Plenary Talk PV I Mon 13:15 Kurt-Alder HS Chemie
Magic Moments: Exotic Calcium Isotopes in Laser Light — •Wilfried Nörtershäuser — TU Darmstadt, Institut für Kernphysik

The chain of calcium isotopes has been of interest for long since it is unique in having two stable doubly magic isotopes and a particular pattern of charge radii with those of the doubly magic ^{40,48}Ca nuclei being similar despite the 40% difference in neutron number. Improvements in experimental techniques allowed us to expand the knowledge of ground-state nuclear structure from ^{36}Ca almost at the neutron dripline up to the neutron-rich ^{54}Ca during the last years. This included laser spectroscopy of ^{54}Ca at a production rate of less than 1 ion/s at ISOLDE/CERN. Progress has also been made in laser spectroscopy in the neighboring elements and results are used to benchmark nuclear structure theory and provide a challenge for ab initio, density functional, and nuclear shell-model calculations.

Plenary Talk PV II Mon 14:00 Kurt-Alder HS Chemie
Tracing ocean circulation with mass spectrometry: AMS and ATTA in focus — •Nuria Casacuberta Arola[1], Christof Vockenhuber[1], Marcus Christl[1], Werner Aeschbach[2], and Markus Oberthaller[2] — [1]ETH Zürich, Switzerland — [2]University of Heidelberg, Germany

Advancements in Accelerator Mass Spectrometry (AMS) and Atom Trap Trace Analysis (ATTA) have, in recent years, disclosed many fairy tales about ocean circulation. In this talk, I will present a summary of the work that we have been doing at ETH Zürich. This project, TITANICA, aimed at deciphering circulation patterns, transport timescales, and mixing in the Arctic and subpolar North Atlantic oceans by using a novel approach that combines the long-lived radionuclides ^{236}U, ^{129}I, ^{14}C, ^{39}Ar. Yet, the big challenge of using these tracers still lies in their precise measurements, owing to their low concentrations in the ocean (i.e., atomic ratios that range from 10^{-8} to 10^{-16} relative to their abundant isotopes, ^{238}U, ^{127}I, ^{12}C, ^{40}Ar). In the last decades, the Laboratory of Ion Beam Physics (ETHZ) and the Kirchhoff-Institut für Physic (University of Heidelberg) have pushed AMS and ATTA performance, respectively, reaching unprecedented precisions, better machine performance, and higher throughput, resulting in comprehensive stories when it comes to ocean circulation and mixing. This talk will thus discuss the potential of combining multiple radionuclide tracers measured with ATTA and AMS technologies, the challenges and successes, and the many adventures that happened between ships and measurement halls.

Plenary Talk PV III Tue 9:00 Kurt-Alder HS Chemie
Nuclear Structure and Reaction Features in Nuclear Astrophysics — •Michael Wiescher — University of Notre Dame, Department of Physics and Astronomy, Notre Dame, IN 46556, USA

This presentation will examine the impact of nuclear threshold effects on nuclear reaction rates. It will highlight a number of significant single-particle and cluster phenomena near the particle threshold that emerge due to quantum coupling effects. These configurations may exert considerable influence on low-energy charged particle and neutron capture reactions in stellar burning environments. The potential consequences of these threshold features will be demonstrated and discussed for a range of quiescent and explosive nucleosynthesis environments.

Plenary Talk PV IV Tue 9:45 Kurt-Alder HS Chemie
Nuclear astrophysics with radioactive beams — •Artemis Spyrou — Michigan State University, East Lansing, MI, USA

Advances during the last decade have shown that the field of Nuclear Astrophysics is more complex than previously thought. The original nucleosynthesis processes proposed in the 1950s are still mostly valid and continue to exhibit important open questions. However, today we understand that additional processes may have significant contributions. In particular, the production of heavy elements, which includes nucleosynthesis in explosive environments, is one of the topics where major discoveries have been made in the last years. These are driven by new astronomical observations, sophisticated new astrophysical models, and new developments in radioactive ion beam facilities around the world. In this talk I will present an overview of the field of nuclear astrophysics, focusing on heavy element nucleosynthesis. I will discuss the exciting opportunities that open up at the new generation of radioactive beam facilities like the Facility for Rare Isotope Beams (FRIB) at Michigan State University. In addition, I will present recent efforts on constraining neutron-capture reactions on short-lived nuclei and their implications on astrophysical processes.

Plenary Talk PV V Wed 9:00 Kurt-Alder HS Chemie
Femtoscopy-for-interactions : a new tool to study low energy QCD — •Laura Fabbietti for the ALICE Germany-Collaboration — Technische Universität München

In recent years a new technique to study the residual strong interaction among hadrons has been developed at the LHC. The ALICE collaboration applied the femtoscopy-for-interactions method to data collected in pp collisions at 13 and 13.6 TeV to study the strong interaction of any hadron pairs containing up, down, strange and charm quarks. The technique provided precision data for systems already studied with scattering experiments, but also allowed to measure for the first time two body interactions which are otherwise not directly accessible. Systems such as Proto-Omega and D meson-pion or D meson-kaon have been investigated with the femtoscopy-for-interactions tool at the LHC. This allowed to test novel lattice calculations, constraint existing chiral models and look for the evidence of bound states. Such studies have recently also be extended to systems containing three hadrons with the aim of accessing genuine three particle interaction in a direct way or investigating the production mechanism of (anti)nuclei in hadron collisions.

The femtoscopy-for-interactions technique opened a plethora of applications in nuclear and hadron physics and this talk will provide an overview of the recent results and future perspectives.

Plenary Talk PV VI Wed 9:45 Kurt-Alder HS Chemie
Ab-initio studies of few-nucleon reactions of astrophysical interest — •Laura Elisa Marcucci — Department of Physics "E. Fermi", University of Pisa, Pisa, Italy — Istituto Nazionale di Fisica Nucleare, Pisa branch, Pisa, Italy

Nuclear reactions involving few-nucleon systems are of great interest for astrophysics, such as in stellar evolution modeling or Big Bang Nucleosynthesis (BBN) theory. Some of these reactions are also considered the best candidates for energy production via nuclear fusion. The great advantage of dealing with light nuclei is that ab-initio techniques can be used to predict cross sections (or astrophysical S-factors for charged nuclei) in the astrophysical energy range, which is difficult to access directly through experiments. In this talk, I will review the most recent ab-initio results obtained for nuclear reactions involving A=3 or 4 nuclear systems.

Lunch Talk PV VII Wed 13:00 HS 1 Physik
Reshaping the History of Quantum Physics: Paths to Gender Equality — •Andrea Reichenberger — TU Munich

We are all familiar with gender dynamics, biases, and stereotypes on the online platforms we visit, use, and co-create every day. They are ubiquitous in large language models (LLMs) and other generative AI technologies trained on large amounts of data. Their spillover effects are now well studied in scientific research. There is comparatively little research on how the history of physics is represented and practiced in today's online spaces. This talk will take you on a journey through the history of quantum physics, exploring new avenues for a gender-sensitive future of the history of physics. And it offers a critical insight into how expertise in the history of physics, science communication and public opinion influence and reinforce each other in the practice of digital history. Drawing on a series of case studies on women in the history of quantum physics, we examine the Matilda effect on online platforms and offer perspectives on how to successfully counteract this effect, which gives a name to the systematic misrecognition of women's contributions to science and technology.

Evening Talk PV VIII Wed 20:00 Kurt-Alder HS Chemie
Kosmische Nukleosynthese: Woher stammen die chemischen Elemente? — •Roland Diehl — Max Planck Institut für extraterrestrische Physik, Garching — Technische Universität München

Die chemischen Elemente und ihre Isotope, die wir auf der Erde und im Sonnensystem vorfinden, sind kosmischen Ursprungs: Kern-Fusions-Reaktionen im Innern von Sternen und Supernova-Explosionen haben den überwiegenden Beitrag geleistet, interstellare Prozesse haben Mischungen und Transport bewerkstelligt. Das so zusammengefasste Wissen ist allerdings etwas vereinfachend, die Vorgänge im Innern von Sternen, das Explodieren eines Sterns, und die Dynamik des interstellaren Mediums stellen Forscher vor viele Rätsel, wie wir sehen werden. Experimente an Teilchenbeschleunigern und im Labor versuchen die kosmischen Bedingungen für Kernreaktionen herzustellen und die möglichen

Reaktionen zu bestimmen. Unterschiedliche astronomische Methoden müssen herangezogen werden, ihre jeweiligen Voreingenommenheiten sind kompliziert: Meteoriten liefern uns Sternenstaub, andere Methoden finden diesen auch in der Tiefsee und der Antarktis. Aber meist sind wir auf Strahlung und ihren Einfang in Teleskopen angewiesen, indirekte Daten also, die verstanden werden müssen. Wie kommt also obiges "Wissen" zustande? In diesem Vortrag wird die Astrophysik der Atomkerne im Universum, die "nukleare Astrophysik" portraitiert, ein aktueller Bestandteil dieser DPG Tagung.

Prize Talk PV IX Thu 9:00 Kurt-Alder HS Chemie

Two-proton radioactivity - status and perspectives — •Marek Pfützner — Faculty of Physics, University of Warsaw, Poland — Laureate of the Smoluchowski-Warburg-Prize 2025

Ground-state two-proton ($2p$) radioactivity is a characteristic decay mode for isotopes of even-Z elements located beyond the two-proton drip line. So far, this exotic process has been experimentally observed in a few light- and medium-mass nuclides with $Z \leq 36$. In fact, ground-state, simultaneous two-proton emission is predicted to be observable for every even-Z element up to tellurium. Most of them, however, will be very difficult to reach in the near future. In the region between tellurium and lead the particle instability is expected to be manifested by sequential emission of two protons. In addition to the ongoing search for new $2p$ emitters, an important research direction aims at precision studies of this exotic decay mode. The interesting question in this context is to what extent details of nuclear structure can be inferred from $2p$ decay observables. It is expected that the momentum correlations between the emitted protons may reveal the composition of the initial wave function. Work is in progress to investigate whether the $p-p$ correlations in the three classical cases ^{45}Fe, ^{48}Ni, and ^{54}Zn will shed light on the $Z = 28$ shell closure in this region of the nuclear chart.

In the talk, I will overview $2p$ radioactivity studies with a focus on recent experimental and theoretical developments.

Plenary Talk PV X Thu 9:45 Kurt-Alder HS Chemie

Towards Solving Computational Challenges in Lattice Field Theory: From Deep Learning to Quantum Computing — •Lena Funcke — University of Bonn, Bonn, Germany

In lattice field theory, several parameter regimes remain inaccessible to conventional Monte Carlo methods, including topological terms, nonzero baryon density, and real-time dynamics. Using lower-dimensional benchmark models as examples, I will review new approaches towards overcoming these challenges, based on deep learning, tensor networks, and quantum computing. Finally, I will discuss the requirements for integrating these methods into (3+1)-dimensional lattice simulations in the future, with a focus on Lattice QCD.

Lunch Talk PV XI Thu 12:30 HS 1 Physik

Book Launch – Physik: Erkenntnisse und Perspektiven (in German) — •Jens Kube[1], Joachim Ullrich[2], Ulrich Bleyer[2], Sarah Köster[3], Claus Lämmerzahl[4], Dieter Meschede[5], and Lutz Schröter[2] — [1]Agentur für Wissenschaftskommunikation awk/jk, Bremen — [2]Deutsche Physikalische Gesellschaft e. V., Bad Honnef — [3]Universität Göttingen, Institut für Röntgenphysk, Göttingen — [4]Universität Bremen, Weltraumwissenschaft ZARM, Bremen — [5]Universität Bonn, Institut für Angewandte Physik, Bonn

Join us for the book launch of the new DPG publication. The title "Physik: Erkenntnisse und Perspektiven" (Physics: Insights and Perspectives) refers to a publication, which was produced on a voluntary basis by almost 200 authors. It provides a detailed exploration of the fundamentals of physics, current research and future developments. The book offers readers an engaging and inspiring insight into the world of physics! The publication is also available at www.physik-erkenntnisse-perspektiven.de – along with exclusive video interviews. Printed copies can be ordered by covering the shipping costs.

Lunch Talk PV XII Thu 13:00 HS 1 Physik

Overview and plans of the Italian German Collaboration in hadron and nuclear physics — •Angela Bracco — Università degli Studi di Milano and INFN

The Italian German Collaboration in hadron and nuclear physics has a well established tradition concerning experiments, technical, and theoretical developments. This long lasting collaboration has been growing during the years. Selected results will be presented that are mainly related to activities at the German and Italian Laboratories and at CERN. INFN is the Italian funding agency supporting during the years these successful researches. Presently there are very fruitful collaborations at MAMI and ELSA addressing open questions for unconventional and exotic hadrons via precision spectroscopy. Via heavy ions experiments at FAIR/GSI and at CERN the search of dense quark matter and of hot and dense quark-gluon plasma has been carried out leading to very interesting results from which it is possible to extract quantity relevant for other physics sectors, in particular for the description of neutron stars. Nuclear structure experiments performed at FAIR/GSI and at INFN-LNL mainly via gamma spectroscopy are presently concentrating on new phenomena occurring far from stability and on nuclear properties of interest for the modeling of the nucleosyntheses. The measurements of reactions occurring in the stars at the laboratory LNGS have led to unique results. From the few selected highlights it is clear that there is bright future ahead and thus it will be important to further reinforce this successful Italian German collaboration.

Plenary Talk PV XIII Fri 9:00 Kurt-Alder HS Chemie

Compressed Baryonic Matter experiment - becoming reality — •Piotr Gasik for the CBM-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung GmbH (GSI) — Facility for Antiproton and Ion Research in Europe GmbH (FAIR) — Institut für Kernphysik, Technische Universität Darmstadt

The Compressed Baryonic Matter (CBM) experiment is under construction at the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. It aims to explore the phase structure and microscopic properties of strong interaction (QCD) matter at large net-baryon densities and moderate temperatures using heavy-ion collisions in the energy range $\sqrt{s_{\mathrm{NN}}}$ = 2.9 - 4.9 GeV.

CBM is a fixed-target experiment, equipped with fast and radiation hard detector systems and an advanced triggerless data acquisition scheme. It will collect data at unprecedented interaction rates by performing online reconstruction and event selection, thus allowing measurements of rare probes not accessible so far in this energy range. These include: multi-strange hadron production and their flow, higher-order cumulants, dileptons, as well as double-strange hypernuclei.

The presentation will provide an overview of the CBM physics performance and objectives, as well as the detector technologies being developed for the experiment. The status of preparations for CBM commissioning in 2028, including performance evaluations of CBM components at FAIR Phase-0 experiments, will also be presented.

Plenary Talk PV XIV Fri 9:45 Kurt-Alder HS Chemie

Latest results on gamma spectroscopy with AGATA — •giovanna Benzoni — INFN, sez. di Milano, Milano, Italy

The study of nuclear structure around and away from the valley of stability has led to the discovery of new phenomena, such as the occurrence of new shapes, new shell closures and shape coexistence. The detailed study of these features require the use of state-of-the-art gamma spectrometers, such as the AGATA gamma-ray tracking array, providing the highest detection efficiency and position sensitivity, crucial to pin down weak signals.

The Advanced GAmma Tracking Array (AGATA) is a major European project, involving over 40 institutes in 12 countries, to develop and operate a high-resolution gamma-ray tracking spectrometer. AGATA is a travelling instrumentation visiting the major European laboratories, GANIL (Fr), GSI-FAIR (D) and INFN-LNL (I).

In this plenary talk the main features of the AGATA array will be presented, together with highlights of the campigns at the 3 main european laboratories, with a look forward to future campaigns.