CERN Bulletin

Issue No. 41-42/2023 – 12 October 2023
http://home.cern/cern-people

CERN Science Gateway: highlights from the opening weekend

See photo highlights from the inauguration on Saturday 7 October and first visitors on Sunday 8 October

Entertainment on the sunny piazza on Saturday.
(CERN-PHOTO-202310-241-10)

On Saturday 7 October, CERN inaugurated its brand-new centre for education and outreach: CERN Science Gateway. An inauguration ceremony was held in its 900-seat auditorium, attended by invited guests, the press and delegates from CERN's Member and Associate Member States. On Sunday 8 October, CERN Science Gateway welcomed its first visitors, who explored the exhibitions, state-of-the-art lab facilities, enjoyed the sunshine on the piazza and a took break in the Big Bang Café. Scroll through the photos on page 3 to see some of the highlights from the opening weekend.

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A Word from Mar Capeans

Balancing preservation with modernisation

Ageing buildings, sustainable ambitions and 9500 ServiceDesk tickets in 2023 so far – here's how the Site and Civil Engineering department defines site consolidation priorities.

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A Word from Mar Capeans

Balancing preservation with modernisation

Ageing buildings, sustainable ambitions and 9500 ServiceDesk tickets in 2023 so far – here's how the Site and Civil Engineering department defines site consolidation priorities

CERN is 69 years old. By CERN, I mean more than 600 buildings, 54 km of roads and 64 km of underground tunnels. About 65% of CERN's infrastructure was built before 1970, so the Site and Civil Engineering (SCE) department needs to balance preservation with modernisation. Here's how we define our site consolidation priorities.

In the past, there would be campaigns to replace windows, then campaigns to replace doors, and so on. But, back in 2021, our approach changed, helped by an increase in budget. It enabled two to three renovations per year of complete buildings. Unfortunately, the recent budget constraints will reduce the amount of complete building renovations from 2028 onwards.

Prioritising which building to renovate relies on four Ss: safety, sustainability, strategy and Stratus.

- **Safety:** our colleagues in the Occupational Health & Safety and Environmental Protection (HSE) unit work alongside SCE to report and address safety compliance issues.
- **Sustainability:** a renovated building will gain 60–80% in energy efficiency, helping to minimise our impact on the environment.
- **Strategy:** renovations must have strategic value for the scientific programme. As a particle physicist myself, I fully understand that scientific priorities come first, but we also have to ensure that the working conditions for the CERN community do not degrade.
- **Stratus:** this professional software tool lets us assess the condition of important aspects of buildings. We use it to evaluate and categorise every building on site, calculating the investment required to bring a building up to the latest standards.

These four Ss feed into the recurrent site consolidation programme, established annually with a 10-year horizon. Recent renovations have included Restaurant 1, the newly reopened CERN Library and Building 180, home of magnet developments.

A major, ongoing renovation is that of Building 60, CERN's main building, which was constructed in 1959. Its modernisation was necessary due to a high presence of asbestos. This work was originally planned for 2027, but the CERN Management decided to bring it forward. We are grateful for this brave decision, which entailed relocating all of the building's offices to Building 42. The project should be completed by late summer 2025.

Renovations are complemented by newly constructed buildings and infrastructures, defined either by technical needs – such as the newly delivered HL-LHC buildings and the Prévessin Data Centre – or because a new construction is a better choice than renovating very old assets. Two such buildings, currently in the design phase – Building 777 in Prévessin and Building 140 in Meyrin – will aim for a net-zero carbon construction, in line with CERN's sustainability ambitions. They bring opportunities to change space management, incorporating a minimum of 30% open-space areas. Once their construction is complete, old barracks and buildings that are uncomfortable, expensive to maintain and have poor energy efficiency will be demolished.

Additionally, with such a large site, urgent repairs and interventions are handled via ServiceNow. Anyone at CERN can send a request for a repair or minor modification, and so far in 2023 we have received no fewer than 9500 ServiceDesk tickets. Safety-related requests are dealt with quickly, while others are integrated into the yearly programme of repair campaigns on site, thus optimising the load of the teams.

Site consolidation is just one of the many aspects of SCE's work. Another, in collaboration with FAP and many other departments at CERN, is the CERN Campus app, launched as a proof of concept this August. With about 3000 users to date, this app unites campus services and information including

food, maps, phonebook, notifications and CERN news. You can find out more and download it here. In everything we do in SCE, our aim is to transform CERN into a greener lab, protecting, preserving and modernising the infrastructure for the many exciting years ahead.

Mar Capeans
Head of the Site and Civil Engineering department

(Continued from page 1)

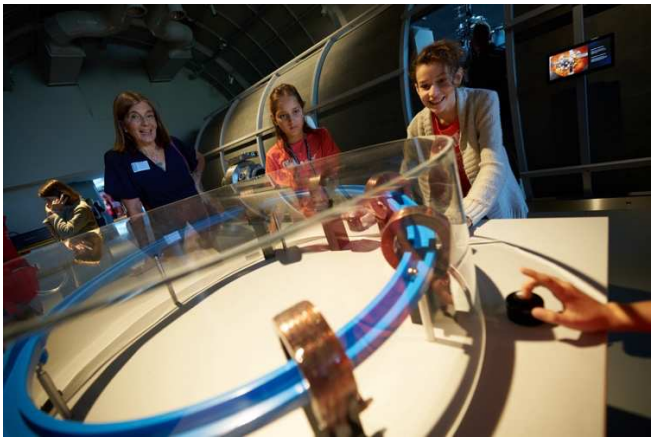
The ribbon-cutting ceremony at 12 p.m. on Saturday, officially declaring CERN Science Gateway open. From left to right: Eliezer Rabinovici, President of the CERN Council, Alain Berset, President of the Swiss Confederation, Fabiola Gianotti, CERN Director-General, John Elkann, Chair of Stellantis, and Renzo Piano, Architect of CERN Science Gateway. (CERN-PHOTO-202310-241-31)

Renzo Piano, Architect of CERN Science Gateway, and John Elkann, Chair of Stellantis exploring the "Discover CERN: Accelerate" exhibition. This model of the LHC is tactile, allowing visitors with visual impairments to explore the LHC. (CERN-PHOTO-202310-241-105)

Throughout Saturday, high-school students from the CERN Solvay camp and children of the CERN community enthusiastically guided the press and delegates, explaining the science in the exhibitions and demonstrating the new lab facilities. At the end of the day, they were invited up on stage and thanked for their hard work. (CERN-PHOTO-202310-241-193)

A student demonstrates the new lab facilities to the President of the Swiss Confederation, Alain Berset. (CERN-PHOTO-202310-241-88)

Three high-level ministerial roundtables took place in the auditorium on Saturday afternoon, where delegates from CERN Member States discussed the importance of STEM education. (CERN-PHOTO-202310-241-191)



Children demonstrate how magnetic fields in accelerators work in this hands-on experiment in the "Discover CERN: Accelerate" exhibition. (CERN-PHOTO-202310-241-80)

The piazza on Saturday afternoon. To the left is the auditorium, to the right is the new visitor reception, CERN shop and the Big Bang café. Solar panels on the roof and trees around the site help to make the buildings carbon-neutral. (CERN-PHOTO-202310-241-98)

Entertainment on the sunny Esplanade des Particules on Saturday. (CERN-PHOTO-202310-241-10)

Visitors on Sunday 8 October explore the "Discover CERN: Collide" exhibition. This installation shows how CERN processes data, against a backdrop of one of the LHC detectors. (CERN-PHOTO-202310-244-42)

Visitors on Sunday 8 October explore the "Our Universe: Exploring the Unknown" exhibition. This exhibition showcases four artworks from former Arts-at-CERN artists, inspired by physics concepts and inviting visitors to contemplate the Universe. (CERN-PHOTO-202310-244-21)

Visitors on Sunday 8 October explore the "Quantum World" exhibition. Various interactive games demonstrate the bizarre behaviours of particles at the quantum level. (CERN-PHOTO-202310-244-29)

The opening weekend was a success thanks to the help of Science Gateway guides from across the CERN Community. Want to enjoy all the facilities that Science Gateway has to offer? It's still not too late to become a CERN guide: https://guides.web.cern.ch/join.

Naomi Dinmore

Accelerator Report: Optimisation for greater success (and new challenges)

Since the last Accelerator Report, lead-ion beams have been successfully provided to the SPS North Area, in particular to the NA61 experiment, which is their principal user. The optimisation of the SPS beam parameters and the slow extraction process last week, together with the optimisation of the beam transport to the North Area, have resulted in an optimal beam spill structure, 50% more efficient than in 2022.

On Friday, 6 October, the LHC completed the stepwise intensity ramp-up of the lead-ion beams and reached 1240 bunches per beam. However, this achievement came with two main challenges: beam losses during the last part of the acceleration ramp, causing the beam to be dumped, and a high level of background noise in the ALICE detector, in an area where the circulating beam interacts with the collimators.

To address the beam loss issue, the thresholds of the beam loss monitors that are distributed around the LHC and serve as input to the beam dump system have been increased. This allows more lead ions to be lost, especially in the areas with collimators, without compromising the safety and reliability of the accelerators. This and other adjustments allowed the losses during acceleration to be kept below the dump threshold and beams with 1240 bunches each to be collided.

Experts from the ALICE experiment and the LHC machine collaborated closely to tackle the issue of background noise in the ALICE detector: many different remedial strategies were studied and tested during several fills over a period of more than 30 hours. Finally, the correction of residual dispersion (see the box below) reduced the background noise to a satisfactory level for ALICE to take physics data in the coming weeks.

Efforts to enhance accelerator performance extend beyond the LHC beams. Teams are constantly fine-tuning the injectors, not only for LHC beams but also for various fixed-target beams. The new AD/ELENA antiproton beam intensity records that we saw last week are a nice example. At the start of the 2023 run, the AD extracted 3.1×10^7 antiprotons. This was increased gradually to reach 4×10^7 antiprotons in September. Following an increase in the number of protons on the AD target, which is the source of antiprotons, optimisations on the AD machine side were performed to increase – to up to 90% – the percentage of antiprotons that reach extraction, resulting in a record intensity of 4.9×10^7 antiprotons extracted from the AD. This is the result of meticulous work by the AD team to better understand the machine and gain a fraction of a percent each time.

After being first decelerated in the AD machine, the antiproton beam is injected into the ELENA machine, where the antiprotons are divided into four bunches that, after further deceleration, can be extracted individually and sent to the different antimatter experiments. In September, these experiments regularly received $8x10^6$ antiprotons per bunch but, last week, after the recent optimisations, they received up to $9.7x10^6$ antiprotons per bunch, a new intensity record for ELENA.

These remarkable achievements reflect the dedication and expertise of the many teams that, together, make the CERN accelerator complex run.

A brief explanation of dispersion

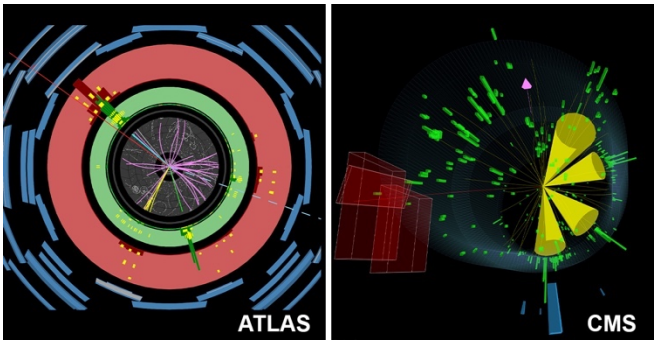
The particles circulating in the LHC do not all have the same energy: some particles in the beam have a slightly lower or higher energy than the average energy of all the particles. A beam of particles thus has an average energy and an energy spread.

The beam is curved by the LHC dipoles, which guide it along the 27-km-long accelerator, but the radius of curvature is different for particles with different energies. Therefore, the physical size of the beam at the exit of the dipoles will depend on the energy spread of the beam. This is what we call dispersion.

Rende Steerenberg

ATLAS and CMS unite to weigh in on the top quark

The new result combines 15 previous measurements to give the most precise determination of the top-quark mass to date



Collision event displays of top-quark production from ATLAS (left) and CMS (right). (Image: ATLAS/CMS/CERN)

Among the known fundamental particles of the Universe, the top quark claims the heavyweight title, with a mass 184 times that of the proton. Measuring its precise value – along with that of the Higgs boson – provides crucial information about the theoretical underpinnings of the Standard Model of particle physics. It also allows researchers to improve the precision of theoretical calculations with which to compare experimental data, better enabling them to search for new physics phenomena.

For the first time, the ATLAS and CMS collaborations have joined forces to measure the mass of this fundamental particle. Their new result, presented at the 16th International Workshop on Top Quark Physics, takes a weighted average of 15 previous individual measurements from ATLAS and CMS to give a precise new determination of the top-quark mass.

The 15 previous measurements, six from ATLAS and nine from CMS, were based on data samples of proton–proton collisions collected by ATLAS and CMS in 2011 and 2012, during the first run (Run 1) of the Large Hadron Collider (LHC).

Though ATLAS and CMS have independent data samples, their measurements do have some shared sources of (systematic) uncertainty. These sources can include shared theoretical modelling of the top-quark production and decay, as well as of the background processes that mimic them. They can also include the presence of multiple, simultaneous collisions affecting measurements in both experiments in similar ways, and a common understanding of the internal structure of the colliding protons.

Therefore, when combining their measurements, the ATLAS and CMS collaborations have to be careful not to double count any of these shared uncertainties. For example, the top quark almost always decays to a W boson and a bottom quark. In these decays, the bottom quark produces a unique spray, or “jet”, of particles, called a b-jet.

Determining the energy of these b-jets relies on simulations of jet formation that are common to both experiments. This leads to shared systematic uncertainties in the top-quark mass measurements of ATLAS and CMS that have to be accounted for.

After conducting a detailed study of these shared uncertainties, the ATLAS and CMS researchers combined their 15 previous measurements to obtain the most precise determination of the top-quark mass to date: 172.52 billion electronvolts (GeV) with a total uncertainty of 0.33 GeV. The researchers also examined the ATLAS- and CMS-only combinations of the top-quark mass measurements and found them to be consistent with the joint-experiment combination, giving further confidence in the new result.

The new result, based on Run 1 data, is a good example of the meticulous work that is required to understand LHC data. Such work can go on for many years after the data are collected. The top-quark mass has also been measured with high precision using data from Run 2, and the unprecedented number of top quarks produced in this run provides further opportunities for ATLAS and CMS to innovate and improve on this important measurement. Looking forward, the ongoing Run 3 will allow the collaborations to continue their investigation of this fascinating particle.

Work Well Feel Well: No, no… it's OK…

Developing an awareness of health indicators

While a healthy amount of stress can provide motivation and drive, when work commitments are high, stress can negatively impact our health. It's essential to put measures in place to protect our health from the harmful effects of chronic stress.

In situations of chronic stress, we often convince ourselves that we can hold out a bit longer, without making any significant changes to our habits. Taking account of our own needs and limits can prove difficult. Sometimes we only become aware of our limits when they have been exceeded and it has become impossible to cope. This can manifest itself in extreme ways, either physically through illness, exhaustion, back pain and heart problems, or emotionally through anxiety, paranoia or burnout.

Take action

As part of the "Efficiency and caring at work" campaign, the Work Well Feel Well website (https://hr.web.cern.ch/work-well-feel-well) now offers useful resources that can be downloaded and completed to help to recognise and pay attention to health indicators at work.

This can help to maintain a balance and ensure that the amount of stress experienced is healthy.

The recording of the Micro-Talk from 6 October 2023 entitled "Preventing burn-out in a demanding professional context" is now available, alongside self-assessment tools here (https://indico.cern.ch/event/1302707/, login required), with the presentation in French and slides in English.

In addition, in the light of World Mental Health Day on 10 October, CERN's Medical Service and psychologists invite you to three interactive sessions on 11, 18 and 25 October to learn effective and useful tools to better deal with stress (https://home.cern/news/announcement/cern/join-three-interactive-sessions-effective-tools-better-deal-stress).

This is the first of a 12-part Work Well Feel Well series, with articles to be published every two months.

LHCb sends gift to PANDA

The decommissioned outer tracker of CERN's LHCb experiment embarked on a one-week journey to the FAIR facility in Darmstadt, Germany, where it will be used by the PANDA experiment to study how subatomic particles build up matter

The outer tracker made its journey from LHC Point 8 at CERN to GSI/FAIR in Darmstadt, where it now awaits its second life. (Image: CERN)

Located near Geneva airport, the LHCb experiment is one of the four big experiments at CERN's Large Hadron Collider (LHC). Dedicated to the study of b-quarks, LHCb uses a set of successive detectors to study the traces of the particles thrown forward from the collision point. One of these detectors is the outer tracker, which was replaced during Long Shutdown 2 by a new set-up based on scintillating fibres, the SciFi. The latter comes with a more refined granularity, allowing for a higher spatial resolution of the tracked particles.

The outer tracker was still in good shape and working perfectly, despite having been in operation for a decade. Therefore, after discussing the spare detector module at a conference with colleagues from the GSI *Helmholtzzentrum für Schwerionenforschung*, the LHCb collaboration decided to donate it to the PANDA (antiProton ANnihilation at DArmstadt) experiment, which will be hosted by FAIR – the Facility for Antiproton and Ion Research – currently under construction at GSI.

At PANDA, the outer tracker will partly go back to resume its initial function of tracing the smallest building blocks of matter. With the aid of the FAIR accelerators, antiproton beams will be generated and stored, then collided with fixed targets (e.g. hydrogen) inside the PANDA detector set-up. As this will happen at lower energies, the outer tracker will be able to detect the light hadrons produced by the collisions. Hadron spectroscopy is where the physics goals of LHCb and PANDA overlap, and the two will be able to collect complementary data that can later be analysed and compared. The tracker will also be used by students and young researchers in R&D projects, as well as in outreach activities for schools and the general public.

Transporting the tracker was no easy feat: In its transport frame, it is seven metres long, 3.5 metres wide and 5.5 metres high. It also weighs 24 tons. In 2018, when the disassembly started, the whole outer tracker was demounted placed in its transport frame – a specially designed handling cage – and removed from the LHCb cavern. Subsequently, it was moved to a storage hall within CERN, and more recently to Sergy, France for the release procedures and finally back to LHCb in Meyrin, Switzerland, where it was prepared for shipping. Hoisted up by cranes onto a truck, the detector began its journey from CERN to GSI/FAIR. Near Colmar, France, it was loaded onto a ship for a multi-day journey up the Rhine River. At Gernsheim, Germany, another truck collected the tracker and brought it safely to GSI/FAIR in Darmstadt where it will start its second life. Read more on the LHCb website here (https://lhcb-outreach.web.cern.ch/2023/10/05/second-life-of-the-lhcbs-outer-tracker-at-gsi/).

Sanje Fenkart & Carola Pomplun

Learn the key skills to save lives on site

The Enlarged Directorate has received hands-on first aid training to learn life-saving actions – now it's your turn!

On a sunny afternoon in Building 42, members of the CERN Enlarged Directorate gathered to attend a special tailored session on life-saving actions. Led by the CERN Fire and Rescue Service and personnel from the Medical Service, they learned basic first aid techniques to apply in emergency situations, focusing on cardiac arrest, reanimation (CPR) and how to use a defibrillator.

The CERN community also had the opportunity to see demonstrations of life-saving actions as part of the rich programme on offer during the Cardiovascular Health Awareness campaign, which was held from 26 to 28 September, ahead of World Heart Day on 29 September.

The First Aid – Life-Saving Actions course is part of a comprehensive first aid training scheme and is a cornerstone of the Organization's medical emergency response strategy. As part of its Organization-wide safety objectives, CERN aims to have 40% of its personnel trained in life-saving actions by Long Shutdown 3. The three-hour course, open to everyone on site, covers the most commonly encountered and most critical emergencies, teaching participants how to raise the alarm and summon life support in the most efficient way.

Don't hesitate: register now to equip yourself with the basic knowledge, know-how and techniques that could save lives. In an emergency, every second counts.

In the event of an emergency or incident, call +41 22 76 74444 (Tel. 74444)

To locate defibrillators on the CERN site, download the CERN Campus App: you can find them under "Emergencies and Contacts"

HSE Unit

Carbon dioxide for the environment

Following the completion of a successful in-house development phase, CERN is equipping the ATLAS and CMS detectors with new carbon dioxide (CO_2) cooling systems that will contribute to the transition towards green and sustainable technology in this area

Several years ago, CERN made it its mission to put the environment at the heart of its scientific research. This philosophy underpins various concrete measures to protect the climate and biodiversity that have been taken at all levels of the Laboratory. In the context of the Laboratory's target to reduce its greenhouse gas emissions by 28% by 2024, the EN-CV and EP-DT groups, with the support of the whole Organization and its partners in science and industry, are preparing to renovate the cooling systems of the ATLAS and CMS detectors, which will help to drastically reduce direct emissions of these gases. The aim is to save the equivalent of 40 000 tonnes of CO_2 each year... by choosing a technology that's actually based on CO_2 (commonly known as R744 in the field of refrigeration, air conditioning and heat pumps).

CERN uses considerable energy and resources to cool its scientific facilities. Alongside its cryogenic systems, which cool the LHC superconducting magnets to as close as possible to absolute zero, the Laboratory uses more conventional cooling systems to keep the detectors and its flagship collider at temperatures as low as -50°C. This invigorating temperature helps to protect the particle detection systems of ATLAS and CMS from ionising radiation during the operation of the machine. Until now, CERN's cooling systems have not differed from those used in industry in that they are based on refrigerants with a very high

global warming potential (GWP), namely perfluorocarbons.

In the context of today's climate crisis, the use of CO_2, which has a GWP of 1, is an excellent alternative to the perfluorocarbons used in low-temperature applications, which have a GWP of several thousand, hence CERN's decision in 2017 to invest heavily in the development of a CO_2-based cooling system. The EN et EP departments' engineers have been working tirelessly ever since to push back the limits of the equipment and the standard cooling cycles, meticulously optimising every parameter in order to cool CO_2 to close to its -56.6°C limit for use.

In addition to high costs, the path towards environmental sustainability was strewn with obstacles, as Pierre Hanf, an engineer from the EN-CV/PJ section confirms: "CO_2-based cooling systems operate at higher pressure than commercially available systems and are known for their greater complexity. Although the operating principle has been validated for small "plug and play" systems, the large-scale production and distribution of cold, taking account of the constraints associated with a cavern 100 metres below ground, had never been achieved in industry. That's why we needed to develop our own solutions, drawing on the expertise of partner institutes. Our collaboration with the Norwegian University of Science and Technology (NTNU), which is renowned throughout Europe for its expertise in refrigeration and its CO_2 applications, was of prime importance in this process."

Six years after the project began, these efforts are bearing fruit: the concept has been validated, the development phase is over, and the industrial production of the new equipment is under way. Once deployed, the CO_2 will circulate in the primary cooling circuit, which is operated by the EN department upstream of the detectors, and in the secondary circuit, the domain of the EP department, at below -53°C. "Over and above environmental considerations, the choice of the new cooling system will equip the ATLAS and CMS detectors to cope with the increased ionising radiation associated with high luminosity", explains Paolo Petagna, the project leader from the EP-DT section. "In this hostile environment, it's crucial that we provide the collaborations with the lowest possible temperatures."

There is still a long way to go before the new system is commissioned ready for the fourth accelerator run. CERN's partners in industry are building more than thirty CO_2 pumps, which will be delivered over the next few years. According to Roberto Bozzi from the EN-CV/PJ section, "The development of these large-scale CO_2 cooling systems is a striking example of the transfer of CERN's own know-how to European industry. Partner companies will be able to reproduce this solution and disseminate it in cooling-intensive sectors such as the food and pharmaceutical industries, thereby contributing to the green transition of those industries."

The list of potential beneficiaries also includes CERN detectors and installations other than ATLAS and CMS, which also have considerable cooling needs and might thus also switch to CO_2 in the longer term. That's what the EP and EN teams working on the project are hoping, at any rate. They emphasise, above all, the collective nature of this long-term undertaking, which could not have succeeded without the invaluable collaboration of the groups responsible for the equipment and services within CERN's AT (Accelerators and Technology) and RC (Research and Computing) sectors and the ATLAS and CMS collaborations' technical and coordination teams. "With the CO_2 cooling system, the whole of CERN is making a concrete and constructive long-term contribution to the climate. It's a recipe that requires many ingredients and we can't wait to try the finished product", Roberto Bozzi concludes.

Thomas Hortala

In search of supersymmetric dark matter

The ATLAS collaboration sets stringent limits on the existence of supersymmetric dark matter particles

If new particles are out there, the Large Hadron Collider (LHC) is the ideal place to search for them. The theory of supersymmetry suggests that a whole new family of partner particles exists for each of the known fundamental particles. While this might seem extravagant, these partner particles could address various shortcomings in current scientific knowledge, such as the source of the mysterious dark matter in the Universe, the "unnaturally" small mass of the Higgs boson, the anomalous way that the muon spins and even the relationship between the various forces of nature. But if these supersymmetric particles exist, where might they be hiding?

This is what physicists at the LHC have been trying to find out, and in a recent study of proton–proton collision data from Run 2 of the LHC (2015–2018), the ATLAS collaboration provides the most comprehensive overview yet of its searches for some of the most elusive types of supersymmetric particles – those that would only rarely be produced through the "weak" nuclear force or the electromagnetic force. The lightest of these weakly interacting supersymmetric particles could be the source of dark matter.

The increased collision energy and the higher collision rate provided by Run 2, as well as new search algorithms and machine-learning techniques, have allowed for deeper exploration into this difficult-to-reach territory of supersymmetry.

ATLAS physicists have pulled together results from eight searches, each seeking evidence for supersymmetric particles in a different way. The combined power and sensitivity of the different search strategies has allowed ATLAS researchers to study tens of thousands of supersymmetry models, each with different predictions about the masses of supersymmetric particles

These ATLAS searches have unprecedented sensitivity and explore a wide range of supersymmetric-particle masses. The ATLAS physicists looked for evidence of "lab-made" dark matter – that is, dark matter created in LHC collisions. Their searches have proved complementary to other experiments seeking natural, "relic" dark matter left over from the Big Bang. Unlike collider searches, which don't need to see the dark matter to infer its presence, the latter experiments rely on the sufficiently large probability of dark matter particles hitting normal materials and therefore being detected.

One of the most significant findings of this combination of searches is that some regions for supersymmetric-particle masses that were previously viewed favourably, where the dark matter particle has about half the mass of the Z boson or the Higgs boson, have now been almost totally ruled out.

Another benefit of such a comprehensive study is an understanding of which supersymmetry models have not yet been probed. ATLAS has presented examples of such surviving models, which can be used to optimise future searches. Though possible hiding places for supersymmetric particles are being systematically reduced, many models remain stubbornly evasive. Improving the sensitivity of ATLAS searches to these models will require more collision data and further clever developments in search strategy.

Find out more on the ATLAS website (https://atlas.cern/Updates/Physics-Briefing/SUSY-Dark-Matter).

ATLAS Collaboration

The library is open again! 24/7!

The welcome desk is now staffed up to 6 p.m. on weekdays

After 12 months of extensive renovation works, the opening ceremony of the CERN Library and Bookshop took place on September 28 in the presence of more than 50 invited friends of the Library.

Charlotte Lindberg Warakaulle, Director for International Relations, Raphaël Bello, Director for Finance and Human Resources, Mar Capeans, Head of the Site and Civil Engineering Department, and Salomé Rohr, Head Librarian of CERN, underlined in their speeches the importance of the Library as the knowledge hub for the CERN Community, offering information resources and a quiet place to study, think and research, but also the importance of teamwork and collaboration for the successful completion of such project. The efforts involved in innovating to make the building eco-friendly were also highlighted.

The ceremony was followed by two days of celebrations with a series of fun activities for the CERN community to discover the new premises.

The library services never stopped during the renovation work but are now fully back to normal operations. The CERN Library is now relocated in its original premises in building 52, first floor and is open 24/7. The Library desk staff is here to help from Monday to Friday, 9 a.m. to 6 p.m. 60 new work places are awaiting you, and more than 16'000 books are available in open stacks! Even more books are available upon request or as e-books: query the CERN Library Catalogue!

We are happy to welcome you back!

Computer Security: Click'n'Boom

This summer, the IT department's identity management team, the mail team and the Computer Security Team rolled out additional measures to protect your account and your mailbox. While 2-factor authentication ("T2U4U2FA") and malware-quarantining ("Fighting spam – the Boss Level") are definitely intended to provide better protection to you, you are not yet off the hook: Attackers are on the prowl to continue luring you into clicking malicious links, QR codes, SMSes, or opening intoxicated attachments.

You might recall some of the malicious emails from the past, bad QR codes and SMSes, which attempted to social engineer our colleagues into transferring money, or which succeeded breaking into CERN computing accounts and produce fake invoices – where, fortunately, no damage happened. We – you! – are target. And the damage can be substantial: sabotaging accelerator operations and accelerator control systems under "your" supervision, manipulating data with "your" analysis jobs, mis-managing IT services via "your" administrator rights, redirecting money using "your" credentials, transferring personal data protected by "your" password, or tearing CERN into the dirt through "your" social media channels… The list is much longer. Just be imaginative what the malicious evil – given lots of time for reconnaissance and information gathering, an objective to do harm or for financial gain, and immense perseverance and all necessary resources to reach that goal – can do once it has access to your CERN computing account or to your computer. Think of the services and systems, data & documents your computer can access; think of the power and privileges your account has; think of your work and what can go wrong if this work is performed by a maliciously evil attacker; and then think of the consequences for CERN, its operations and reputation. You got the picture: One wrong click on one malicious link in a webpage/email/WhatsApp message/Instagram feed/SMS, one wrong scan of a malicious QR code, and the lights go off for CERN. Boom! For much longer than repairing a bellow.

Hence, this is why we ask you again and over again to "STOP – THINK – DON'T CLICK" before accessing

a link. And today we ask again, as we are still being requested to "de-quarantine" emails, i.e. to deliver emails which our SPAM filtering system has blocked, emails which have been detected to surely be malicious*. We can and must do better! "STOP – THINK – DON'T CLICK": Do you know the sender of the link? Do you expect a message from her/him? Do its contents relate to you, your life or your work? Is it written in a language you understand? Do you trust the corresponding website, the URL the link points to?
If you just answered one question with "no", stop here. Stay vigilant and careful. Delete the message or check with us at Computer.Security@cern.ch when in doubt. While our "ActiveGuard" mail quarantine is supposed to protect your mailbox from malicious emails and email attachments, while our outer perimeter firewall is supposed to protect against malicious incoming network traffic, while 2-factor authentication is supposed to protect your account from being abused (check out here how to configure your 2-factor token if not done yet), and while the Organization takes every measure to stay resilient and have business continuity and disaster recovery measures in place, you are still an important line of protection. Just "STOP – THINK – DON'T CLICK" for a securely protected Organization. As the next attack might just be around the corner.

**Admittedly, the SPAM filtering is not 100% perfect, so some de-quarantine requests do make sense… Still, please… "STOP – THINK – …"!*

Computer Security team

Official news

26 October: Annual Information Meeting of the Pension Fund

All members and beneficiaries of the Pension Fund are invited to attend the Annual Information Meeting, which will take place on **Thursday, 26 October 2023 from 2.30 p.m. to 3.30 p.m. in the Council Chamber (503-1-001) and by webcast here (https://indico.cern.ch/event/1327056/)**

As well as providing an update on the Pension Fund, the PFGB Chair and the Fund's Chief Executive Officer will be pleased to answer any questions you may have. Members and beneficiaries present in the Council Chamber or connected via Zoom videoconference will have the possibility to ask questions. If you wish, you can also send us questions in advance of the meeting, by Monday 23 October at the latest, either by e-mail to pension-fund@cern.ch or by post to:

Mr Douglas Heron
Chief Executive Officer
CERN Pension Fund
"Annual Information Meeting"
Office 5-5-012, Postbox C23800
CH-1211 Geneva 23
Switzerland

The 2022 Pension Fund Annual Report and Financial Statements are available on the Pension Fund's website: https://pensionfund.cern.ch/en.

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Coffee and tea will be served prior to the meeting as of 2:00 p.m.

Announcements

Symposium: Celebrating electroweak milestones | 31 October

On 31 October 2023, CERN Science Gateway will host its first scientific event in the new Sergio Marchionne Auditorium. Celebrating 50 years since Gargamelle discovered neutral currents and 40 years since UA1 and UA2 discovered the W and Z bosons, the symposium offers a full-day programme of past and present milestones in the development of electroweak theory.

In 1973, the Gargamelle collaboration discovered neutral-current interactions, via which (elementary) particles can interact by means of the weak force. This first experimental evidence placed the unified electroweak theory – proposed by Glashow, Weinberg and Salam – on solid footing. It also pointed to the energy range to look for the mediators of the weak force. Just 10 years later, in 1983, the W and Z bosons were discovered by the UA1 and UA2 collaborations, operating at the SppS.

The following decades enabled increasingly precise measurements of W and Z boson properties and refinements in the electroweak theory, such as the confirmation of the existence of exactly three neutrino flavours at LEP. In the future, the proposed FCC-ee will continue to explore electroweak physics.

The evening before the event (30 October 2023), there will be a public event in French (with English slides), co-hosted by the French Physical Society, which is celebrating its 150th anniversary. This event – "*L'aventure de la première grande découverte au CERN*/The adventure of CERN's first major discovery" – is dedicated to the Gargamelle collaboration and focuses on the physics as well as the human aspect of working on giant discoveries.

Registration required.
30 October 2023:
https://indico.cern.ch/event/1333553/
31 October 2023:
https://indico.cern.ch/event/1301000/overview

L&D Micro-talk: Immunity to change: shift the paradigm | 19 October

HR Learning & Development invites you to another micro-talk on our inability to change, delivered by an expert in the field.

Join us in this interactive talk to get practical advice on how to overcome challenges, find new solutions and commit to the change you want to make.

Expert: Christoph Glaser, Executive Coach, Speaker, Trainer and CEO at TLEX Institute
19 October 2023 – 2 p.m. to 3.15 p.m on Zoom and recorded in English
More information and registration at http://cern.ch/go/B8jM

L&D Micro-talk: Flexible work and the four-day week | 27 October

HR Learning & Development invites you to an additional highly exciting micro-talk lead by an expert speaker

What's next for the world of work? Fins out more on the latest research and devlopments in the field of flexible working and the "four-day week".

Expert: Dr Rita Fontinha, Director of the World of Work Institute (Flexible Working) and Associate Professor of Strategic Human Resource Management at Henley Business School, University of Reading, UK

27 October 2023 – 2 p.m. to 3.15 p.m on Webcast and recorded in English

More information and registration at http://cern.ch/go/B8jM

Protect yourself and others: get the flu vaccine

With flu season approaching, it's time to think about getting a flu vaccine to protect yourself and others. Please note that CERN will go back to its pre-COVID practice of vaccinating at the CERN infirmary. The infirmary will vaccinate anyone working on the CERN site (MPE, MPA, temporary workers and contractors) provided that the person brings their own vaccine and completes the relevant medical questionnaire at the infirmary confirming there are no contraindications to vaccination. Both conditions have to be met for the vaccine to be administered. A medical prescription will be provided after vaccination to allow the patient to claim back the cost with their health insurance provider.

CERN retirees and family members can obtain the flu vaccine in France or Switzerland from their general practitioner or pharmacy. The vaccine is also reimbursed under the CHIS according to its own rules.

The infirmary is open for vaccination from Monday to Friday from 8 a.m. to 12.30 p.m. and from 2 p.m. to 4.30 p.m.

For more information, see: https://hse.cern/fluvaccination

Medical Service

Sign your child up for the *Futur en tous genres* programme!

On Thursday, 9 November, CERN will take part in the *Futur en tous genres* programme designed to broaden young people's professional horizons beyond gender stereotypes!

Futur en tous genres is an annual event organised by the Swiss Department of Public Education, Training and Youth (DIP). This year, in a new format, workshops will take place over half a day only. Children will be invited to explore various professional fields in order to broaden their horizons and consider their career and life prospects free from any preconceived ideas.

On Thursday, 9 November, 24 children of members of the CERN community will have the chance to join in activities that break the barrier of gender stereotypes. The morning's schedule will provide an introduction to jobs at CERN, workshops and a guided tour.

Eligibility criteria: The programme is open to the children of people with any type of CERN affiliation (MPE, MPA, official guides, ENTC, TEMC) and who are also:

- 9th grade school pupils attending a school in the canton of Geneva, or

- 7H to 9H grade school pupils attending a school in the canton of Vaud, or
- 8H grade school pupils attending a school in the canton of Valais.

Visit this link to find out more and sign your child up for the event: https://indico.cern.ch/e/futur-en-tous-genres-2023

Workshop on acceleration of event generators and N(n)LO codes: register now!

Are you interested in exploring the full potential of graphics processing units (GPUs) and how they can optimise the performance and workload capacity of Monte Carlo simulations? If so, sign up for the upcoming workshop on heterogeneous computing architectures, taking place at CERN from 13 to 14 November:
https://indico.cern.ch/event/1312061/.
Free and open to all, the "Event generators' and N(n)LO codes' acceleration" workshop is being organised jointly by experts from CERN's Theory, Experimental Physics and Information Technology departments.
The event will run over two days, Monday and Tuesday, and will be an excellent opportunity to discover ways to improve the computing performance of Monte Carlo event generators and higher-order perturbative calculations. In particular, participants will learn more about the transition to heterogeneous hardware architectures beyond the general-purpose central processing units (CPUs).
The workshop will be held in hybrid format: both the morning and afternoon sessions will be held physically at CERN and broadcast over Zoom. For those on site, a welcome drink will be offered following the end of the last afternoon session on Monday.
A detailed agenda and a Zoom link will be made available shortly, but you can already suggest topics or discussion items using the "comments" section of the registration page: https://indico.cern.ch/event/1312061/registrations/96851/
**Given the importance of the topic, this kick-off meeting will mark the launch of a series of similar workshops in 2024 onwards.*

Alumni event on 20 October: "Virtual company showroom" with ISIS Neutron and Muon Source

Join representatives from ISIS Neutron and Muon Source to find out more about the company, potential job opportunities and the skills and talents they are now seeking.
The event will start at **11 a.m. on 20 October** with a general presentation, which will be followed by a Q&A session – come armed with your questions!
Please **register here** for the event to receive the zoom link: https://alumni.cern/events/119899.

Alumni event on 27 October: “Virtual company showroom” with Hyperplan

Join representatives from Hyperplan to find out more about the company, potential job opportunities and the skills and talents they are now seeking.
The event will start at **11 a.m. on 27 October** with a general presentation, which will be followed by a Q&A session – come armed with your questions!
Please **register here** for the event to receive the zoom link: https://alumni.cern/events/122699

Ombud’s corner

True or false: How much do you know about mediation? (Part I)

Mediation is at the heart of the Ombud’s services. The mandate of the Ombud states that the services of an Ombud can help to resolve disputes in a consensual and impartial manner, thus promoting the good functioning of the Organization.
I have dedicated a page on the Ombud’s website to mediation and encourage you to take a look if you would like to understand what mediation is and what it can do for you (https://ombuds.web.cern.ch/mediation).
Despite all the communication to promote the Ombud’s services, the possibility to request mediation when dialogue with a colleague has broken down is still largely overlooked and underused. One of the reasons for this apparent lack of interest could be misconceptions about mediation.
With this in mind, here is a first set of questions designed to test your knowledge of this conflict resolution tool and to debunk a few myths about this highly effective process.

True or false? Mediation is just one of many tools available for informal conflict resolution

True: The Ombud offers many different ways to resolve conflicts, all of them informal. A simple discussion facilitated by a third, independent party can be enough to defuse a conflict. In other cases, when two parties are finding it impossible to speak to one other, the Ombud can offer good offices services. In such cases, the Ombud will deliver messages from one party to the other, ensuring that exchanges remain respectful and constructive. Finally, mediation by the Ombud is a structured process that encourages both parties to discuss their perception of a situation, to clearly state the impact the situation is having on them, to voice their needs and to reach an agreement to restore a good working relationship.

True or false? Mediation is not always necessary, I can resolve my conflicts on my own

Both: The mandate of the Ombud says that ideally, interpersonal issues between people working at or on behalf of CERN should be resolved between the colleagues concerned. However, the mandate also states that when dialogue is not successful or possible, the services of the Ombud may help. During a conflict with another person, our brain automatically goes into “fight or flight” or “freeze” mode, preventing us from having the necessary perspective and empathy to understand that the same situation can be perceived differently by two parties. A third party, particularly the Ombud, who is a fully independent body trained in informal conflict resolution, can help to re-establish dialogue.

True or false? Mediation is a voluntary process

True: No-one can force you to use mediation to resolve a conflict. Mediation may be recommended to you by a colleague, a supervisor, your human resources advisor or by the Ombud directly. For mediation to be successful, it is important that the two parties in conflict are fully committed to the process of restoring a calm and productive working relationship. As well as being voluntary, mediation is confidential and non-judgemental and remains under the control of both parties at all times.

True or false? My supervisor or other people can be notified of the outcome of mediation

False: Mediation by the Ombud is a strictly confidential process. It provides a safe space for the two parties in conflict to discuss the situation that has arisen in the workplace. The Ombud's role is to structure and facilitate dialogue by encouraging empathy and consideration of the other party's perspective. The agreement reached by the two parties will be theirs alone. The Ombud will only conduct mediation requested by a supervisor if both parties agree and are fully committed to the process. If a supervisor has recommended mediation, the Ombud will simply notify the supervisor about whether the mediation has taken place and whether the parties have reached an agreement. It should also be noted that both parties are bound by the same confidentiality requirement.

True or false? Mediation services for the CERN community are offered only by the Ombud

False: Your human resources advisors can also offer support for informal conflict resolution in the workplace. However, the Ombud offers mediation that is strictly confidential, informal and led by an independent, neutral and unbiased third party. These are the guiding principles of the Ombud's work and what makes it unique compared to all the other support channels offered by the Organization.

True or false? Mediation takes time

True: Mediation through the Ombud takes time, but much less time than the time that is lost if a conflict drags on. A destructive conflict requires a lot of energy and comes with significant costs: loss of concentration and productivity, stress, a damaged or destroyed working relationship, lower morale, a tarnished reputation, etc. Structured mediation takes roughly six hours of each party's time: two meetings with the Ombud spread over two days and an afternoon for a meeting with the other party, with of course the Ombud present.

True or false? The earlier the mediation, the better the chance of a successful outcome

True: If an interpersonal conflict is left to fester, it will not simply resolve itself and will likely escalate. The earlier the mediation, the more likely it is that both parties will be able to resume dialogue and rebuild empathy and mutual respect.

I hope that this quiz has helped to demystify mediation and provided you with clear information. Check out my next article for answers to frequently asked questions about mediation.

Laure Esteveny

I would like to hear your reactions and suggestions – join the CERN Ombud Mattermost team at https://mattermost.web.cern.ch/cern-ombud/.

Find out more about the role of the CERN Ombud and how to contact the Ombud at: https://ombuds.web.cern.ch/