biography of Mileva Marić Einstein was published in Serbian in 1969 but remained largely unknown despite being translated first in German, then in French in the 1990's. The publication of Mileva and Albert's love letters in 1987 revealed how they lived together while two recent publications shed more light on Mileva Marić's life and work. I will review this evidence in its social and historical context to give a better idea of her contributions. In this presentation, I avoid all type of speculation and do not attack Albert Einstein personally, but rather strictly stick to facts. The audience will be able to appreciate why such a talented physicist has been so unkindly treated by history.

Parallel / 30

The state of fusion research: progress, challenges and future prospects

Author: Sophia Henneberg

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Fusion —the process in which atomic nuclei combine to form heavier elements —releases immense energy and represents a key frontier in the pursuit of sustainable energy. This talk will provide an overview of fusion research, introducing fundamental concepts and highlighting significant progress toward the development of viable fusion reactors. It will also explore both historic milestones and recent breakthroughs, and examine their implications for the future of fusion energy.

Parallel / 44

Gender und seine Folgen –Diskriminierung, Intersektionalität und Lösungsansätze

Author: Cassedyn Elya Wirtz[1]

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Geschlecht geht weit über Männer, Frauen und das sogenannte „dritte“Geschlecht hinaus, geschlechtsspezifische Diskriminierung ebenso. Insbesondere in der höheren Bildung und klassischen „Männerberufen“wie den Naturwissenschaften sorgt diese Ungleichheit für alltägliche Probleme und behindert Lehre, Forschung und Wissenschaft.
Der Vortrag bietet einen kurzen Überblick über die Vielfalt von Geschlechtsidentität (Gender) und medizinischem Geschlecht (sex) sowie deren Auswirkungen in einer sexistischen und patriarchalen Gesellschaft: Diskriminierung weit über Sexismus hinaus, Minderheitenstress und Intersektionalität.
Es werden konkrete Lösungsansätze präsentiert.

Workshops / **110**

Science Communication

Parallel / **25**

Polaritons in two-dimensional materials and hybrid systems probed by electron beams

Author: Nahid Talebi[1]

[1] *Kiel University*

Polaritonic quasiparticles in two-dimensional (2D) materials have emerged as a powerful platform for studying light–matter interactions and mediating novel photon- and phonon-driven correlations between electronic excitations. In this work, we employ electron beam-based techniques to probe exciton and plasmon polaritons across a diverse set of 2D materials, including transition metal dichalcogenides, perovskites, hexagonal boron nitride, borophene, and hybrid heterostructures.
By combining cathodoluminescence and photoluminescence spectroscopy, we investigate how electron and photon excitations differ in their ability to access polaritonic modes—shedding light on distinct selection rules and excitation pathways. Furthermore, we apply a recently developed technique that leverages electron-driven photon sources inside a transmission electron microscope to perform Ramsey-type ultrafast spectroscopy. This enables us to directly measure the temporal coherence of polaritonic CL emission from exciton polaritons (Nature Physics 19, 869–876 (2023)) and defect states in hBN (Nature Communications 16, 2326 (2025)).
These findings demonstrate the potential of electron-beam spectroscopy as a uniquely powerful tool for accessing ultrafast and nanoscale polaritonic dynamics in 2D systems, with applications spanning coherent quantum optics, materials science, and nanophotonics.

Quantum2025 / **9**

Jo van Leeuwen, the other physicist behind the Bohr-Van Leeuwen theorem

Author: Margriet van der Heijden[1]

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[2] *Delft University of Technology*

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The first four women to obtain a PhD in physics at Leiden University all graduated with Nobel laureate Hendrik Lorentz. Hendrika Johanna (Jo) van Leeuwen (1887–1974) was one of them. Her thesis elucidates that magnetism is exclusively a quantum phenomenon –a result that was independently also obtained by Niels Bohr and that is now commonly known as the Bohr–van Leeuwen theorem. From 1920 onwards Van Leeuwen worked at the Technische Hoogeschool in Delft (now Delft University of Technology). Initially serving as an assistant, she was appointed as a reader in theoretical and applied physics in 1947, becoming the first female reader in Delft. This talk outlines Van Leeuwen's work and early contributions to the quantum theory of magnetism –putting it in the broader context of quantum developments and of women in physics in the Netherlands / Western Europe during the (early) 20th century.

Parallel / 59

Resistively detected electron spin resonance and g factor in few-layer exfoliated MoS2 devices

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Co-authors: Appanna Parvangada [2]; Kai Rossnagel [3]; Lars Tiemann [2]; Jens Martin [4]; Robert Blick [2]

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MoS_2 has recently emerged as a promising material for enabling quantum devices and spintronic applications. In this context, the demonstration of resistively detected electron spin resonance (RD-ESR) and the determination and improved physical understanding of the g factor are of great importance. However, its application and RD-ESR studies have been limited so far by Schotttky or high-resistance contacts to MoS_2. Here, we exploit naturally n-doped few-layer MoS_2 devices with ohmic tin (Sn) contacts that allow the electrical study of spin phenomena. Resonant excitation of electron spins and resistive detection is a possible path to exploit the spin effects in MoS_2 devices. Using RD-ESR, we determine the g factor of few-layer MoS_2 to be $\approx$1.92 and observe that the g factor value is independent of the charge carrier density within the limits of our measurements.

Parallel / 57

„Die Projektwoche hat mit gezeigt, dass mehr in mir steckt als ich dachte"–Evaluation eines Interventionsprogramms zur Förderung der Physikidentität junger Frauen

Authors: Andrea Westphal[1]; Armin Baur[2]; Hilke Schulz[1]; Paula Becker[3]; Peter Wulff[2]

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[2] *Pädagogische Hochschule Ludwigsburg*

[3] *1Pädagogische Hochschule Heidelberg*

Junge Frauen sind in Physik ab der Sekundarstufe II nach wie vor unterrepräsentiert. Sie zeigen ein vergleichsweise geringeres Interesse an Physik und sind bei gleicher Leistung in geringerem Maße als zum Beispiel junge Männer davon überzeugt, physikalische Aufgaben mit ihren Fähigkeiten bewältigen zu können. Dies ist problematisch, da sowohl fundierte Physikkenntnisse als auch vielfältige

Perspektiven in der Physik zur Bewältigung der Herausforderungen des 21. Jahrhunderts unerlässlich sind.
Die Forschung zeigt, dass identitätsbezogene Konstrukte wie Selbstwirksamkeitsüberzeugungen, Interessen und das Gefühl zur Physikcommunity dazuzugehören eine entscheidende Rolle für die Entwicklung einer Physikidentität und damit für das langfristige Engagement in Physik spielen. Um diese Faktoren nachhaltig zu fördern und junge Frauen zu ermutigen, Physik zu studieren, wird das Potenzial von Interventionsprogrammen diskutiert.
Im Rahmen des BMFTR-Projekts „You-Scie-MINT"wurde ein Interventionsprogramm entwickelt, welches möglichst viele Elemente integriert, die in bisherigen Studien positiv mit einem langfristigen Engagement in MINT-Fächern korrelierten: Im Zentrum des Programms steht forschend-entdeckendes Lernen im Kontext des Klimawandel in einem mono-edukativen Setting. Die Schülerinnen führen in Gruppen ein eigenes Forschungsprojekt mit Messensoren durch, präsentieren es öffentlich und werden dabei von weiblichen Rollenvorbildern unterstützt. Bislang nahmen 40 Schülerinnen* im Alter von M (SD) = 17.4 (0.7) an der fünftägigen Projektwoche teil. Ziel ist es, längsschnittlich zu untersuchen, inwieweit dieses evidenzbasierte Interventionsprogramm das Engagement der Schülerinnen und ihre Absicht, ein physikbezogenes Studium zu wählen, positiv beeinflussen kann. Hierzu wurden mithilfe validierter Skalen zentrale identitätsbezogene Konstrukte, Fachwissen zum Klimawandel und die Intention Physik zu studieren an vier Messzeitpunkten mit Fragebögen erhoben und mit einer Kontrollgruppe (N = 84) verglichen. Im Rahmen des Tagungsbeitrags sollen Ergebnisse der Interventionsstudie vorgestellt und Implikationen für die Gestaltung geschlechterinklusiver Physiklernumgebungen diskutiert werden.

Parallel / 55

Impurity transport in the edge of tokamak plasmas

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Nuclear fusion offers the prospect of a sustainable and base load capable source of energy, produced in a high-temperature plasma of deuterium and tritium. One of the most advanced approaches to achieve reactor-relevant conditions is magnetic confinement of the plasma. In the tokamak configuration, the plasma is enclosed in an axisymmetric toroidal magnetic field, established using external coils and an inductively driven plasma current.

A central remaining challenge on the path towards a tokamak reactor is the integration of high confinement of energy and particles, necessary to produce net fusion power, with a solution for heat and particle exhaust at the plasma edge that protects the vessel components from being damaged by too high incident heat fluxes. Impurities play a crucial role in achieving this balance. Their radiative cooling will be required at the plasma edge of a reactor for machine protection, but at the same time, they dilute the fusion fuel and radiate power, which can be detrimental for the performance of the core plasma. Therefore, appropriate distributions of impurities are essential and it is important that their transport be understood and well-controlled.

Of special relevance is the radial transport in the narrow region at the edge of the confined plasma, which connects the plasma core and the power exhaust region via steep gradients in temperature and density profiles. This region is termed the 'pedestal'and it is subject to complex physics processes influencing the impurity transport, which can vary significantly between different operation regimes. However, these different pedestal impurity dynamics remain largely unexplored due to experimental difficulties posed by the steep gradients.

Besides an overview of the topic, we present an experimental study using dedicated discharges at the ASDEX Upgrade tokamak to determine the radial impurity transport in the pedestal of reactor-relevant operation regimes. Our investigations are based on high-resolution spectroscopic measurements and a sophisticated data analysis framework, which solves the high-dimensional, nonlinear

inverse inference problem with Bayesian statistics. By comparing our experimental findings to transport simulations, we are able to identify the role of different transport mechanisms. The results facilitate predictions of impurity behavior in future fusion reactors.

Parallel / 28

Tomographic Imaging using the Multiple Scattering of Electrons

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Co-authors: Leticia Braga da Rosa [1]; Malinda De Silva [1]; Paul Schuetze [2]; Simon Spannagel [2]

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electronCT (eCT) is a new imaging method, which uses multiple scattering of electrons to determine the material budget of objects. This imaging method could be used in the context of FLASH radiotherapy with very high energy electrons (50-250 MeV). A pencil beam of MeV electrons is aimed at an object and the widening of the beam is measured, where the widening of the beam is dependent on the material budget that the beam traversed. Proof-of-concept studies have been performed to test this method. This talk will introduce eCT as a concept and discuss the quality of the obtained images based on different measurement variables.

Parallel / 94

The Physics Project Days - A workshop to promote gender equality in physics

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The Physics Project Days are a four-day workshop for female high school students to encourage them to study physics, but above all to give them the self-confidence that they are capable of doing physics. Through hands-on experimentation in various physics disciplines, including particle physics, laser physics, plasma physics, and nanoscience, participants engage with cutting-edge research topics. The Physics Project Days undergo a rigorous evaluation to ensure its effectiveness and won the equal opportunity prize of the University of Hamburg in 2020. As of today, the Physics Project Days happen in four different locations: Kiel, Hamburg, and Aachen in Germany, and Louvain-la-Neuve in Belgium. The main elements of the workshop, as well as selected results of the survey will be discussed.

Parallel / 12

Same Same but Different. Vibronic Coupling to Selectively Target Subpopulations.

Authors: Jens Bredenbeck[1]; Lara Denninger[1]

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Controlling light–matter interactions at the molecular level is a fundamental challenge in physics, with broad implications for chemistry and material science. Selective electronic excitation becomes particularly challenging within molecular mixtures, especially when species share nearly identical UV/VIS absorption spectra. We demonstrate how Vibrationally Promoted Electronic Resonance (VIPER) spectroscopy enables such control by combining infrared (IR) and UV/VIS light pulses to target specific molecular subpopulations. The IR pulse targets specific molecular vibrations, shifting the electronic absorption band of selected molecules, allowing the UV/VIS pulse to excite only those of interest.[1-3]
Using 2D vibrational-electronic (2D-VE) spectroscopy, we explore how IR light modulates electronic absorption spectra via vibronic coupling in real time. Our model system—a coumarin substrate in dynamic equilibrium with a hydrogen-bonded catalyst—shows that this approach can distinguish and selectively address free vs. bound substrate. Selection can be based on direct vibronic coupling or on vibrational energy transfer from the catalyst to the substrate.
These findings highlight how light can be used not just to probe but to selectively control chemical reactions, offering new possibilities for studying and steering molecular interactions in complex environments—especially relevant for applications like photocatalysis.

1 L. J. G. W. van Wilderen, A. T. Messmer, J. Bredenbeck, Angew. Chem. Int. Ed. 53, 2667 (2014).
2 M. Horz et al., J. Chem. Phys. 158, 064201 (2023).
3 J. van Cosel et al., J. Chem. Phys. 147, 164116 (2017).

Parallel / 86

Investigating Reproducibility Issues of the 1331 Excitation Pulse During wbNAA Sequence Implementation

Authors: Franziska Lohrengel[1]; Jan-Bernd Hövener[1]; Oded Gonen[2]

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[2] *New York University Grossman School of Medicine*

Synopsis
We attempted to implement a whole-brain NAA (wbNAA) spectroscopy sequence in a vendor-agnostic environment. During the 16 repeated acquisitions, we observed large fluctuations of the water signal exceeding 50%. It was demonstrated that these instabilities originate from the binomial $1^{-}3\ 3^{-}1$ excitation pulse. Ongoing work aims to identify the underlying cause of this behavior.
Introduction
Whole-brain magnetic resonance spectroscopy (wbMRS) enables non-invasive quantification of N-acetyl-L-aspartate (NAA), a key neuronal metabolite, across the entire brain. It is particularly useful for investigating diffuse or non-focal neurological conditions. To detect low-concentration metabolites like NAA, the wbNAA sequence combines inversion recovery, water suppression, and binomial $1^{-}3\ 3^{-}1$ excitation pulses.
During implementation in Kiel, we observed unexpected water signal fluctuations exceeding 50% between repeated acquisitions, potentially compromising reproducibility. Preliminary findings pointed to the $1^{-}3\ 3^{-}1$ excitation pulse as particularly sensitive to magnetic field inhomogeneities.
To explore this, we performed isolated measurements of the $1^{-}3\ 3^{-}1$ pulse. Understanding the source

of this variability is essential for achieving robust whole-brain NAA quantification.
Methods
All measurements were performed on a whole-body 3T MRI system (Cima.X, Siemens Healthineers) equipped with a 64-channel head/neck coil. The wbNAA sequence included an adiabatic inversion pulse, WET water suppression, and a binomial 1⁻3 3⁻1 excitation pulse, implemented in a vendor-agnostic framework (pulseq 1) as described by Soher et al. 2 To isolate the effect of the 1⁻3 3⁻1 pulse, the same pulse was applied 16 times without other sequence elements and with a repetition time of TR = 10s. A spherical 1.4 L phantom containing brain metabolites (such as NAA, choline, and creatine) was scanned using the wbNAA sequence and then the single, isolated 1⁻3 3⁻1 pulse. Data processing and visualization were performed in MATLAB R2022b.
Results
The water signal measured over 16 repetitions of the wbNAA sequence showed fluctuations of 61.6% relative to the mean.
To test whether this variability was inherent to the implementation, a conventional FID sequence with a standard 90° excitation pulse was used. Here, signal deviations remained below 1% (0.62%).
When the 1⁻3 3⁻1 excitation pulse was applied 16 times in isolation, similar variability (50.5%) was observed.
Discussion
The wbNAA sequence showed substantial signal fluctuations (>60%) across repeated measurements, while the conventional FID sequence yielded stable signals (<1%), confirming that the variability is not caused by the pulseq framework or hardware.
When the 1⁻3 3⁻1 excitation pulse was applied in isolation, similar fluctuations were observed, identifying it as the main source of instability.
As this pulse is crucial for suppressing water signals, its poor reproducibility compromises the reliability of the entire wbNAA sequence. Further investigation is needed to understand and mitigate this effect for robust whole-brain NAA quantification.
Conclusion
We demonstrated that the binomial 1⁻3 3⁻1 excitation pulse induces pronounced signal variability in repeated measurements, rendering the wbNAA sequence unstable under the tested conditions. Future work will focus on systematic investigations to identify the underlying mechanisms and to develop modifications that enable reproducible whole-brain NAA spectroscopy.

References
1 Layton KJ, Kroboth S, Jia F, et al. Pulseq: A rapid and hardware-independent pulse sequence prototyping framework. Magnetic Resonance in Medicine. 2017;77(4):1544-1552. doi:10.1002/mrm.26235
2 Soher BJ, Wu WE, Tal A, et al. Automated whole-brain N-acetylaspartate proton MRS quantification. NMR in Biomedicine. 2014;27(11):1275-1284.

Quantum2025 / 87

From Quantum Physics'History to Quantum Technology: Making Women Visible

Author: Andrea Reichenberger[1]

[1] *Technical University of Munich*

Quantum technologies are key emerging technologies with promising potential. Quantum computers will expand and complement existing classical and powerful supercomputers and fundamentally transform industries that rely on large-scale computations. For example, quantum computing offers new possibilities for solving problems that cannot be addressed using classical methods, such as simulating high-dimensional nonlinear dynamics, optimizing complex energy flows, and real-time decision-making in distributed systems. In the domain of quantum sensing, researchers are exploring quantum magnetometers and interferometers for monitoring grid assets, measuring renewable resources, and even seismic sensors for protecting energy infrastructure. Concurrently, quantum networking is evolving to establish secure communication channels for energy grid operators, thereby offering long-term prospects for quantum cloud computing, wherein secure data is processed in quantum-based remote environments.

While these advances are promising, fundamental, overarching challenges must also be acknowledged, including those relating to IT security and energy consumption, as well as the training of skilled workers and engineers. While the equal participation of highly qualified women in quantum technologies is recognized as a vital component of a sustainable and future-oriented development of quantum technology, there is a limited number of well-founded studies on gender inequality and epistemic injustice beyond general gender statistics.
First and foremost, the significance of the history of physics in examining the processes that have led to and perpetuated the invisibility of women in the domain of quantum technologies is frequently underestimated. Moreover, the influence of power structures inherent in the politics of memory culture is scarcely recognized. Last but not least, what is often overlooked is the fact that the process of shaping the future invariably involves a transformation in perspectives on the history of science. Consequently, the pursuit of a gender-equitable future needs a self-critical re-evaluation of the history of quantum physics. The objective of my talk is therefore twofold: firstly, my intention is to raise awareness of a history of quantum physics that takes women's contributions into account; and secondly, to rethink the history of quantum physics against the backdrop of the current challenges of quantum technology. In doing so, I will address the role of women as agents of change, as well as gender stereotypes and their instrumentalization at the intersection of research practice, public perception, and social policy. Finally, some consequences and challenges for science communication and science journalism are discussed.

Parallel / 113

Active Physics-Informed Deep Learning for Topological Nanophotonics under Nonplanar Excitation

Author: Fatemeh Davoodi[1]

[1] *Kiel University, Christian Albrechts University*

Topological nanophotonic systems offer robust light propagation modes with immunity to defects, holding promise for quantum technologies and advanced optical devices.1 However, designing such structures under nonplanar excitation remains computationally intensive due to high-dimensional design spaces and nonlinear interactions. I introduce a physics-informed deep learning framework that integrates physical constraints into surrogate modeling to accelerate the design of topological plasmonic devices.2 My approach reduces simulation requirements by 50–70% compared to conventional data-driven methods while ensuring physical consistency. Using a three-stage training strategy, the model predicts strong versus weak coupling regimes, identifies topological phases in Su-Schrieffer-Heeger (SSH) chains, and optimizes ring geometries for unidirectional edge mode propagation under nonplanar wavefront excitations. The framework successfully designs a nanohole-based SSH ring resonator supporting robust one-way plasmonic edge modes at 378 THz, resilient to structural defects. This work demonstrates how combining machine learning with physics principles enables scalable, resource-efficient design of topologically protected photonic devices, paving the way for next-generation nanophotonics and integrated quantum systems.3

Keywords: topological photonics, physics-informed machine learning, plasmonics, surrogate modeling, nonplanar excitation
References: 1 F. Davoodi, Active Physics-Informed Deep Learning: Surrogate Modeling for Nonplanar Wavefront Excitation of Topological Nanophotonic Devices, Nano Lett. 2025, 25, 768–775. https://doi.org/10.1021/acs.nanolett.4c05120 2 F. Davoodi, etal. Unidirectional Wave Propagation in a Topological Plasmonic Ring Resonator via a Symmetry-Broken Excitation Scheme, ACS Appl. Nano Mater. 2023, 6, 20823–20830. http://dx.doi.org/10.1021/acsanm.3c03796 3 F. Davoodi, Beyond Decoherence: Control the Collective Quantum Dynamics of Quasi-Particles in Topological Interface, arXiv preprint, 2025. https://arxiv.org/abs/2506.12805

Parallel / 105

ChatGPT vs. Physics Olympiad Participants: Insights for Rethinking Physics Problem Solving and Assessment

Author: Paul Tschisgale[1]

[1] *IPN Kiel*

Large language models (LLMs) are now widely accessible, reaching learners at all educational levels. Their rapid adoption has sparked concerns that students may use them in ways that bypass essential learning processes and undermine the integrity of established assessment formats. In physics education, where problem solving is at the heart of both teaching and assessment, these concerns are particularly pressing. To address them, it is important to understand how LLMs approach physics problems and what their capabilities and limitations mean for instruction and assessment.

In this talk, I will present findings from a study that compared the problem-solving performance of two advanced LLMs—GPT-4o and the reasoning-optimized o1-preview—with that of participants in the German Physics Olympiad. Using a set of well-defined Olympiad problems, we examined not only whether the models arrived at correct solutions but also how they reasoned through the problems, identifying characteristic strengths and weaknesses of LLM-generated solutions.

The results show that both models demonstrate advanced problem-solving capabilities, on average surpassing the performance of the human participants. Specifically, o1-preview outperformed both GPT-4o and the human benchmark. Prompting strategies seemed to have no to little effect on LLMs' performance. These findings highlight the rapidly evolving capabilities of LLMs and pose important challenges for physics education: How can assessments maintain their integrity when models can already outperform top students? And how can educators help learners engage critically and productively with these tools rather than simply relying on them?

I will conclude by discussing the implications of these findings for the design of summative and formative assessments in physics education and outline possible pathways for integrating LLMs into instruction in ways that support, rather than replace, meaningful learning.

Parallel / 118

Professional Development for the Productive Use of Digital Data Acquisition in the Physics Classroom

Authors: Knut NEUMANN[1]; Lea RUNGE[1]; Markus Sebastian FESER[1]

[1] *IPN –Leibniz Institute for Science and Mathematics Education*

Despite the importance of Digital Data Acquisition (DDA) for research in the physical sciences and in our daily lives, physics teachers seem to shy away from utilizing these tools for their teaching on a regular basis. With the aim of supporting teachers in planning and implementing DDA in their lessons, we developed a multi-part professional development program (PD), where teachers can explore experiments with DDA and learn more about the basics of DDA systems. Our submission provides insights into the PD design as well as preliminary results of the PD evaluation.

Keynote talk / 14

Keynote: Quantum-computing

Authors: Heike Riel

Quantum computing is emerging as a transformative new paradigm aiming to solve relevant problems intractable to classical computers. Quantum processing units have seen rapid advancements across the full technology stack – from hardware and software to integration with classical systems, error mitigation and correction, algorithms and applications. To rapidly enhance system performance – including qubit count, operational fidelity, and processing speed – advancements are required across the entire quantum computing stack. A modular architecture, combined with robust error correction algorithms, paves the way for building a highly scalable and fault-tolerant quantum computer. The goal is to realize a system with 200 logical qubits capable of executing 100 million quantum operations by 2029. This presentation will provide an overview of the key challenges, recent technological progress, and the roadmap guiding this ambitious development for advancing quantum computing systems. Furthermore, I will highlight our research to explore approaches to microwave-optical quantum transduction devices based on optomechanical and electro-optic modulation. These optomechanical and electro-optical resonators provide a route to interconversion of microwave and optical photons for quantum interconnects.

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Conference picture

Keynote talk / **119**

Bound to be discovered? The short-lived romance of the top quark.

Author: Katharina Behr[1]

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The top quark holds a unique place in nature as the heaviest known elementary particle: with a mass comparable to that of a gold atom, it is the particle with the strongest coupling to the Higgs boson, which was discovered at the Large Hadron Collider (LHC) in 2012. The top quark considered one of the most promising probes of phenomena beyond the SM, such as additional Higgs bosons or heavy axion-like particle that could act as mediators to dark matter. It also stands out among the six quark flavours due to its extremely short lifetime (10-25 s), which is considerably below the timescale for hadronisation (10-23 s). It therefore decays before it can form a bound state (hadron), making it the only "bare"quark in nature.
This year, an unexpected excess of collision events with a top quark-antiquark pair was observed by the ATLAS and CMS Collaborations at the LHC. This excess occurs in a region where the quark and antiquark are slow moving (non-relativistic). It is consistent with the formation of a fleeting union of the top quark and antiquark in which the quark and antiquark exchange one or two gluons –the early stages of hadronisation –before one of them decays. This short-lived quasi-bound state, commonly referred to as toponium, was predicted as early as 1987 but its observation at the LHC was deemed impossible due to technical constraints. Its recent discovery is an impressive demonstration of the capabilities of the LHC experiments and the collaborations operating them. Its further study will allow particle physicists to study the early stages of hadron formation in the heaviest quark and search for potential deviations from the SM that could point us toward yet undiscovered phenomena. In this talk, I will introduce the intriguing properties of the top quark and review the experimental and theoretical progress that lead to this recent discovery. I will also provide an outlook on the exploration to come and the things we can learn from the study of this new state of matter.

Workshops / 37

Enabling Entrepreneurship: From Science to Practice (Part 3)

The workshop aims to introduce interested individuals and researchers to entrepreneurial thinking and action, provide the basics of starting a business, strategic management, and corporate leadership, and offer the opportunity to enhance their own key qualifications and soft skills. In a blend of theory and practical work, a learning and working atmosphere will be created where new ideas can emerge, and where the research projects/results and ideas of the participants can find a path toward a potential future in entrepreneurship.

Parallel / 69

Automated lab-on-chip system for time-series nitrate measurements from soil solution

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Precision agriculture, which involves the use of sensors, information databases, and high-tech machinery, can improve agricultural productivity achieving high yields with targeted fertilization. Today, soil nutrient measurements typically require manual soil sampling. First electrochemical sensors have been deployed in the field and show promising results, while still requiring manual intervention for calibration 1. For natural water nitrite and nitrate measurements an automated lab-on-chip system with syringe pumps and solenoid valves has been demonstrated that uses on-chip reference liquids for calibration 2. We investigate an automated lab-on-a-chip system for extracting soil solution and measuring nitrate based on the well-established Griess assay [3,4]. The sensor is intended for wireless battery-operated installation at the plant root level, where it takes nutrient concentration measurements as well as soil temperature and soil humidity data at regular intervals. Soil water is drawn into a microfluidic chip through a ceramic suction cup. The Griess assay results in a concentration-dependent color change. A light-emitting diode - photodetector pair is used for photometric readout. Once the concentrations have been determined, the mixture is pumped into a waste reservoir. Wireless data transfer is achieved via the LoRaWAN network [5]. We introduce the microfluidic chip based on a 3-layer PDMS-on-glass approach fabricated by photolithography and combined with pumps and valves. The measurement procedure and the fluidic control approach are discussed. System operation is demonstrated with laboratory tests for nitrate concentrations in a range from 0 to 50 mg/l. The results of pot tests and first field tests are presented. With our SOILMONITOR system we aim at contributing to a balance in the supply of soil nutrients to preserve resources, improve soil quality and reduce adverse effects on the environment.

This work is supported by EIC Transition grant SOILMONITOR, 101097989.

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Workshops / **111**

Science Communication

Workshops / **42**

Science Slam Workshop (Part 2)

Want to make your research compelling and accessible to any audience? Whether for conferences, proposals, or industry collaborations, clear and concise communication is a vital skill for every scientist. In this workshop, you refine your presentation skills by teaching you how to distill complex ideas into engaging narratives. Learn expert tips and tricks to captivate both specialists and laypeople.

Parallel / **83**

A chaotic pendulum- the path way to my professorship ”Analytical X-ray Physics”

Author: Birgit Kanngießer

.There is more than one pathway to obtain a professorship. I like to present my way as it cannot be found so often. Based on a foundation for a dedicated professorship, denominated “Analytical X-ray Physics”, I got the chance to build up my research group.
I will give insights into our research which main basis is BliX, the „Berlin Laboratory for innovative X-ray Technologies “.
BliX, is an application laboratory in the knowledge triangle between university, research and companies. It is jointly operated by the Institute of Physics and Astronomy of the Technical University of Berlin (TUB) and the Max Born Institute (MBI). For the Max Born Institute it fulfils the function of a “Leibniz-Application laboratory”. BLiX is settled at the chair for Analytical X-ray Physics of the Technical University of Berlin.
One major leading line for the scientific research and development at BLiX is the establishment of synchrotron-based X-ray methods in the laboratory. For example, the characterization of nanostructured material by soft X-ray spectroscopy is made possible by a Laser-Plasma-Source which delivers soft X-rays below 1.2 keV. This Laser-Plasma-Source has been jointly developed by MBI and TUB. The characterization of thin film solar cell material will now become possible in the laboratory. Also, a new X-ray microscope, based on a Laser-Plasma-Source as well, enables the investigation of bio-medical specimens with a resolution of about 30 nanometers in the laboratory. In the hard X-ray regime, we developed X-ray absorption spectrometers for chemical speciation, currently mainly used for catalysis research.
The talk will give insight into the creation of an endowed professorship and an overview of new laboratory X-ray instrumentation, its performance and fields of applications.

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Panel discussion: Science Communication

Keynote talk / **51**

Searching for Long-Lived Particles at the LHC and Beyond

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Particles beyond the standard model (SM) can generically have lifetimes that are long compared to SM particles at the weak scale. When produced at experiments such as the Large Hadron Collider (LHC) at CERN, these long-lived particles (LLPs) can decay far from the interaction vertex of the primary proton–proton collision. Such LLP signatures are distinct from those of promptly decaying particles that are targeted by the majority of searches for new physics at the LHC, often requiring customized techniques to identify, for example, significantly displaced decay vertices, tracks with atypical properties, and short track segments. In this talk, I will present the latest searches for LLPs at the LHC and other experiments and then give my view of where the field will go in the future.

19

Panel discussion: Physics Careers: Stories of Challenge & Change

What does it take to build a career in physics —from academia to industry, from research to leadership? In this panel discussion, leading physicists including Prof. Dr. Beate Heinemann (Director of DESY), Dr. Ulrike Böhm (industry physicist & DPG Equal Opportunities Committee), Dr. Irene Neumann (IPN Kiel), and Dr. Melanie Eich (data scientist) will share their personal career paths, the challenges they faced, and the strategies that helped them succeed. Together, we will discuss how to overcome barriers, strengthen networks, and create more opportunities for women in physics. An inspiring session for anyone thinking about their own future in science!

Workshops / 39

Vocal Power –Speak with Confidence and Clarity

How do I project my voice? Where should I stand? How do I come across as a speaker? This interactive workshop focuses on strengthening your vocal presence and body language to help you become a more confident, clear, and engaging communicator. We'll address common speaking fears and challenges—including imposter syndrome and performance anxiety—and explore practical strategies such as breath control, calming techniques, and vocal warm-ups. Participants will take part in a short recording session with feedback and leave with a personalized toolbox of exercises to continue building vocal strength and presence. We'll also share essential tips for protecting your voice during high-demand events like conferences and presentations.

AKC Mitgliederversammlung (general meeting of the Equal opportunities working group) / 48

Informationsveranstaltung und Mitgliederversammlung des Arbeitskreis Chancengleichheit

Authors: Agnes Sandner; Ruzin Ağanoğlu; Ulrike Böhm; Stephanie Essig; Mathias Getzlaff; Franko Greiner; Beate Klösgen; Dagmar Paarmann; Angelica Zacarias

Der Arbeitskreis Chancengleichheit (AKC) der DPG hält im Rahmen der DPT eine Informationsveranstaltung und seine jährliche Mitgliederversammlung ab. Alle Mitglieder sowie auch weitere Interessierte sind herzlich zur Teilnahme eingeladen!

Die AKC-Kommission berichtet über ihre Arbeit des vergangenen Jahres und gibt eine Vorschau auf geplante Projekte und Veranstaltungen. Alle Anwesenden sind aufgerufen, sich aktiv mit neuen Ideen und Vorschlägen einzubringen. Eure Mitarbeit an den einzelnen Projekten ist jederzeit willkommen.

Im Rahmen der Mitgliederversammlung wird zudem nach den Regularien des AKC die Wahl neuer Kommissionsmitglieder stattfinden.

Wir freuen uns auf Euch.

Parallel / **7**

Cross-Process Interference in Strong-Field Ionization: Insights from CEP-Dependent Photoelectron Spectra

Author: Anne Herzig[1]

Co-authors: Thomas Fennel [1]; Lennart Seiffert [1]

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Photoelectron spectra from strong-field ionization show features like energy cutoffs and interference patterns, influenced by direct and backscattered electrons 1. The typical cut-offs at 2⊠⊠ and 10⊠⊠ can be explained within the famous three-step model, while quantum inter- and intracycle interferences are typically associated with selfinterference of direct or backscattered, respectively [2,3]. However, also cross-process interference (CPI) between direct and backscattered electrons could reveal further insights. To isolate CPI, competing effects from self-interference must be suppressed, achievable with singlecycle laser pulses [4] that confine electron emission to a single optical period. Metallic nanotips further enhance this by restricting electron motion to one half-space, ensuring strong backscattering [5]. Quantum simulations predict CEP-dependent photoelectron spectra with distinct interference patterns. An extended trajectory model confirms these features originate from CPI, offering insights into the underlying physical mechanisms.
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[5] S. Zherebtsov et al., Nature Physics 7, 656-662 (2011)

Parallel / **27**

How stratospheric ozone recovery influences surface weather conditions

Author: Sabine Bischof[1]

Co-authors: Pia Rethmeier [1]; Robin Pilch Kedzierski [2]; Wenjuan Huo [1]; Sebastian Wahl [1]

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Weather occurs primarily in the troposphere, where midlatitude forecasts are typically reliable for 5–10 days. In contrast, the stratosphere is more stable and evolves on longer timescales, allowing it to influence tropospheric variability over extended periods. Previous studies have shown that incorporating stratospheric information can improve surface weather predictability, especially following stratospheric extreme events like sudden stratospheric warmings (SSWs).
In 2019, an SSW in the Southern Hemisphere (SH) disrupted the stratospheric circulation and contributed to extreme heat and drought in Australia, intensifying that year's fire season. Such events are very rare in the SH due to the strength of the stratospheric polar vortex, which suppresses planetary wave propagation - a key driver of SSWs. However, it is still unclear how climate change may impact the occurrence of SH SSWs through opposing effects of increasing greenhouse gases and ozone recovery.
We use climate model time slice simulations with greenhouse gas and ozone concentrations following the SSP5-8.5 scenario to examine how the frequency and surface impact of SH SSWs may change under different global warming levels. Our results indicate that SSW frequency remains near historical levels up to ~2 K of warming but declines thereafter. The tropospheric response to SSWs weakens significantly only at +4 K, when greenhouse gas forcing dominates over ozone recovery. These findings suggest that, in the coming decades, stratospheric warming events will likely continue to modulate extreme heat in regions such as Australia and Southern Africa, compounding the direct effects of global warming.

Parallel / 62

Direct Laser Writing of Ferromagnetic Nickel Structures Utilizing the Principle of Sensitized Triplet Triplet Annihilation Upconversion

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Co-author: Georg von Freymann [2]

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Metallic microstructures have become a topic of great interest for many fields due to their conducting and magnetic properties. Conventional Direct Laser Writing (DLW) is a versatile method for additive manufacturing of microscale polymeric structures. Despite the fact that many applications would benefit from the ability to directly print metallic and especially ferromagnetic microstructures, there have only been a limited number of proposals to take advantage of the benefits of DLW technology for the fabrication of metal structures.
In this talk a novel approach to Direct Laser Writing of metallic materials is presented. For this purpose, photochemical compounds and principles were investigated via different methods and applied in a home-built setup for Direct Laser Writing. A sensitized triplet-triplet annihilation upconversion process (sTTA-UC) is used to generate the energy required for the photochemical reduction of nickel. In order to ensure the sTTA-UC to work efficiently without having to work in degassed media, a photochemically deoxygenating solvent provides a local deoxygenated area upon excitation by a sensitizer to ensure the sTTA-UC to work efficiently. In combination, these three processes offer a new approach to DLW of 2D Nickel structures.
As a proof of concept for this method, Nickel structures with feature sizes down to 200 nm were fabricated and are presented together with an analysis of their materials properties. To investigate the

ferromagnetic characteristics of the structures, the emerging technique of nitrogen-vacancy (NV) magnetometry is used.
By closely linking physics to photochemistry and combining the potential of both fields to fabricate and characterize innovative nickel structures, this work represents a major step forward in extending the possibilities of DLW to a wide range of materials.

Parallel / 91

30 years of solar wind from the Charge, Element, and Isotope Analysis System (CELIAS) onboard the Solar and Heliospheric Observatory (SOHO)

Author: Verena Heidrich-Meisner

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The solar wind is a continuous stream of charges particles emitted by the Sun. Its properties are determined by the conditions in the solar corona. The solar wind contains the transition from a collisionless to a thermalized plasma. Thereby the solar wind provides the opportunity to investigate fundamental plasma processes and give insights into to solar corona. SOHO celebrates his 30th anniversary this year and some of the particle instruments of CELIAS are still operational. Here, we give a short overview in solar wind science with SOHO/CELIAS.

Workshops / 40

Physical Presence –Own the Room with Confidence

How do I come across as a speaker? How can I use my body to support my message? This workshop helps participants develop a confident and grounded physical presence by exploring posture, movement, gestures, and spatial awareness. We will address common fears and challenges—such as nervous energy or feeling "invisible"—and practice key elements like making a strong entrance and exit, using purposeful eye contact, and staying focused under pressure. A highlight of the session is a 2-minute spontaneous talk with individual feedback. Participants will leave with a practical set of tools and exercises to continue building their presence and impact as speakers.

Parallel / 106

NEPTUNE - NEW PROJECTORS FOR UNMANNED UNDERWATER SYSTEMS

Author: Franziska Reiser

The marine ecosystem has gained significant public attention in recent years. The increased utilization of the oceans through offshore wind energy, deep-sea exploration for marine mining, or the laying of data, power, and gas lines presents, along with the economic use through fisheries, shipping, and aquaculture, an ever-growing challenge. Due to climate change, aspects of disaster and civil protection are becoming increasingly important.

Conventional underwater sound transmitters, which operate using piezoceramics, are relatively heavy when it comes to the generation of low-frequency signals. This limits their use on autonomous and small marine platforms for underwater communication and acoustic surveillance. Low frequencies are particularly important, as they achieve a greater range in water, thus enhancing the effectiveness of communication and detection systems.
Within the joint project, an entirely new underwater sound transmission method is being developed using innovative Aerographene nanotechnology, which redefines the current state of the art. Aerographene is an electrically conductive, sponge-like structure composed of a three-dimensional network of graphene nanotubes. Due to its exceptional micro- and nanostructure, it consists of up to 99.9 % air or gas and has a material density of less than 1 mg/cm≥. Aerographene and the gases it contains can be rapidly heated electrically and subsequently cooled down again, resulting in an explosive volume expansion and the generation of sound pressure within the material. This principle enables a compact, lightweight, yet powerful solution.
The integration of a newly developed active-digital transmitter electronics elevates the application range to a multi-use potential, enabling rapid adaptation to novel transmission methods and laying the foundation for a cost-effective actuator technology for future systems.
Currently, the project is in Phase 1, focusing on the Proof-of-Concept of the novel transducer. The first functional prototype has been developed to analyze the fundamental possibilities and limitations of the transducer system. This initial stage is crucial for evaluating the technical feasibility and for identifying potential areas for further optimization and development.

NEPTUNE (NEw ProjecTors for unmanned UNderwater systEms) is a research project by ELAC SONAR GmbH in collaboration with the Faculty of Technology at Christian-Albrechts-University in Kiel and Phi-Stone AG. It is funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK), represented by the Forschungszentrum Jülich GmbH.

Parallel / 115

Characterization of the Timepix3 camera for electron, ion, and photon spectroscopy applications at SQS

Authors: Alice Judt[1]; Björn Senfftleben1,3, Rebecca Boll1, Nils Rennhack1, Simon Dold1, Jacobo Monta˜no1, Yevheniy Ovcharenko1, Ares Igharas1, Markus Ilchen2, Michael Meyer1[2]

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At the Small Quantum Systems (SQS) scientific instrument at the European X-ray Free Electron Laser (XFEL), ultrashort, intense soft x-ray pulses are used to irradiate and often multiple-ionize samples in the gas phase, such as atoms, molecules, or nanoparticles in a vacuum environment. To investigate those samples, various spectroscopic techniques are employed. One of them is Velocity Map Imaging (VMI), where the 3D momentum of charged particles (ions or electrons) is captured by using a set of electrostatic lenses that direct the particles onto a time- and position-sensitive detector. Here, such detection is realized through an in-vacuum Microchannel Plate (MCP)-phosphor stack in combination with a mobile out-of-vacuum Timepix3-based camera. At the SQS instrument, a variety of MCP-phosphor stacks (with different channel sizes, coating, or type of phosphor) are used with the
Timepix3-based camera. To study and compare the performance of these detectors, a testing setup consisting of a UV LED uniformly irradiating the MCP-phosphor stack was built. Using a known characterization target (USAF 1951), it could be determined that after post-processing a spatial resolution of 44.2 µm is achieved, an almost 7-fold improvement compared to the raw pixel data. The impact of parameters such as the operating conditions of the MCP and phosphor, and the settings applied to the Timepix3-based camera was evaluated to establish optimal experimental conditions and to improve data quality during experiments at the SQS instrument. Finally, studying different MCP-phosphor stacks under the same UV illumination conditions enables a direct comparison of their characteristics when combined with a Timepix3-based camera.

Parallel / 71

Taming Data from Simulations and Experiments for FAIR Science - From Scattered Files to Structured Insights with NOMAD

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Simulations and experimental measurements in physics and materials science routinely generate terabytes of heterogeneous data, much of which remains inaccessible beyond the original study. The widespread use of proprietary or program-specific file formats, combined with the failure to supply relevant metadata, reduces the reproducibility and extendability of available data, thereby violating the FAIR principles of Findability, Accessibility, Interoperability, and Reusability.

NOMAD (nomad-lab.eu), the open-source data infrastructure developed within the German NFDI consortium FAIRmat, addresses these challenges by implementing a consistent and extensible framework for FAIR data management across computational and experimental materials science.[1,2] Recent developments expand its scope beyond electronic-structure simulations and experimental techniques to include classical molecular dynamics, free energy calculations, and multiscale modeling. Its structured, plugin-based architecture for custom parsers, metadata schemas, and workflow management facilitates provenance tracking across various data sources, allowing, e.g., for the representation of force fields, molecular topologies, and hierarchical systems. Integrated tools coupled with an extensive API provide convenient access to curated, AI-ready datasets for secondary analysis.

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2 Scheffler, M. et al., Nature 604, 635-642 (2022).

Parallel / 121

The impact of impurities on sintering behaviour and mechanical properties of cemented carbide

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This research was conducted as a Master's thesis for University of Luxembourg at CERATIZIT Group, Luxembourg. Within the course of this research, the impact of impurities on the mechanical properties of cemented carbides together with their sintering behaviour are studied. The material studied here consists of submicron-sized grains as the hard phase with 10.3wt% of metallic binder. The reference sample used for sake of comparing the results also includes some grain growth inhibitors.
Tests conducted on samples included the mechanical tests (transverse rupture strength, hardness and toughness), magnetic tests (magnetic saturation and coercivity), for which the samples are sintered under the same sintering program. Other series of tests included thermo-analytical tests; dilatometry test was performed on green cylindrical pieces with circular bases, but the thermogravimetry test was performed on mixed powders that were pressed manually.
The tests were evaluated through microstructural analysis, providing a visual understanding of the influence exerted by various additives on the samples'microstructure. Mixing additives with the reference sample was carried out during ball milling and included two types: transition metal cubic carbides and additives of metallic binder type. Except for Mo2C and Cr3C2 with two levels of addition, all the other additives were in three levels of content.
In all cases of Grain Growth Inhibitor (GGI) addition, the hardness increased, the toughness decreased, and the TRS values showed an initial increase followed by a sharp decline, which could be attributed to surpassing the solubility limits of these additives in the binder phase.
With all mechanical tests results considered, TiC was the most impactful GGI in terms of enhancing

the hardness through reducing average WC grain size, diminishing the toughness and TRS through introducing defects and porosity, yet homogenising the microstructure which was reflected through Weibull analysis in TRS testing.

Parallel / 92

Femtosecond-spectroscopy of novel Fe(III)-complexes demonstrating a reservoir effect

Authors: Samira Dabelstein[1]; Lennart Schmitz[2]; Miguel A. Argüello Cordero[1]; Franziska Fennel[1]; Jakob Steube[2]; Lorena Fritsch[2]; Matthias Bauer[2]; Stefan Lochbrunner[1]

[1] *University of Rostock*

[2] *Paderborn University*

Conventional photosensitizers (PSs) for photocatalysis are typically derived from rare and valuable precious metals, prompting the search for alternatives based on first-row transition metals [1, 2, 3]. Among these, iron-based photosensitizers emerge as potential candidates but are limited by their short-lived charge transfer states. To overcome this limitation, targeted ligand design is employed as a strategy [2, 3]. This study presents a series of emitting iron(III) complexes modified with chromophores, featuring either phenyl or anthracene groups. The chromophores are attached to the ligand via a methyl spacer. While the phenyl-extended complexes exhibit behavior similar to the original complex, the anthracene-extended complexes reveal a reservoir effect, characterized by a population transfer from the ligand-to-metal charge transfer state to the triplet state of anthracene. Additionally, a correlation is observed between the number of attached anthracene units and the rate of population transfer. Our findings, obtained through time-resolved methods, specifically femtosecond transient absorption UV-Vis spectroscopy and streak camera measurements, are discussed in detail.

Acknowlegments
Thanks to SPP 2102 and LiMatI SFB/CRC 1477.

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2 J. Steube et al., Nat. Chem. **2023**, 15, 468-474.
3 P. Dierks, Y. Vukadinovic, M. Bauer, Inorg. Chem. Front. **2022**, 9, 206-220.

Parallel / 102

Time-resolved UV-vis Spectroelectrochemistry

Authors: Nina Brauer[1]; Ramisha Rabeya[1]; Robert Francke[2]; Stefan Lochbrunner[3]

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Homogeneous electrocatalysis based on transition metal complexes holds great potential for carbon dioxide utilization. In order to develop an efficient catalytic system, detailed knowledge about each step of the complex reaction chain is highly desirable. Until now, only long-lived intermediates have been observed. Therefore, the identification of short-lived intermediates and the determination of their life-times is of crucial importance here.

Spectroelectrochemistry has proven to be a powerful experimental approach to determine the reaction dynamics during electrocatalytic processes. In this work, a time-resolved UV-vis spectroelectrochemistry setup is developed using laser pulses to achieve a time resolution of microseconds. In contrast to previous work, this enables precise detection of catalytic reaction rates down to the diffusion limit. In the experiment, a femtosecond supercontinuum is focused closely to the working electrode surface inside a custom electrochemical cell based on a quartz glass cuvette. Upon applying a potential step to the electrodes, the induced absorption change inside the diffusion layer is measured as a function of time.

Parallel / 112

Klimawandel bremsen: Aufbruch in die technische Revolution, Selbständigkeit mit neuen Innovationen in die Technik-Wende

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Alternative Techniken werden seit vielen Jahrzehnten gefördert und entwickelt um den Klimawandel aufzuhalten. Ebenso um autarke Energieversorgung ohne fossile Energie zu ermöglichen, und zu etablieren: Sonnen –und Windenergie zur Elektrizitäts-Gewinnung sowie die Wasserstoffwende: Viele werden zwar weit verbreitet und gefördert, doch manche vernachlässigt und vergessen. Die Entwicklung der Infrastruktur hängt hinterher, darum dauert es sehr lange, bis die Energiewende tatsächlich eintritt. Meine Entwicklungen tragen zur technischen Verkehrswende bei, denn sie revolutionieren die Antriebstechnik. Wie schwer es für Frauen ist, an Förderung zu kommen, und warum es so lange dauert bis es zur Gründung und Produktion von alternativen Techniken kommt, erkläre ich am Beispiel meiner Entwicklungen als Physikerin. Wie leicht es hingegen für mich ist, neue Technologien durch eigene Berechnungen und Problemlösungen zu entwickeln, erkläre ich anhand meines Projektkonzepts. Als Physikerin, die im Energielabor einer Reformuniversität studierte und quasi mit den alternativen Energien und Techniken aufwuchs, sah ich mich vor drei Probleme gestellt und löste sie durch meine Berechnungen von physikalisch-technischen Parametern für die Antriebstechnik. Mithilfe meiner Power-Point-Präsentation erkläre ich die Physik und die Technik, die hinter meinen Innovationen steckt. Ebenso stelle ich das schwedische Modell vor, das die Massenproduktion von alternativen Antriebstechniken erleichtert. Fließbandarbeit ist längst überholt. Dafür steht die Teamarbeit an, die ebenso mit Robotern zusammenbaut. Neue Prototypen von Fahrzeugen zu bauen, ist gar nicht schwer, denn es gibt flexible Hersteller von neuen alternativen Fahrzeugteilen. Ergänzend im Fabrikationslabor plane ich den Bau von neuen Prototypen, die ich vorstelle.

Workshops / 31

Becoming appointable (Part 1)

At the final stages of their doctoral research or during their postdoc phase, many scientists are confronted with crucial career decisions: What are my professional goals and career aspirations? Do I envision my future in academia? Am I equipped with the expertise and competencies required for a professorship in my field? Finding individual answers to these questions is essential for long-term satisfaction and professional fulfillment. This workshop pursues two main objectives: Firstly, participants will gain detailed insights into various international career paths leading to a professorship, including their specific conditions and requirements. Secondly, participants will become familiar with key elements and methods for strategic career planning. Based on the principles of triadic career counselling, the workshop will consider professional achievements and personal aspects such as individual preferences, motivational factors, and specific circumstances within participants' fields.

Workshops / 32

Becoming appointable

At the final stages of their doctoral research or during their postdoc phase, many scientists are confronted with crucial career decisions: What are my professional goals and career aspirations? Do I envision my future in academia? Am I equipped with the expertise and competencies required for a professorship in my field? Finding individual answers to these questions is essential for long-term satisfaction and professional fulfillment. This workshop pursues two main objectives: Firstly, participants will gain detailed insights into various international career paths leading to a professorship, including their specific conditions and requirements. Secondly, participants will become familiar with key elements and methods for strategic career planning. Based on the principles of triadic career counselling, the workshop will consider professional achievements and personal aspects such as individual preferences, motivational factors, and specific circumstances within participants' fields.