



Highlights

- Publication in the scientific journal "Nature": Milestone in antimatter research
- Proton transport from the antimatter factory of CERN
- AEgIS transforms smartphone sensors into an unprecedented resolution antimatter camera

Dear friends of low energy antimatter physics,

This MIRROR brings news of several milestones that remind us why our field is so exciting. The BASE collaboration has published a landmark result in Nature: for the first time, a single antiproton was manipulated as a quantum bit. Holding its spin coherence for nearly a minute is nothing short of extraordinary, and it promises a new level of precision in CPT symmetry tests. Congrats to the entire team!

BASE has also demonstrated the first successful transport of trapped protons using a portable Penning-trap system – a crucial step toward moving antiprotons into ultra-shielded labs where measurements can reach entirely new accuracies. What once was fiction Dan Brown's best-selling book is now turning into science reality.

Meanwhile, in AEgIS we have taken an very creative approach by turning smartphone camera sensors into the world's highest-resolution antimatter detector. This elegant solution combines cutting-edge physics with everyday technology, and it is already enabling new ways to study gravity's effect on antimatter. You can find out more about this interesting technology in this MIRROR. I am also absolutely delighted to report that the AEgIS positronium laser cooling result has been named one of Physicsworld's Top 10 breakthroughs of 2024 – a fantastic and well-deserved recognition of the excellent teamwork and perseverance which have made this possible.

Finally, at FAIR, the SIS100 accelerator has reached its first high-vacuum milestone, with magnets now being installed underground. Each of these steps brings us closer to the discoveries that lie ahead.

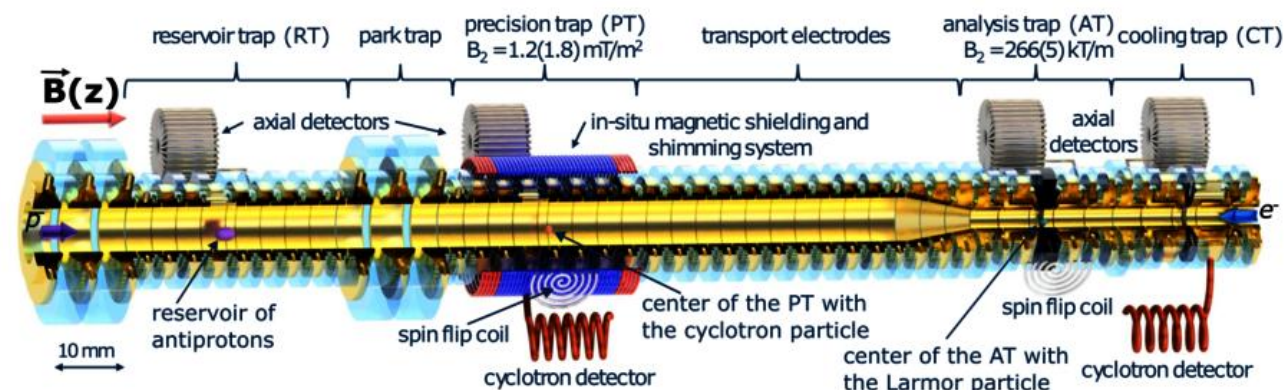
A lot of exciting news – and even more in this MIRROR. Congratulations to all involved – your achievements continue to inspire!

With my very best wishes,

A handwritten signature in black ink, appearing to read "Carsten Welsch".

Prof Carsten P Welsch, Editor

Publication in "Nature": Milestone in antimatter research



The multi-penning trap system in which the coherent spin quantum transitions were determined with a single trapped antiproton. The trap stack consists of (from left) a reservoir trap, a parking trap, a shielded precision trap, the actual analysis trap and a cold trap. The trap electrodes marked in gold are separated from each other by sapphire rings (blue). Image credit GSI/FAIR.

The BASE collaboration at the European Organization for Nuclear Research CERN in Geneva has achieved a breakthrough in antimatter research: For the first time, the researchers were able to let a single antiproton – the antimatter counterpart of a proton – oscillate between two quantum spin states in a controlled manner for almost a minute. The collaboration includes scientists from numerous international institutions, including researchers from Heinrich Heine University Düsseldorf (HHU) and AVA partner GSI/FAIR.

The study, which has now been published in the journal *Nature*, marks the world's first realization of an antimatter quantum bit (qubit for short). "This is a milestone that will enable much more precise tests of fundamental symmetries in the future," says HHU physics professor and BASE spokesperson Stefan Ulmer.

Compared to a proton, antiprotons have the same mass but the opposite electrical charge. Both

particles behave like miniature rod magnets. Their so-called spin – comparable to a compass needle – points in one of two directions. The precise measurement of the associated magnetic moment, in particular a controlled "flipping" of the spin, is one of the central tools of modern quantum measurements. It enables high precision tests of fundamental laws of nature.

The study used the method of "coherent spin quantum transition spectroscopy". This enables the high-precision manipulation and observation of individual spin states. The measurements are motivated by tests of the so-called CPT symmetry (charge, parity, time reversal) which requires that matter and antimatter – apart from their opposite charges – behave in exactly the same way. As a consequence, they should also appear with the same quantity in our universe. However, the real world shows a considerable asymmetry: it consists almost entirely of matter. This is still an unsolved mystery of modern physics.

So far, such coherent quantum transitions have been observed, for example, in macroscopic particle ensembles or in the hyperfine structure of stored ions. The BASE collaboration has now for the first time demonstrated and observed such coherent flips of a single free nuclear spin of an antiproton – which is an enormous physical and technical challenge.

“A good analogy for this is a child’s playground swing,” explains Professor Ulmer. “With the right push, the swing arcs back and forth in a perfect rhythm. In our case, the swing is the spin of a single antiproton, which we set into motion in a controlled manner using electromagnetic fields. On top of that, we achieved a coherence time of 50 seconds.”

The antiprotons, required for the experiment, were produced by CERN’s Antimatter Factory (AMF) and stored in Penning traps - high-precision electromagnetic instruments for exact particle control. The antiprotons were then individually transferred to a separate multi-trap system in which their spin states could be measured and manipulated. “This is nothing else than a qubit based on a single antiproton spin,” emphasizes CERN scientist Dr. Barbara Maria Latacz, first author of the publication.

The BASE collaboration has previously been able to show that the magnitudes of the magnetic moments of protons and antiprotons are identical within a just few parts-per-billion. Dr. Christian Smorra from HHU explains “At that time, however, incoherent spectroscopic methods were used, in which magnetic field fluctuations and technical perturbations affected the spin dynamics. This ultimately limited the accuracy.”

But is there still a tiny difference? An essential question, because even the slightest difference would break CPT symmetry and thus point to new physics beyond the Standard Model of particle physics

Substantial upgrades of the experimental setup have now made it possible to systematically suppress these decoherence mechanisms and enable the first coherent spectroscopy of an antiproton spin. The research team thus not only created a stable antimatter qubit, but also unlocked new measurement methods.

“This work gives us the opportunity to apply the entire spectrum of coherent spectroscopy methods to single particles of antimatter for the first time,” emphasizes Ulmer, adding: “Specifically, we expect to be able to determine the magnetic moment of the antiproton with ten times improved precision in the future, and in the long term with up to a hundred times greater accuracy, for example in dedicated laboratories that we are currently developing at HHU.”

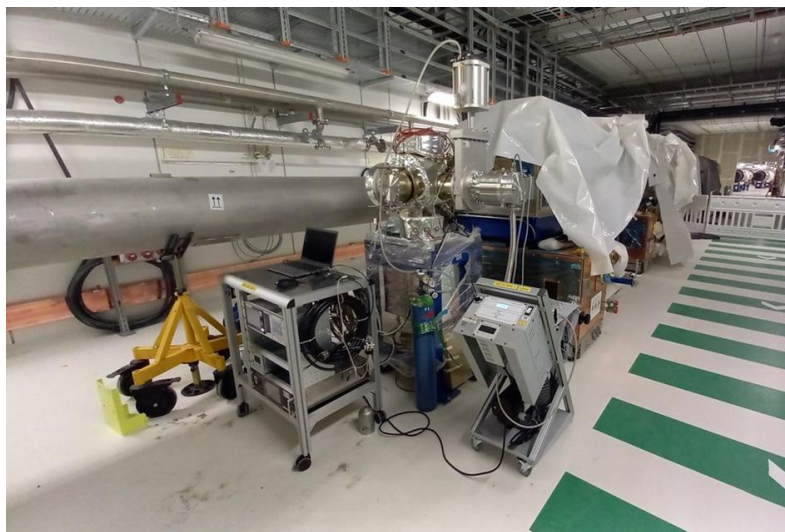
The next big leap is already planned: Using the newly developed BASE-STEP system, antiprotons will in future be transferred with transportable traps from the AMF to highly-stable precision laboratories. There, significantly longer spin coherence times can be achieved and thus a much higher measurement accuracy.

“Once it is fully operational, our new offline precision Penning trap system, which will be supplied with antiprotons transported by BASE-STEP, could allow us to achieve spin coherence times maybe even ten times longer than in current experiments, which will be a game-changer for baryonic antimatter research,” says Barbara Latacz.

The publication in Nature can be found [here](#)

This article is based on an original article published on the GSI/FAIR website [here](#)

First section of FAIR ring accelerator SIS100 under vacuum



Vacuum measurement set up at the FAIR accelerator SIS100. Photo credit: GSI

Another significant step has been achieved in the commissioning of FAIR, based at AVA partner's GSI site. For the first time, the beam pipe of a section of the FAIR ring accelerator SIS100, operating at room temperature, has been pumped down to a high vacuum level (approx. 10^{-8} mbar). The commissioning of the vacuum systems serves the recording and analysing of pump-down curves, as well as tests of the functionality of valves, pumps and vacuum gauges and the execution of leak checks.

In recent weeks, the first three room temperature cells of the straight ring section have been installed into the tunnel by teams from the department "Transport & Installation" and handed over to the vacuum testing after completion. The vacuum segments are about eight meters long and consist of acceleration cavities, a first-turn diagnostic

chamber, standard pumping chambers and several tubes, bellows and adapter flanges.

As the main accelerator of the new FAIR complex, the superconducting heavy ion synchrotron SIS100, which is currently under installation, operates in an underground tunnel about 17 meters below ground and has a circumference of about one kilometre. The machine consists of alternating segments operating at room temperature or at cryogenic temperature (liquid helium at -269°C).

Following the successful vacuum acceptance tests on this SIS100 section, work will continue in other room-temperature sectors.

This news article is based on original news article published on the GSI/FAIR website here:

<https://www.gsi.de/en/start/news/details/2025/06/12/1st-vacuum-sis100>

Proton transport from the antimatter factory of CERN

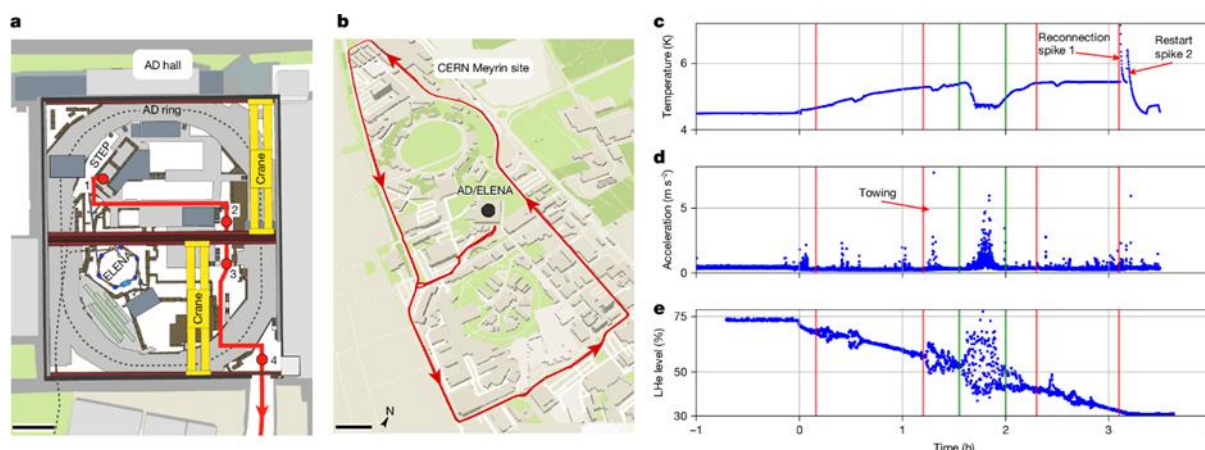


Image credit: M.Leonhardt et al, Nature 641, 871–875 (2025)*

The **BASE international research collaboration**, which is located at CERN who were a partner in the **AVA project**, have successfully demonstrated the transport of a cloud of trapped protons from the Antimatter Factory (AMF) using a revolutionary, portable Penning-trap system.

This pioneering achievement, [published in Nature](#), marks a crucial step towards being able to relocate antiprotons to specialized, low-noise laboratories worldwide, promising unprecedented precision in the search for subtle differences between matter and antimatter.

The experiment, conducted by the Baryon-Antibaryon Symmetry Experiment (BASE) collaboration, utilized a device called BASE-STEP (Symmetry Tests in Experiments with Portable Antiprotons). While the initial test involved ordinary protons, the success of this dress rehearsal strongly indicates the feasibility of transporting antiprotons, the antimatter counterparts of protons,

which are produced at CERN's Antimatter Decelerator (AD).

Experiments at CERN's AMF, such as BASE, are designed to test fundamental charge-parity-time (CPT) invariance by precisely comparing the properties of protons and antiprotons, including their magnetic moments and charge-to-mass ratios. However, the precision of these measurements has been limited by magnetic field fluctuations caused by the very accelerators that produce the antiprotons. Professor Dr Stefan Ulmer, founder and spokesperson of the BASE collaboration, explains: "We need an extremely high level of measuring accuracy to be able to identify possible differences in the magnetic moment or charge-to-mass ratio. It is virtually impossible to achieve this close to CERN's accelerators, though, as the magnetic disturbance that the accelerators there generate is simply too high. Accordingly, we want to bring antiprotons produced at CERN to [Heinrich Heine Universität] Düsseldorf to measure them here in a new, extremely well shielded laboratory."

The BASE-STEP system is a transportable, superconducting, autonomous, and open Penning-trap system. During the test, a cloud of trapped protons was transferred from the experimental area at the AMF onto a truck and transported across CERN's Meyrin site. Marcel Leonhardt, a master's student of Professor Ulmer at Heinrich Heine Universität Düsseldorf and lead author of the publication said: "We were able to demonstrate the loss-free relocation of protons, sustain autonomous operation without external power for four hours and continue to operate the trap loss-free afterwards. An important step that shows that particles can thus be relocated over longer distances in normal road traffic."

This successful proton transport confirms that the intricate electromagnetic confinement required for charged particles can be maintained outside laboratory environments. Now that the transport system's functionality has been proven with protons, the next step is to tackle the relocation of antiprotons. Dr Christian Smorra, BASE-STEP Project Leader and senior scientist in BASE adds: "If we also manage this, then it will mark the potential rise of a new era in antimatter precision research. We could then perform antiproton spectroscopy in the most suitable laboratories"

The ultimate goal remains the lossless relocation of antiprotons, which would not only alleviate the need for duplicating expensive antimatter facilities but also enable unprecedented measurement accuracies, pushing the boundaries of our understanding of the universe's fundamental symmetries.

This article is based partly on an [original article](#) on the GSI website and also on the [paper in published in Nature](#)

**Feature Image*

- (a) *The route for the first transport demonstration through the AMF hall. Point 1 is the experiment zone from which an overhead crane moved the transport frame to point 2; at point 2, the transport frame was loaded onto a trailer and moved to point 3, where it then got picked up by the second overhead crane. Point 4 is the loading bay with the truck.*
- (b) *Road map of the Meyrin site of CERN and the GPS position data recorded during transportation. Map reproduced from <https://www.openstreetmaps.org>.*
- (c) *Magnet temperature*
- (d) *total acceleration*
- (e) *liquid helium level measured during transport.*

AEgIS transforms smartphone sensors into an unprecedented resolution antimatter camera



The Optical Photon and Antimatter Imager, integrating 60 sensors, and some examples of antiproton annihilations obtained with it. Credit: AEgIS/CERN.

Did you know that the camera sensor in your smartphone could help unlock the secrets of antimatter?

Scientists working together in the “Antihydrogen Experiment: Gravity, Interferometry, Spectroscopy” ([AEgIS](#)), a key experiment in the AVA network, developed a detector using modified mobile camera sensors to track in real time the points where antimatter annihilates with matter. This new device, described in a paper just published in *Science Advances*, can pinpoint antiproton annihilations with a resolution of about 0.6 micrometres, a 35-fold improvement over previous real-time methods.

AEgIS and other experiments at CERN’s Antimatter Factory, such as [ALPHA](#) and [GBAR](#), are on a mission to measure the free-fall of antihydrogen under Earth’s gravity with high precision, each using a different technique. AEgIS’s approach involves producing a horizontal beam of antihydrogen and measuring its vertical displacement using a device called a moiré deflectometer that reveals tiny deviations in motion and a detector that records the antihydrogen annihilation points.

“For AEgIS to work, we need a detector with incredibly high spatial resolution, and mobile camera sensors have pixels smaller than 1

micrometer,” says Francesco Guatieri from the research neutron source FRM II at TUM and Principal Investigator of the research. “We have integrated 60 of them in the single photographic detector, the Optical Photon and Antimatter Imager (OPHANIM), with the highest number of pixels currently operational: 3840 MPixels. Previously, photographic plates were the only option, but they lacked real-time capabilities. Our solution, demonstrated for antiprotons and directly applicable to antihydrogen, combines photographic-plate-level resolution, real-time diagnostics, self-calibration and a good particle collection surface, all in one device.”

Specifically, the researchers used Sony optical image sensors that had previously been [shown](#) to be capable of imaging low-energy positrons in real time with unprecedented resolution. “We had to strip away the first layers of the sensors, which are made to deal with the advanced integrated electronics of mobile phones,” says Guatieri. “This required high-level electronic design and micro-engineering.”

“This is a game-changing technology for the observation of the tiny shifts due to gravity in an antihydrogen beam travelling horizontally, and it can also find broader applications in experiments where high position resolution is crucial, or to

develop high-resolution trackers.” says AEgIS spokesperson Ruggero Caravita. “This extraordinary resolution enables us also to distinguish between different annihilation fragments, paving the way for new research on low-energy antiparticle annihilation in materials,” concludes Caravita.

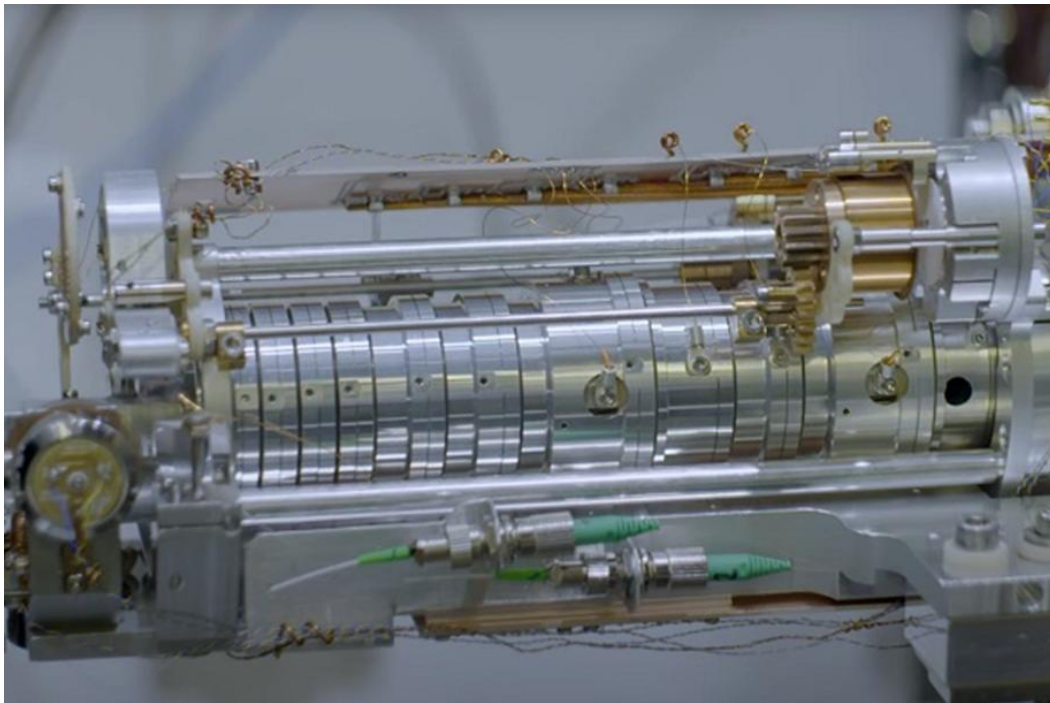
Indeed, annihilations appear as star-shaped events with multiple tracks emanating from one primary vertex. Green, cyan and orange arrows indicate examples of nuclear fragments, protons, and pions.

A key factor in achieving the record precision was an unexpected element: crowdsourcing. “We found that human intuition currently outperforms automated methods”, says Guatieri. The AEgIS team asked their colleagues to manually determine the position of the antiproton annihilation points in each of the more than 2,500 detector images, a procedure that turned out to be far more accurate and precise than any algorithm. The only downside: it took up to 10 hours for each colleague to plough through every annihilation event.

More information:

www.science.org/doi/10.1126/sciadv.ads1176

AEgIS research recognized in Physics World's Top 10 Breakthroughs of 2024



Photograph of the AEgIS trap

Physics World has named its Top 10 Breakthroughs of 2024, with the AEgIS collaboration at CERN honoured for achieving the first-ever laser cooling of positronium. This milestone advances antimatter research and enhances precision in exploring fundamental physics.

Positronium, a unique atom made of an electron and positron, might be a key to understanding the universe's matter-antimatter asymmetry. Laser cooling enables unprecedented precision in these studies. Dr Benjamin Rienäcker, AEgIS Physics Coordinator, remarked: "This breakthrough

enhances our ability to study antimatter and address profound questions about the universe's origins."

Professor Carsten P Welsch, Liverpool team leader in AEgIS, proudly added: "This achievement showcases the power of collaboration and innovation. Congratulations to the entire collaboration!"

For more on Physics World's Top 10 Breakthroughs, visit [Physics World](#). Learn about the positronium cooling breakthrough [here](#)

Review of the AEgIS Collaboration Meeting (16-19 Dec 2024)



Delegates at the AEgIS Collaboration Meeting.

The meeting opened with a welcome address by spokesperson Ruggero Caravita and a physics run overview by Physics Coordinator Benjamin Rienacker. They highlighted the significant progress made despite the interim upgrade during August and September, putting a lot of additional pressure on the team. This upgrade opened the experimental downstream side, enabling antihydrogen atoms to move from the production area toward the moiré deflectometer for future gravity measurements.

Updates on the control system, lasers, and positron system were presented, along with a session on positronium (Ps) in AEgIS. The latter provided critical insights into the challenges posed by low efficiency in recent years.

The next day began with discussions on the ballistic production of antihydrogen and the development of a new positronium target, expected to overcome current limitations and produce a high-intensity, forward-directed antihydrogen beam. Presentations on high-charge ion (HCI) formation from antiproton interactions and the Torun ion source status showcased innovations in experimental techniques. Afternoon sessions included initial test results of a portable antiproton trap and the unveiling of the groundbreaking OPHANIM detector, developed by Francesco Guatieri and Michael Berghold from AEgIS's newest partner institution, the Technical University of Munich, led by Prof. Christoph Hugenschmidt.

The following day focused on improving antiproton catching and accumulation, with promising initial results from the Jagellonian University's JPET modules for positronium and antihydrogen physics. Presentations on moiré deflectometer mechanics and scintillators highlighted readiness for upcoming installations. Strategic discussions revolved around the upcoming SPSC review and AEgIS's long-term role in the European Strategy Group.

During the Collaboration Board meeting, Malgorzata Grosbart was elected as the new technical coordinator of AEgIS, while Ruggero Caravita was re-elected as Spokesperson. A new emeriti status was introduced, with Stefan Haider, former technical coordinator, and Michael Doser, former spokesperson and AEgIS founder, becoming the first to hold this honor as they transition into retirement or post-CERN careers. The day concluded with a traditional cheese fondue dinner in Geneva, fostering team spirit and informal exchanges.

The final day focused on winter shutdown activities and the physics potential of the positronium test

chamber and the cryostat for novel cryogenic measurements which will be installed soon. Discussions on the acquisition of a new laser system explored various options to enhance experimental performance. The meeting concluded with a vote to adopt Mattermost as the collaboration's new communication platform, reflecting a forward-thinking approach to team management.

The AEgIS collaboration meeting was a highly productive event, providing a platform for sharing progress and charting future directions. The decisions and insights gained during these sessions will guide the next phase of the project. With ongoing advancements in experimental techniques and infrastructure, AEgIS is well-prepared to make groundbreaking contributions to antimatter research in the coming years.

Further details of all the sessions in this meeting can be found on the Indico page [here](#)



Shining a Light on Antimatter Research



YouTube @AstroTim

Antimatter, once the stuff of science fiction, continues to fascinate both researchers and the public. Recent interviews featuring AVA Coordinator and [QUASAR Group](#) leader Professor Carsten P Welsch shed light on the latest developments in this field.

The first interview was done by well-known YouTuber “Astro” Tim Ruster, and has drawn already over 220,000 views. Professor Welsch talks about his group’s latest experiments at CERN, where the Liverpool researcher’s study why the universe appears to contain far more matter than antimatter with their colleagues in the [AEgIS experiment](#). The discussion covers challenges involved in producing and storing anti-hydrogen for experiments, how researchers measure the impact of gravity on antimatter and whether there may be any subtle differences from the behaviour of normal matter, and the innovations that allow antimatter to be contained and studied for longer periods. In their

45 minute-long conversation, Astro Tim and Professor Welsch talk about these concepts in an approachable manner, covering a range of breakthrough experiments that were done over the past few decades.

Shortly after the YouTube video, Professor Welsch appeared on the *Jay Thakkar Show* podcast to explore antimatter research in greater depth. This included an overview of antimatter’s properties and its role in modern physics, potential uses in medical treatment and future energy solutions, and current hurdles in antimatter experiments and anticipated developments.

Professor Welsch is a leading science communicator who frequently appears on online platforms and public events, explaining challenging topics such as antimatter in understandable terms. More details about his group’s wider outreach activities can be found [here](#).

Additional Resources

- Astro Tim’s YouTube Video (in German) [*Dieses Antimaterie-Experiment verändert unseren Blick auf das Universum!*](#)
- Jay Thakkar Show, Episode 4 [*Demystifying Antimatter with Professor Carsten P. Welsch*](#)

Empowering the Next Generation: African Students Explore Global Research Pathways with Prof. Carsten Welsch



Logo of the African School of Physics

In a landmark African School of Physics ([ASP](#)) Online Seminar on 25 February 2025, over 200 live attendees from across Africa and beyond joined Professor Carsten P. Welsch, AVA Coordinator and Head of the QUASAR Group at the University of Liverpool, for a dynamic and practical discussion on international research funding and career development for early-career scientists.

With more than 500 registered participants, the event highlighted the growing demand for structured, accessible training routes that support African researchers in science and engineering.

Professor Welsch, an expert in accelerator physics and former Head of the University of Liverpool's Physics Department, brought decades of experience coordinating large EU research networks to the session. His message was clear: "International collaboration, early exposure to interdisciplinary environments, and proactive networking are key to building a successful research career."

The seminar focused on the critical role of structured training programmes in empowering researchers to thrive in both academia and industry. Referencing very successful models such as the European Union's Marie Skłodowska-Curie Actions (MSCA) and the UK's Science and Technology Facilities Council (STFC) Centres for Doctoral Training such as [LIV.INNO](#), Professor Welsch emphasized cohort-based training, cross-sectoral exposure, and international mobility as essential elements of modern scientific education.

He showcased a series of doctoral networks, including [AVA](#) (antimatter research), [OMA](#) (accelerators for cancer therapy), and [EuPRAXIA-DN](#) (plasma accelerator R&D), that offer African students fully funded PhD opportunities, hands-on lab experience, and strong industry links. "These programs aren't just about research," he said. "They equip you with the diverse skill set needed to lead in science, whether in the lab, in startups, or in policy."

The seminar was highly interactive, with participants raising questions about scholarships, postdoctoral opportunities, and the challenges of gaining international exposure. Professor Welsch provided practical strategies, from crafting compelling application letters to finding positions via trusted platforms such as [EURAXESS](#), which offers thousands of research vacancies and guidance for mobility across Europe.

A key takeaway was that quality matters more than quantity. “For postdoc applicants, strong, well-aligned publications and a clear research vision will take you further than just stacking your CV,” Professor Welsch said. He also reassured older researchers and career changers that many fellowships, particularly within MSCA, have no age limit, prioritizing potential and relevance over age.

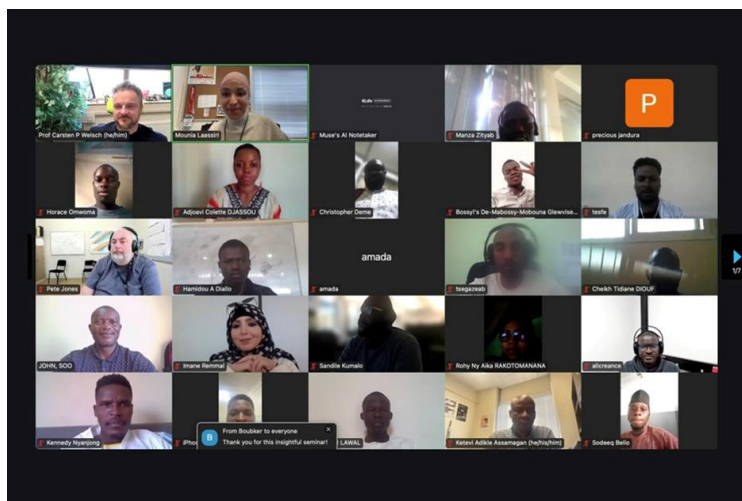
Beyond technical skills, Professor Welsch urged participants to find mentors, build peer networks, and engage with the research community through conferences and collaborative platforms. He stressed that international research careers are not built in isolation: “Join summer programs, reach out to labs, volunteer in your university—every step builds your confidence and opens new doors.”

One inspiring example was that of Miha Červ, a former fellow in the AVA network, who leveraged connections made during his PhD to transition into the field of medical accelerator technology from his research in fundamental science; an illustration of how integrated training programs can set the stage for impactful careers.

With Africa’s research ecosystem evolving rapidly, the seminar served as both a knowledge-sharing forum and a rallying call for collaboration. Professor Welsch’s seminar did more than inform, it inspired. His final message was a call to action: “Use the tools, platforms, and programs available to you. The future of global science will be shaped by diverse voices, and yours needs to be one of them!”

As interest in international fellowships and training intensifies, initiatives like this ASP seminar play a crucial role in connecting talent with opportunity, and in ensuring that the next generation of researchers is equipped to solve global challenges – in collaboration.

For further information and to access the recording of the seminar, please visit: <https://indico.cern.ch/event/1514388/>



Participants at the ASP online seminar.

Voice of Science: Prof Welsch puts AVA into the spotlight at CERN



The Globe of Science and Innovation at CERN.

A packed library at CERN was treated to a fascinating talk by Professor Carsten P. Welsch, AVA project coordinator and Head of the accelerator science cluster in Liverpool, on Friday 14 February 2025. His talk on “Hollywood Physics” was an engaging deep dive into blockbuster movie-making and an overview of the latest research breakthroughs of his group.

From the outset, Professor Welsch captured the crowd's imagination by highlighting how real physics often underpins the on-screen illusions in major films. Drawing on examples from big Hollywood blockbusters such as Iron Man, The Flash or Stranger Things, he explained that while cinematic storylines can take creative liberties, many studios are eager to maintain a semblance of scientific authenticity to heighten realism. This “Hollywood” angle provided a lively icebreaker, setting the stage for a broader discussion of advanced research within the QUASAR Group.

This included discussions around the beam gas curtain monitor, recently installed in the Large Hadron Collider, breakthroughs in antimatter research within the AEGIS collaboration, and how AI is driving advances in accelerator optimization

and beam instrumentation. A dynamic Q&A session followed, with audience members quizzing Prof Welsch on the importance of scientific outreach, career progression to specific research techniques used in his group.

Prof Welsch said: “Stories in blockbuster films captivate global audiences, and when they're grounded in real science - even if creatively adapted - they can spark lasting curiosity. Our job is to make sure that spark leads to greater understanding and perhaps even inspires the next generation of scientists.”

The enthusiastic response to Professor Welsch's talk highlights the enduring fascination with cutting-edge physics and its interplay with mainstream media. By using Hollywood's big-screen magic as a springboard, the event explained how science can transition from the realm of imagination to practical, world-changing technology.

For anyone interested in Professor Welsch's background or in seeing photos from the event, please go to <https://indico.cern.ch/event/1470941>.



Prof Welsch presenting 'Hollywood Physics' at the packed library at CERN.

Liverpool to Host World's Largest Particle Accelerator Conference in 2029



The University of Liverpool is delighted to announce that Liverpool has been selected to host the International Particle Accelerator Conference (IPAC) in May 2029. This prestigious event, the largest of its kind, will bring together global experts in accelerator science to discuss groundbreaking research, technological innovation, and the societal applications of particle accelerators.

The successful bid, led by the University of Liverpool and its UK partners, overcame strong competition from Poland, Spain, and Switzerland. It highlights Liverpool's rich scientific heritage as the birthplace of particle accelerator technology and its ongoing contributions to this field.

Professor Carsten P Welsch, AVA Coordinator and Chair of the Local Organizing Committee, expressed his enthusiasm: "Securing IPAC'29 for Liverpool is a dream come true and a testament to incredible teamwork and support. Hosting the world's largest accelerator conference where this transformative technology first began is a proud moment for Liverpool and the North-West. We look forward to showcasing cutting-edge research, engaging the public with an inspiring outreach program, and celebrating the vital role of accelerators in both science and society."

IPAC'29 presents a unique opportunity to spotlight the UK's leadership in accelerator science. With world-class facilities such as the STFC Daresbury Laboratory and the Cockcroft Institute located in the

North-West, Liverpool is perfectly positioned to showcase the nation's contributions to fields like healthcare, energy, and advanced manufacturing.

Hosting IPAC'29 aligns with Liverpool's ambition to drive growth in science and innovation while reinforcing its global reputation as a hub of scientific excellence. This event is expected to attract more than 1,000 delegates, delivering significant economic and academic benefits to the city and the wider region.

An integral part of IPAC'29 will be an engaging public outreach program. From hands-on workshops to interactive exhibitions, the program aims to engage the local community and inspire the next generation of scientists by highlighting the transformative impact of accelerators on everyday life.

Lisa Owen, Head of Business Tourism at Liverpool Convention Bureau, praised the collaborative effort behind the successful bid: "This achievement underscores the power of partnerships across academia, government, and industry. It not only showcases Liverpool's strengths as a conference destination but also reinforces the importance of innovation-driven events for the city's long-term growth."

Liverpool's hosting of IPAC'29 will serve as a fitting tribute to the city's pioneering role in accelerator science. The event will transform the city into a showcase of innovation and provide a platform for the UK to cement its status as a global leader in the field. As Professor Welsch put it, "Accelerators are coming home."

We all look forward to welcoming the international accelerator community to our vibrant city!

Events

17 th - 22 nd May 2026	International Particle Accelerator Conference (IPAC26), Deauville, France
20 th - 25 th May 2029	International Particle Accelerator Conference (IPAC29), Liverpool, UK

Notice Board

Help us communicate interesting events, updates and latest R&D in antimatter physics and send us your news and updates.

MIRROR – A newsletter for friends of antimatter physics

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