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(Image : CERN)

COVID-19 vaccination: boosters in France and Switzerland

Our Host States have begun their COVID-19 booster vaccination campaigns. Please consult the following links to find out how to get your booster:

- In Geneva: https://www.ge.ch/en/getting-vaccinated-against-covid-19 (last updated on 11 October 2022).
- In Vaud: https://www.vd.ch/toutes-les-actualites/hotline-et-informations-sur-le-coronavirus/faq-covid-et-sante/vaccin-covid-dans-le-canton-de-vaud/ (in French only).
- In France: https://www.ameli.fr/ain/assure/covid-19/vaccination-contre-le-covid-19/vaccination-covid-19-mode-d-emploi (in French only, last updated on 7 October 2022).

No COVID-19 vaccination campaign is planned by the Organization.

As a reminder, however, CERN is offering the flu vaccine free of charge to all people working on the CERN site (up to 11 November).

A Word from Enrica Porcari

A new strategy and structure to tackle the ambitious challenges ahead

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A new strategy and structure to tackle the ambitious challenges ahead

Making sure we were ready for Run 3 was the objective we could not lose sight of last year. At the same time, we started a process to set up an IT Strategy – the what we will do, which I hope you will read – and a Target Operating Model – the how, which I will explain here. Coming from outside the world of CERN, it was a steep learning curve for me, and I had big shoes to fill. When we initiated this process, I told our team that our work is like running a restaurant: we need to pay attention to what our customers want, to what they need, to the experience that they have. We need to make sure that they trust that the plat du jour is what they need, is what they like... But what happens in the kitchen is our problem.

We went through a thorough exercise, both internally in the department and by engaging with many of our communities, to help us identify what worked well – we wanted to ensure we preserved that – as well as the pain points to be addressed. It was a real team effort, consultative, engaging, collaborative. I got to know the real spirit of CERN, the passion that drives those who work here, their commitment, their enthusiasm.

We designed the Target Operating Model on six pillars. The first is to follow a people-first strategy by understanding individuals' key strengths and ambitions and identifying suitable opportunities in the target structure. The second is to enhance strategic engagement and alignment with users, while the third is to adopt a holistic solution-design approach by identifying strategic areas where we should build solutions compared to where we can buy solutions. Number four is to define IT's role in innovation; five is to focus resources effectively; and six is to provide a secure framework for our digital work. These six pillars support our priorities: to strengthen our engagement with our users and partners; to create a data and architecture function to streamline and simplify our technology landscape; to put an agile governance framework in place allowing us to be clear on how we make decisions; and to strengthen our service management making sure that a virtuous loop with our users and partners is in place.

People are an organisation's greatest asset. Most say that, but how do we stay true to it? We have set up a talent management role to help guide our staff, fellows and students in their career journey and to give our technical talents the opportunity to be exposed to different areas of the departments. We have put in place the people roles framework, which mirrors the four IT department roles described in our strategy. These roles are: provider (to meet the information technology needs of the Organization); optimiser (to enhance production quality services); pioneer (to prepare for the challenges of the scientific programmes' evolution and the Laboratory's future); and connector (to increase CERN's scientific, societal and economic impact). Anyone in the department can dedicate a percentage of their time to serve in other roles, and that work is reflected in their MERIT.

The IT department is now structured around three large clusters:

- *Strategy and Executive Governance*

How we do our work – includes innovation, education, engagement, communication, security and governance.

- *Resource Management*

Which resources we use to do our work – includes finance, talent management and vendor management.

- *Technical Delivery*

What services we provide – includes infrastructure, platforms, software, capacity planning, release management, and service management to increase intra- and inter-departmental technical collaboration and alignment.

This new structure has been designed to increase collaboration across IT groups, enabling innovation to flourish in line with the IT Strategy. The structure of service delivery groups within IT has been recast into four layers within the Technical Delivery cluster. The ambition of this restructuring was to increase intra- and inter-departmental collaboration as well as alignment with goals and objectives.

The new structure came into effect on 1 May, so it is still early days. We are still recruiting for key positions. We are still learning how our new engagement team is building stronger links with experiments and departments, how our project portfolio management can help us monitor our progress against plans to increase transparency and accountability, and how our release and change board will ensure that every IT service and product goes through a rigorous peer review process before it is put in production, to name just a few. But this is our kitchen, our internal organisation, which is designed to help IT continue to be a strong partner to the Laboratory in these changing times. This is a journey we are taking together, and we will learn along the way, adjust and keep moving forward.

This is our commitment and we stand ready to build a close partnership with departments, experiments, civil society, Member States, the overall HEP community and beyond, to ensure that we design, develop and provide results that we can continue to be proud of.

Enrica Porcari
Head of the Information Technology (IT) department

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No COVID-19 vaccination campaign is planned by the Organization.

As a reminder, however, CERN is offering the flu vaccine free of charge to all people working on the CERN site (up to 11 November).

Please note that there is no contraindication to having the COVID-19 booster and flu vaccine administered at the same time. For more information, see: https://www.has-sante.fr/jcms/p_3368002/fr/covid-19-la-has-integre-les-vaccins-bivalents-dans-la-strategie-de-vaccination-pour-l-automne (in French only) and https://vaccinateagainsttheflu.ch/en-us/gemeinsam-gegen-grippe.html.

TRAMED and self-tests

If you have tested positive, are symptomatic or are a close contact, you should declare your situation on TRAMED, which has been fully automated since August.

If you have been in contact with a person who has tested positive for COVID-19, you should declare your situation on TRAMED and follow the instructions that you receive. CERN aligns with the French rules, i.e. only one self-test is required, 48 hours after the most recent contact with the person who has tested positive. Self-tests are now available from department and experiment secretariats for those who have declared themselves as a close contact on TRAMED.

Self-tests are also available from the CERN Stores for stratified testing for business continuity.

Basic hygiene measures, such as hand washing, regularly ventilating offices and disinfecting, remain important to protect us against viral infections and are strongly encouraged. We would like to remind you that individuals are at liberty to choose for themselves whether to wear face masks. It is a personal choice and should be respected by all of us: whether you choose to wear a mask or not, you do not have to justify your decision to anyone. Masks, including FFP2s, continue to be made available by CERN.

To keep up to date with COVID-19 measures at CERN, consult CERN's coronavirus information, measures and recommendations page, which is regularly updated (https://hse.cern/covid-19-information).

Please also consult and follow the CERN instructions on COVID-19-related health (https://edms.cern.ch/ui/file/2370903/LAST_RELEASED/CERN_COVID_instructions_Annex1_EN_docx_cpdf.pdf) and safety measures, in particular in the event of a suspected or confirmed COVID-19 case.

LHCb's new VELO springs into action

The subdetector aligned more closely with the LHC beam than ever before, marking an important milestone in LHCb data taking

The LHCb VELO installation earlier this year. (Image: CERN)

On Friday, 21 October, at 10.15 p.m. CEST, the Large Hadron Collider beauty (LHCb) Upgrade I experiment passed an important milestone for Run 3. Its state-of-the-art vertex locator, or VELO upgrade, aligned more closely with the LHC beam than ever before. This process, known in LHCb jargon as "VELO closing", allows the experiment to reconstruct the trajectories of the particle collisions at LHCb with extreme precision.

LHCb analyses particles thrown forward from the collision point of the two LHC beams. In particular, the LHCb team searches for a type of particle called a B meson, which is characterised by containing a "beauty" quark. B mesons are important for particle physics research because their interactions may hold the clues to the limitations of the Standard Model, which currently dictates all of particle physics. Earlier this year, using data from the previous version of the detector, LHCb announced the discovery of new types of matter–antimatter asymmetry and new exotic particles. Both of these topics, and many more, will be probed further with the new detector.

To be able to understand these particle interactions fully, physicists need more data. The VELO's job is to completely reconstruct the trajectories of particle collisions, pick out the important interactions involving B mesons, and analyse them.

"It has to be incredibly close to the beams in order to get the maximum accuracy," says Paula Collins, LHCb experimental physicist. The VELO achieves this by gradually moving pairs of plates closer to the beam, so close that they even enter the vacuum of the LHC beam pipe. The subdetector is composed of millions of pixels, which act like a camera, taking pictures of the interaction at a rate of 14 million times per second.

The plates start at a width of about 3 cm apart, and carefully move to centre around the beam. "When we're closed, the aperture where the LHC beams pass is just 3.5 mm," continues Collins. "This is something like the diameter of a pencil, and the 400 mega-joule LHC beams have to pass through this very narrow space."

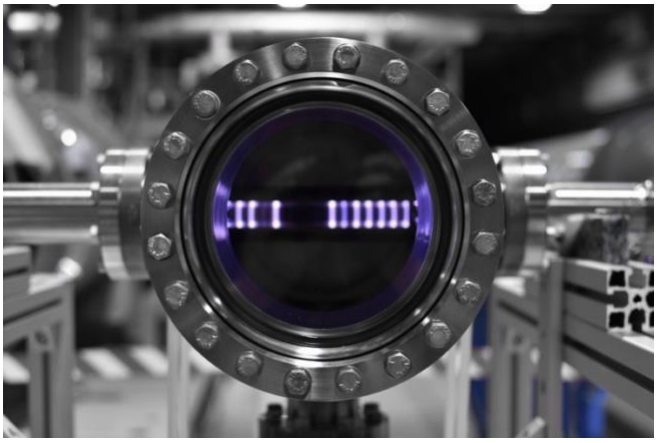
This impressive feat could not have been achieved without a huge team effort to design, install and operate the VELO. The LHCb detector underwent a complete overhaul in preparation for Run 3 of the LHC, which began on 5 July 2022. The VELO is only one of a number of brand-new subdetectors that have increased LHCb's precision and data-taking capacity. Other new subdetectors include the new upstream tracker (UT) and the scintillating fibre tracker (SciFi), which analyse the beam either side of the central LHCb magnet.

Since the LHC began, physicists have discovered the existence of 68 new hadrons, 60 of which were discovered by the LHCb experiment. The unprecedented accuracy achieved by the new VELO marks an exciting new era for the experiment, with hope for plenty more discoveries to come.

Naomi Dinmore

A remedy against electron clouds inside particle colliders

An LHC quadrupole whose beam screen had been coated with a fine layer of carbon displayed minimal heat load in comparison to other magnets, constituting a promising step in eliminating electron clouds in future particle accelerators



A plasma cell « sputters » carbon on a beam screen in a laboratory (Image: CERN)

Electron clouds are the bane of particle accelerators: a few stray electrons in a vacuum chamber, when stirred by a proton beam, can bounce off the walls of the beam screen (the metallic inner surface of the vacuum chamber), multiplying and whizzing around the beam. The resulting "cloud" can lead to a heat load being deposited on the cryogenic circuit and to a significant decrease in the beam quality, especially in areas where bunches are denser, such as inside the focusing triplet magnets surrounding the collision points of the LHC. The production of denser beams is precisely the goal of future accelerator projects such as the High-Luminosity LHC, which aims to achieve a ten-fold increase in integrated luminosity across the collider – making the issue of electron clouds even more pressing. And yet, crippling electron clouds may soon be a thing of the past thanks to a new method for coating beam screens with a layer of carbon.

While the copper surface of the LHC magnet beam screens can give back up to two electrons for any single one it receives, a carbon surface will yield only one particle at most. With that in mind, spraying LHC magnets with carbon seems like a no-brainer to thwart electron clouds. But, in practice, this is not easily achieved: engineers in TE-VSC-SCC (Surfaces, Chemistry and Coatings) must coat the beam screen with a carbon layer that is fine enough to preserve the resistivity properties of the copper surface without disturbing the fragile environment of the LHC magnet. They thus resort to a physical vapour deposition technique called sputtering. A graphite rod, inserted inside the vacuum chamber, is bombarded with argon ions produced in a plasma. As the ions hit the rod, carbon atoms on its surface are sprayed out, scattering towards the beam screen, on which they settle: a carbon layer forms on the copper surface of the screen.

Implementing the principle of sputtering carbon onto a beam screen poses a number of physical challenges, forcing engineers to jump through many hoops. To increase the adhesion of the carbon on the copper (i.e. to make it stick), the native copper oxide must first be removed by bombarding the beam screen with argon ions before coating it with an intermediate titanium layer, which adheres well to both the copper and the carbon. In addition, the titanium removes

hydrogen impurities in the plasma, which would have caused the carbon to lose its valuable electronic properties.

"Beyond these physical challenges, we are also dealing with significant spatial constraints, working inside the LHC tunnel, on magnets that cannot be taken out of the collider. This made us develop creative ways of treating the surface from a distance", explains Pedro Costa Pinto, the project leader. To combat these constraints, a modular sputtering device has been designed, composed of a titanium rod and a carbon rod enclosing small permanent magnets. This plasma cell can be pulled by a cable along the LHC magnet. The device has already proved its worth on the LHC's Q5L8 quadrupole, which received the carbon treatment before the LHC restart as a first test. The first results are unequivocal: the standalone magnet has received minimal heat load (damage from the electron clouds) compared to all other magnets.

The logical next step will be to apply this technology where it is needed most: on the new triplet magnets surrounding the ATLAS and CMS collision points, where the luminosity is particularly high. In parallel, the first HL-LHC magnet beam screens will undergo the same treatment. "The brand-new HL-LHC screens haven't been placed in the accelerator yet, which obviously makes things easier for us, since the sputtering can be carried out in the workshop, in a controlled environment. However, we need to update both our method and our tools to adapt for the larger, innovative beam screens", says Spyros Fiotakis, who has worked on the carbon-coating method since its inception.

"When we presented the project in 2015, few believed we could make carbon-coating work on a magnet in the LHC tunnel. Seven years later, we are ready to apply this technology to more and more machines, with the hope of lifting a long-running limitation on the performance of particle accelerators", adds Pedro. Time will tell whether carbon coating will save accelerators from themselves, but the technology will, without a doubt, be part of the answer.

Thomas Hortala

Completion of the final civil-engineering works at HL-LHC Point 1: A new CERN facility is born

The construction of the last surface buildings for HL-LHC Point 1, including the underground connections to the HL-LHC cavern, is now complete

(Image: CERN)

Following the completion of the HL-LHC Point 1 underground galleries in spring 2021 and the delivery of two surface buildings in the summer of that year, the delivery of additional service buildings and of connecting galleries in September 2022 marks the end of the civil-engineering works for HL-LHC Point 1. This new facility, along with its sibling at Point 5, will house the cutting-edge equipment needed to sustain the ten-fold increase in integrated luminosity promised by the HL-LHC project.

The image above shows the cooling tower building (first row), the cryogenics building (second row), which will house cycle compressors that can compress helium from 1 bar to just over 20 bars, and a cluster of three buildings housing the shaft-head, as well as equipment for ventilation and electrical distribution (third row).

The construction of the final buildings, carried out by JVMM (Joint Venture Marti Meyrin) in close coordination with CERN's Sites and Civil

Engineering (SCE) department, brings this vast civil-engineering undertaking to a close four years after the first excavator bucket hit the ground. The coming months will see the brand-new facility filled with general services and technical infrastructure, laying the groundwork for a successful HL-LHC era.

Thomas Hortala

CERN joins with leaders from research and industry to propose an Open Quantum Institute

Fabiola Gianotti, CERN Director-General, addresses attendees at the 2022 GESDA Summit. (Image: GESDA/Benedikt v. Loebell)

CERN has joined a coalition of science and industry partners proposing the creation of an Open Quantum Institute. This institute will work to ensure that emerging quantum technologies are put to use to tackle key societal challenges. The proposal is being made through GESDA, the Geneva Science and Diplomacy Anticipator Foundation, in collaboration with leading research institutes and technology companies. Other founding supporters of the Open Quantum Institute include the University of Geneva, the Swiss Federal Institutes of Technology in Zurich (ETH) and Lausanne (EPFL), Microsoft and IBM.

The proposal was launched at the 2022 GESDA Summit. During her address at the event, CERN Director-General Fabiola Gianotti highlighted the potential of quantum computing – and other associated quantum technologies – to help achieve key UN Sustainable Development Goals.

“As it did for the creation of CERN, Geneva can play a key role in bringing science and diplomacy to recognise the importance of working together, in order to develop real-world applications for transformative technologies,” says Gianotti, who is also a member of the GESDA Foundation’s board. “The Open Quantum Institute will benefit from CERN's experience of uniting people from across the globe to push the frontiers of science and technology for the benefit of all. We will work to ensure that quantum technologies have a positive impact for all of society."

CERN has long recognised the potential of quantum technologies. In 2020, the Organization launched the CERN Quantum Technology Initiative (QTI), which is exploring the potential of these breakthrough new technologies for particle physics and beyond, in collaboration with its Member States and other key stakeholders. Today, the initiative runs 20 R&D projects, several of which are carried out in collaboration with leading technology companies through the CERN openlab framework.

“By the nature of its research and the technologies it develops, CERN is well positioned to make significant contributions to the quantum revolution,” says Alberto Di Meglio, head of CERN QTI and CERN openlab. “Building on the Laboratory’s collaborative culture and proven track record of developing breakthrough technologies, CERN QTI provides a platform for innovation.”

“This platform builds on national quantum initiatives in CERN’s Member States and beyond, fostering pioneering new applications of quantum technologies – both for science and society,” explains Di Meglio. “Experience and knowhow from the CERN QTI will feed into the Open Quantum Institute, helping to fulfil its mission of maximising the societal impact of these technologies.”

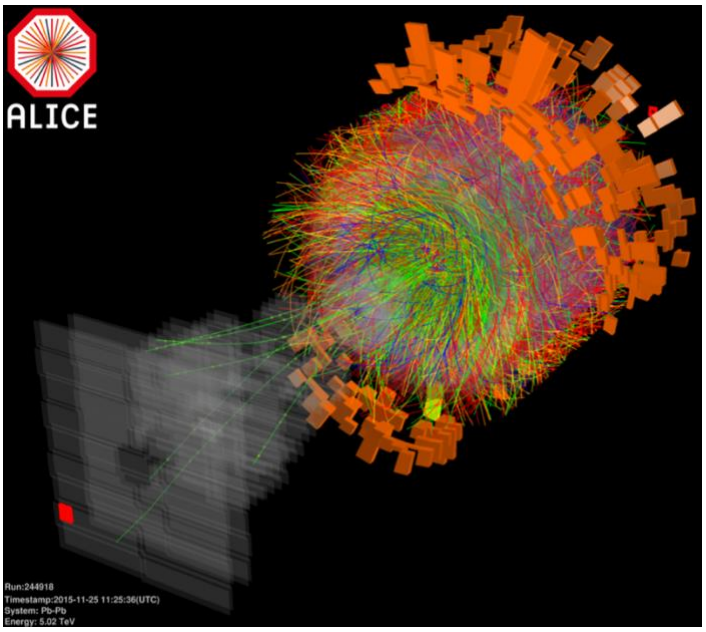
As the next step in the process, the GESDA Foundation will launch a survey to help shape the

priorities of the Open Quantum Institute, which will begin its "incubation" phase in 2023. Members of the institute will work to engage further with UN organisations, quantum scientists and industry leaders over the coming months.
Find out more on the GESDA website. Full details on the Open Quantum Institute can be found in the announcement published by the GESDA Foundation today. On 1-4 November, CERN will host a special conference on the use of quantum technologies to support particle physics. Find out more about this here.

Andrew Purcell

ALICE explores the hidden charm of quark–gluon plasma

The ALICE collaboration shows that different bound states of a charm quark and its antimatter counterpart are differently modified by quark–gluon plasma, opening new avenues for studying this special state of matter and its effects



A lead–lead collision event recorded by ALICE in 2015. (Image: ALICE collaboration)

Quark–gluon plasma is an extremely hot and dense state of matter in which the elementary constituents – quarks and gluons – are not confined inside composite particles called hadrons, as they are in the protons and neutrons that make up the nuclei of atoms. Thought to have existed in the early universe, this special phase of matter can be recreated at the Large Hadron Collider (LHC) in collisions between lead nuclei.
A new analysis from the international ALICE collaboration at the LHC investigates how different bound states of a charm quark and its antimatter counterpart, also produced in these collisions, are affected by quark–gluon plasma. The results open new avenues for studying the strong interaction – one of the four fundamental forces of nature – in the extreme temperature and density conditions of quark–gluon plasma.
Bound states of a charm quark and a charm antiquark, known as charmonia or hidden-charm particles, are held together by the strong interaction and are excellent probes of quark–gluon plasma. In the plasma, their production is suppressed due to "screening" by the large number of quarks and gluons present in this form of matter. The screening, and thus the suppression, increases with the temperature of the plasma (see illustration) and is expected to affect different charmonia to varying degrees. For example, the production of the ψ(2S) state, which is ten times more weakly bound and 20% more massive than the J/ψ state, is expected to be more suppressed than that of the J/ψ state.
This hierarchical suppression is not the only fate of charmonia in quark–gluon plasma. The large number of charm quarks and antiquarks in the plasma – up to about a hundred in head-on collisions – also gives rise to a mechanism, called recombination, that forms new charmonia and counters the suppression to a certain extent (see illustration). This process is expected to depend on the type and momentum of the charmonia, with the more weakly bound charmonia possibly being produced through recombination later in the evolution of the plasma, and charmonia with the lowest (transverse) momentum having the highest recombination rate.
Previous studies, which used data from CERN's Super Proton Synchrotron and subsequently from the LHC, have shown that the production of the ψ(2S) state is indeed more suppressed than that of

the J/ψ. ALICE has also previously provided evidence of the recombination mechanism in J/ψ production. But, until now, no studies of ψ(2S) production at low particle momentum had been precise enough to provide conclusive results in this momentum regime, preventing a complete picture of ψ(2S) production from being obtained.
The ALICE collaboration has now reported the first measurements of ψ(2S) production down to zero transverse momentum, based on lead–lead collision data from the LHC collected in 2015 and 2018.
The measurements show that, regardless of particle momentum, the ψ(2S) state is suppressed about two times more than the J/ψ. This is the first time that a clear hierarchy in suppression has been observed for the total production of charmonia at the LHC. A similar observation was previously reported by the LHC collaborations for bound states of a bottom quark and its antiquark.
When further studied as a function of particle momentum, the ψ(2S) suppression is seen to be reduced towards lower momentum. This feature, which was previously observed by ALICE for the J/ψ state, is a signature of the recombination process.
Future higher-precision studies of these and other charmonia using data from LHC Run 3, which started in July, may lead to a definitive understanding of the modification of hidden-charm particles and, as a result, of the strong interaction that holds them together, in the extreme environment of quark–gluon plasma.

Ana Lopes

CERN ignites imaginations at the Fête de la science in the Ain department

CERN plays a key role in several events in the towns of Bourg-en-Bresse, Saint-Genis-Pouilly and Ferney-Voltaire

CERN's science show See the Invisible (Image: Médiathèque Georges Sand)

The 2022 edition of the Fête de la science, a French initiative that seeks to educate the public on scientific topics, is drawing to a close. It's time to take stock of the events held in the Ain department, many of which involved CERN's participation.
On 7 October, ALTEC, the scientific, technical and industrial association of the Ain department, officially opened the 31st edition of the Fête de la science in the main auditorium of Bourg-en-Bresse's Scène nationale. The evening kicked off with a screening of the documentary film Big Bang, l'appel des origines, directed by Dominique Regueme. Following the film, Frederick Bordry, CERN's former Director for Accelerators and Technology, and astrophysicist Nicolas Laporte led a roundtable discussion on the theme of the infinitely big and the infinitely small, which attracted an enthusiastic 350-strong audience.

On 1 October, more than 80 science enthusiasts came to the opening of the exhibition "Une mission scientifique pour le XXIe siècle" (A scientific mission for the twenty-first century) in Saint-Genis-Pouilly, during which local youngsters enjoyed CERN's science show See the Invisible. The exhibition will be on display at the Médiathèque Georges Sand until the end of October. Around a hundred pupils from the Lycée international in Saint-Genis-Pouilly also attended a screening of the film Francois Englert, rebelle et Nobel, and got the chance to talk to its director and producer, as well as to Belgian physicists Albert de Roeck and Filip Moortgat.

Lastly, on Saturday 15 October, CERN hosted a stand at the Fête de la science et de la biodiversité in Ferney-Voltaire, which provided the perfect opportunity to show our neighbours the efforts the Organization is making to limit its environmental footprint as much as possible. The main focus was CERN's flagship heat recovery project at point 8 of the LHC, which will heat a new neighbourhood being built in Ferney-Voltaire.
Visitors of all ages and from all backgrounds had the opportunity to find out about the various environmental themes presented and to learn more about the heat recovery project from CERN engineers Serge Claudet and Paul Pepinster, and representatives from the HSE Unit, Anna Cook, Luisa Ulrici, Ebba Jakobsson and Sonja Kleiner.
We would like to extend our warm thanks to the events' organisers and to the many volunteers who, every year, help to promote CERN's activities in an engaging and accessible way.

Bringing students and experts together around environmental applications of accelerators

The I.FAST project's yearly student challenge was held this summer, exploring environmental and societal applications of accelerator technology

The I.FAST project's yearly student challenge was held this summer, exploring environmental and societal applications of accelerator technology (Image: CERN)

How can accelerators address environmental issues? This summer, the EU-funded I.FAST project gathered highly motivated students from all across Europe to find innovative answers to that question.
The 2022 edition of the I.FAST Challenge-Based Innovation project was held at the European Scientific Institute (ESI) in Archamps, near Geneva. The event brought together 23 students of 17 different nationalities, with as many different backgrounds: physics and engineering, as well as law, business and environmental science. They spent ten days attending high-level seminars on accelerators and learning about their environmental applications. Multidisciplinary teams were then asked to suggest potential new applications and to present their project to experts in the field on the last day of the challenge.
The winning project was announced at a ceremony held at CERN, during which participants faced a panel of renowned experts presided by Frédérick Bordry, former CERN Director for Accelerators and Technology. Devised by the "Human Beam" team, the idea of using particle accelerators to address algae blooms in lakes was deemed the most interesting by the jury.
"I was impressed by the skills and passion shown by the four teams. Such events are a great opportunity for students to learn more about accelerator science and to work on concrete challenges. Their different backgrounds allowed them to think about projects from distinct perspectives – from the scientific and technical to the economic and legal – the way it's done in actual organisations," said Frédérick Bordry.
The jury highlighted the quality of the work of each team and their motivation. Three other projects were presented: investigating soil depollution by irradiation; loading a compact Compton source on a boat; and studying how accelerators can strengthen wind turbine blades.
This year's theme was suggested by a Steering Committee composed of Philip Burrows, Nicolas Delerue, Bob Holland, Elias Métral, Louis Rinolfi and Maurizio Vretenar, with the help of a

Programme Committee. The next edition of the I.FAST Challenge-Based Innovation project will take place in summer 2023 and will again focus on the topic “Accelerators for the environment”. Applications will open in December 2022.

Nicolas Delerue, Louis Rinolfi and Elias Métral.

Six local school pupils light up the Globe with their scientific projects

CERN hosted Partage ta science, the cross-border scientific symposium, in the Globe of Science and Innovation on Friday, 14 October 2022

Partage ta science, the cross-border scientific symposium, in the Globe of Science and Innovation on Friday, 14 October 2022 (Image: CERN)

For the eleventh time in a row, Partage ta science, an event organised by and for young people, took place at CERN. Modelled on the style of a scientific symposium, it featured six pupils who presented their secondary school graduation work.

This year, three pupils flew the flag for France, two from the Cité Scolaire Internationale in Ferney-Voltaire and one from the Lycée Jeanne d’Arc in Cessy, while Switzerland was represented by pupils from the Collège Claparède, the Collège Voltaire and the Centre de Formation Professionnel Technique.

The French pupils took turns to briefly present their Grand Oraux (the final baccalaureate research project undertaken in France), while their Swiss counterparts discussed their Travaux de Maturité or Travaux Pratiques Individuels (similar projects completed by Swiss pupils).

The presentations covered a variety of topics, ranging from extra-terrestrial life to phantom limb pain, the use of mathematics to detect tax evasion and the construction of a telescope using a 3D printer. The pupils also explored topical issues, such as global warming and optimising the energy of heating systems.

Once again, the pupils delivered their presentations under the sharp eye of cartoonist Barrigue, the creator of satirical magazine Vigousse and founder of the association CrayonSolidaires, dessiner pour tous. Over the course of the evening, Barrigue gave live reactions to the presentations, in a quirky and, at times, provocative way!

Computer Security: Finally, bonbons for download

Last year, just before Christmas, we announced the arrival of new protective means for your computer (“A new bonbon to protect you”): endpoint protection and anti-malware (called “anti-virus” in the ancient IT past). In addition to the new outer perimeter firewall, email protection appliances and the upcoming deployment of two-factor authentication for certain people (“Multifactor for the masses”), running decent anti-malware software on your Windows or Apple computer is considered best practice in order to protect your files, folders, documents and data. And as of now, after a roller coaster of technical finesses, CERN is offering you that bonbon: a new,

sophisticated anti-malware appliance free to download to your Windows or Apple computer at CERN or at home.

One major attack vector against the Organization involves end-user devices, namely your laptops, PCs, smartphones and tablets. By getting you to click on just one malicious link or open one malicious attachment, the attacker might succeed in installing malware on your device. Malware that will then spy on your activity and actions. Enabling your microphone and camera. Logging your every keystroke and mouse movement – including your CERN and other passwords! Exfiltrating photos and documents. Eventually encrypting all your files and folders (the so-called "ransomware attack"). The device ends up under the full control of the attacker. And your personal digital life, gone.

In order to protect the Organization and your devices that are connected to CERN's networks, a series of protective measures have been deployed. Firewalls and network segregation. Spam filtering and quarantining appliances. Single-Sign On and two-factor authentication. The next bonbon for your protection is now ready: new anti-virus/anti-malware software for your Windows or Apple computer, free to download from the CERN app store for Windows ("ESET Endpoint Security") or via the Mac Self-Service ("ESET Endpoint Antivirus"). It can be installed on any Windows or Mac computer you own, including those used for teleworking. The only conditions are that you must be affiliated with CERN as a member of the personnel and hold an eligible CERN computing account. With that account, you can enrol your device(s) with the CERN/Microsoft Windows app store or the Mac Self-Service, respectively, and install the corresponding installation package ("ESET…"). The installation includes a "CERN software" agent that keeps track of licence usage (as someone still has to pay for that anti-malware software). The anti-malware licence is valid for the current calendar year and must be renewed for each subsequent year (again using the CERN app store or Mac Self-Service, respectively). Please note that owners of CERN "CMF" centrally managed Windows PCs and laptops don't need to do anything. Their devices will get this anti-malware plus additional endpoint protection automatically installed as of the first half of 2023, including full support by the IT department's CD (Compute and Devices) group.

So, ready we are. A new bonbon to protect your PC, laptop or MacBook. Now it's up to you to better protect your files, folders, documents and data. To protect your digital life and to protect the Organization. Just install that bonbon and you'll be fine.

Computer Security team

Official news

The CERN Energy Policy is now published

In the opinion piece on 11 October concerning the measures undertaken by the Organization to save energy, it was reported that "the Enlarged Directorate also recently approved an energy policy document, which will be published shortly." The Energy Policy is now available and can be consulted on the following link: https://edms.cern.ch/ui/file/2777699/1/CERN_Energy_Policy.pdf.

Share your feedback on energy savings on Mattermost and environment.info@cern.ch.

Announcements

Refurbishment of Restaurant 1 to resume next month

In February this year, an ambitious refurbishment of the Restaurant 1 kitchens was begun. The final phase of the work will take place between November 2022 and March 2023, and measures are being taken to ensure minimum disruption.

Following an initial phase of work on Restaurant 1 (R1) carried out between December 2021 and March this year, work will resume on 26 November and is scheduled to be complete by 17 March 2023. With a total budget of 1.3 MCHF, the renovations involve major works behind the scenes in the kitchen, preparation and washing areas, as well as in the basement storage areas, to align them with current best practice. More energy-efficient equipment will be installed. The free-flow and Grab 'n' Go areas will also be refreshed with a new look and feel to welcome customers in March.

Aesthetic improvements, designed by the SCE department, will provide clearer information about what's on offer and improve the flow of people through the restaurant. These include new signage, along with a redesigned entrance and coffee areas. The tray collection, microwave and water fountain areas will also be refurbished, while ventilation and insulation will be optimised.

To ensure continuity of service, the SCE department has been working with the contractor, Novae, to ensure that a broad and attractive range of options will be available throughout the period. R1 will continue to operate at close-to-normal capacity, with the exception of the Glassbox, which will be moved to Restaurant 2, where equivalent table-service capacity will be available in the Brasserie area. A tent will also be set up to compensate for R1 seating space that will be unavailable during the refurbishment.

Throughout the works, food will be prepared for R1 in R2 and distributed from a temporary servery. The current free-flow area, coffee area and Grab 'n' Go will be temporarily moved. The full range of services of the Grab 'n' Go will be available in the former post office in Building 500, and the range of food on offer in the cafeterias will be extended to provide more choice across the site.

Full details of the temporary installations will be communicated regularly, starting in November. Signage will also be in place throughout the duration of the works.

Restaurant 1 has been an important hub for CERN since the very early days of the Organization. These works will equip it to play its essential role of nourishing the CERN community, body and mind, for the decades to come.

A new CERNBox user interface

CERNBox, CERN's collaboration hub, is an integrated platform dedicated to storing, sharing and collaborating on documents and data. The CERNBox team is committed to ensuring that every user has an excellent experience using the platform.

A new CERNBox Web user interface will be released on 24 October in response to the valuable feedback received from the CERNBox user community. Aligned with the latest version of the upstream product, ownCloud, it introduces a new, more intuitive and efficient design. The new system retains all of the previous version's

features while also including the terabyte of storage space and the security and confidentiality assurances provided by the CERN Data Centre. In addition, a number of highly requested features are being rolled out:

An option to open and edit files with Microsoft Office 365 and Markdown (CodiMD), as well as Draw.io and text editor. In addition, several viewers are available, including PDF viewer, Media viewer, IFC viewer, Jupyter Notebook viewer and Root viewer. CERNBox can also be used to access data, code and files with the SWAN Data Analysis service.

The new CERNBox supports collaboration with external partners by introducing social and lightweight accounts. Unlike normal CERN accounts, these do not have storage associated with them. They can, however, be used to collaborate on shared resources and projects.

URLs become universal. It is possible to simply copy a file's URL and share it directly with someone else. They will be able to open it, provided that they have the necessary permissions.

Sharing single files was a much-requested feature and is now possible. You can share with both viewer and editor permissions.

Projects get their own trashbins. You can recover project files by right clicking on a project and then on "Open trashbin".

In addition to these updates, more features and improvements are in the works, including:

Integrations with other services (Indico already available)

An improved search tool

Auditing and reporting/notifications

Back-up restore UI

So far, community feedback has been collected through different channels, such as the CERNBox User Forum, Service Now, dedicated workshops and second line support feedback. We encourage you to keep contributing your ideas and feedback to the continuous improvement of CERNBox through Service Now.

Traffic disruptions due to works at the entrances of ATLAS and SPS BA5 sites

Renovation work on the access gates and fences of the ATLAS and SPS BA5 sites is scheduled by the SCE department from 25 October to 20 November 2022.

Traffic disruptions are to be expected, we thank you in advance for your understanding.

Celebrate Dark Matter Day 2022 with CERN

This spooky season, CERN, along with multiple scientific organisations around the world, is celebrating the hunt for dark matter

For the fifth annual celebrations of Dark Matter Day, scientists all over the world are hoping to shed some light on one of the greatest mysteries of the universe. From 26 October up to and including the day itself on 31 October, CERN is joining these global celebrations with several dark-matter-themed events, both online and in person. Scientists estimate that all the matter we see and interact with makes up only 5% of the universe's mass – the rest is unseen and little-known. Around 85% of this unseen mass is thought to be dark matter. It is notoriously difficult to study because it does not visibly interact with light. While scientists cannot directly detect dark matter, they are able to observe its influence from the way galaxies are held together and how they spin faster than expected.

So, if dark matter cannot be seen, how do scientists study it? At CERN, there are a number of ways researchers look for dark matter. One of the main techniques is by using the Large Hadron Collider (LHC) to collide beams of protons, whose

collisions may directly produce dark matter particles. Detectors around the LHC such as ALICE, ATLAS, CMS, LHCb and FASER track the particle collisions to look for signs of dark matter, indicated by a discrepancy in the collision momentum. CERN is also host to a variety of other non-LHC experiments involved in dark matter research, such as CAST, which looks for hypothetical particles called axions, NA64, which collides electron beams with atomic nuclei, and AMS, which searches for cosmic rays from the International Space Station.

Keep an eye on CERN's social media channels during the Dark Matter Day celebrations to find out more. There will be takeovers from expert theoretical physicists and conversations with representatives from the CERN experiments on Twitter Spaces and Instagram. You will also be able to submit your own questions about dark matter on social media, using the hashtags #DMD2022, #DarkMatterDay and #DarkMatterDay2022.

CERN's Dark Matter Day celebrations culminate with a lecture in the Globe of Science and Innovation at 8.00 p.m. on 31 October. It will be delivered by Nicholas Rodd, a CERN theoretical physicist with expertise on dark matter and its mass. You can sign up for this talk on the event page.

If you would like to get in on the action from elsewhere in the world, you can find events happening near you at interactions.org.

Jardin des Particules – Discovery Wednesdays

Since the beginning of the school year, the Jardin des Particules has been running a new programme on Wednesdays from 8.00 a.m. to 6.00 p.m. for children aged from 4 to 8, which is open to everyone. The children are welcomed by our educators and accompanied by an English teacher, who focuses on awakening their curiosity in and learning of the English language in the afternoons. This is a great initiative that allows us to meet the needs of families and offer the children a school-free day with a nevertheless educational approach, focused on different areas of learning, but learning in a different way!

According to the pedagogical thinking of Loris Malaguzzi and the Reggio Emilia Approach, whose philosophy plays an active role in our establishment, children are "made of 100 languages", which they use to express themselves, observe and investigate their environment. To support this exploratory process and the pluralism of the child's own language, our Discovery Wednesdays offer a rich range of options and experiences to spark their curiosity.

Thanks to some great collaborations with the CERN clubs, the children have the opportunity to experiment and enjoy rich and stimulating experiences in relation to science, photography, music, art, nature and sport. We thank the clubs for their availability, their investment and their attention to the children's needs.

The price per day, including a cooked lunch served from 12.15 to 1.30 p.m., is 85 CHF. Enrolment can be done on either a regular, long-term or an ad hoc basis, depending on your needs. For more information, contact us at: https://staff-association.web.cern.ch/form/contact.

Jardin des Particules – Occasional childcare

The Jardin des Particules has launched a new project offering more flexible childcare in response to the demands of families in the CERN community.

Since the beginning of the school year in August, an occasional childcare service has been available from Monday to Friday from 8.00 a.m. to 6.00 p.m. This service is intended for children aged from 1 to 6, who are taken care of at the crèche and/or the school.

Conditions:

For children under 2 years of age, care is only available for a minimum of one week.

For children aged 2 and over, care is possible per day, per week or longer term.
Children who are enrolled in occasional care will be able to join our different groups, depending on the number of places available, in accordance with the educational guidelines and provided that we are in a position to offer them a quality environment.

Our qualified and experienced staff are here to listen to your needs. Your child will be in good hands with our education team, who will do their utmost to help them integrate into the group and make friends.
Don't hesitate to contact us and find out more about our educational reality: https://nurseryschool.web.cern.ch/our-structure.

CERN Alumni Virtual Company Showroom with Blue Brain – 4 November

Join representatives from Blue Brain 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 4 November with a general presentation and will be followed by a Q&A session, come armed with your questions.
Please register here for the event to receive the zoom link.

About Blue Brain
EPFL's Blue Brain Project is a Swiss brain research initiative aiming to establish simulation neuroscience as a complementary approach alongside experimental, theoretical and clinical neuroscience to understanding the brain by building the world's first biologically detailed digital reconstructions and simulations of the mouse brain.
More information on the Alumni website.

CERN Alumni Virtual Company Showroom with FactoryPal – 28 October

Join representatives from FactoryPal 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 28 October with a general presentation and will be followed by a Q&A session, come armed with your questions.
Please register here for the event to receive the zoom link.

About FactoryPal

FactoryPal is a Software-as-a-Service (SaaS) company in the manufacturing domain. FactoryPal provides a cloud-based solution built with artificial intelligence (AI) to digitally enable factories and help them to boost their production efficiency, gain transparency in their process, and ensure a smooth operation.
More information on the Alumni website.

Applications are open for the 2023 CERN Latin-American School of High-Energy Physics

Apply to the 2023 CERN Latin-American School of High-Energy Physics by 18 November to attend the school held in San Esteban, Chile, from 15 to 28 March 2023.

The lectures will cover a broad range of HEP topics at a level suitable for students working for a PhD in experimental particle physics, but MSc students and postdoctoral workers are also welcome provided their level in HEP topics allows them to follow the courses. Phenomenologists as well as experimentalists may be accepted if they are working in a relevant area of physics.

Please note that full financial support may be available for Latin-American students attending the school. Although the school is targeted specifically at students from Latin-American countries, it is open to self-funding students from other regions.

For registration and more details, please visit the school's Indico event (https://indico.cern.ch/event/1210891/) .

Obituaries

Volker Soergel (1931 – 2022)

(Image: DESY)

Volker Soergel passed away on 5 October 2022 at the age of 91. Born in Breslau on 9 March 1931, Soergel was a brilliant experimental physicist and an outstanding leader, shaping particle physics for many years.

Receiving a doctorate from the University of Freiburg in 1956 under the tutelage of Wolfgang Gentner, Soergel remained at Freiburg until 1961, with a year spent at Caltech, in the United States, in 1957–58. He then joined CERN as a research associate, working with Joachim Heintze on the beta decay of elementary particles, especially very rare decays of mesons and hyperons. Their results became milestones in the development of the Standard Model, resulting in the award of the German Physical Society's highest honour in 1963.

In 1965, Soergel became a professor at the University of Heidelberg. He continued his research at CERN while taking on important roles at the university: as director of the Institute of Physics, as dean, and as a member of the university's administrative council. With vision and skill, he played a major role in shaping the university.

Important tasks outside Heidelberg followed. From 1976 to 1979, he chaired the DESY Scientific Council through a period that saw work begin on the electron–positron collider PETRA. Under his

leadership, the Council played an important role in DESY's transition from national to international laboratory. In 1979 and 1980, he served as Research Director at CERN, helping pave the way for the collider experiments of the 1980s.
From 1981 to 1993, Soergel headed DESY, overseeing the construction of the HERA electron–proton storage ring, together with Björn Wiik and Gustav-Adolph Voss. HERA and its experiments benefited from large international contributions, mainly in the form of components and personnel, an approach that became known as the HERA model. Soergel's powers of persuasion, his reputation and his negotiating skills led to support from institutes in Western Europe, Israel and Canada, as well as from Poland, Russia and China. From 1996 to 2000, he headed the Max Planck Institute for Physics in Munich.

Soergel's time at DESY coincided with German reunification. He enabled the merger of the Institute for High-Energy Physics in Zeuthen, near Berlin, with DESY and, together with Paul Söding, made Zeuthen a centre for astroparticle physics. Even before the Iron Curtain fell, Soergel personally ensured that Zeuthen scientists could work at DESY.
Volker Soergel received many honours. He was awarded the Federal Cross of Merit, First Class, and honorary doctorates from the Universities of Glasgow and Hamburg. He has left a lasting legacy. All who worked with him remain grateful for all they learned from him and will not forget his support and guidance. Our deepest sympathy goes to his family.

Albrecht Wagner

Hans Frischholz (1938 – 2022)

Hans working on a 1 MW cw klystron for LEP in the test stand in hall 112, in 1983. (Image: CERN)

After a long illness borne with courage and dignity, our colleague and friend Hans Frischholz passed away on 19 September 2022. Hans was a renowned specialist on radiofrequency (RF) power systems and made many important contributions to the ISR, LEP and the LHC.

Hans joined CERN in 1968, working in the ISR division's RF group led by Wolfgang Schnell. He worked on the development of the RF cavities and amplifiers with Fritz Ferger and later took full responsibility for their operation, leading a small team. Hans and his team were also responsible for the construction, commissioning and operation of the beam loading compensation systems. These high-power systems were designed to allow the RF system to cope with high-intensity injected PS beams but they were also crucial for the acceleration of ISR beams to 31.4 GeV. Hans made a major contribution to the success of the ISR.

In preparation for the LEP project, Hans studied the design of the 1 MW high-power klystrons needed to power the copper cavity RF system. He collaborated with industry on the construction of prototypes. An important aim, successfully achieved, was reaching the high specification for DC to RF conversion efficiency at full power. Hans coordinated the external manufacture of 16 klystrons and the testing of the production series at CERN. Hans and his relatively small team then carried out the installation and commissioning of the whole RF power system for LEP1, comprising 8 RF units each made up of a complex arrangement of waveguides, circulators and loads. They oversaw its successful operation throughout the LEP1 period. During the LEP2 upgrade, running through the 1990s, Hans and his team accomplished the huge task of installing a further

36 klystrons needed to drive a total of 288 superconducting RF cavities. This was a vital contribution to the success of the LEP2 project and the achievement of ultimately reaching 3600 MV circumferential voltage, enabling LEP energies of up to 104.5 GeV.

Following his LEP achievements, Hans took responsibility for the design of the 400 MHz LHC klystrons and their RF power systems. The klystron design was based on work he had done during an earlier sabbatical at Stanford. In 2003, Hans took his well-deserved retirement, after many years of successful dedication, smoothly handing his activities and responsibilities over to his colleagues.

He will be remembered fondly by all who had the pleasure of working with him, not only for his accomplishments and his professionalism but also for his informal and friendly style.

We offer our heartfelt condolences to his family.

His friends and former colleagues

Ombud's corner

The harm that misunderstandings can cause

The origin of the word "misunderstanding" is clear: it combines the prefix "mis-", meaning badly or wrongly, with the noun "understanding". So a misunderstanding is when something has been understood wrongly.
Very often in the Ombud's Office, when visitors come to see me about a conflict and we explore its origins together, I have to float the possibility that a misunderstanding has occurred.
My predecessors often wrote about the risks of misunderstandings. As on many other subjects, their articles – and the advice they gave – have stood the test of time. I encourage those of you who you are interested to take another look at the following articles:

- Everyone has their own way of communicating, about our automatic tendencies in the way we communicate
- At cross purposes?, about the risks of making assumptions about other people's intentions
- That's not what I meant..., about the frequent gap between what we say and what others understand.

These articles contain some excellent analyses and advice. I'd like to add some additional food for thought by looking at what happened between Simon* and Patricia*.
We have so many interactions with our colleagues; how can we single out the ones that might have involved a misunderstanding? Generally speaking, misunderstandings trigger a clear surge of anger, surprise or disappointment. If Simon is having a conversation with Patricia and finds himself saying to himself "How can she say that?", "What's the matter with her?", "No, that can't be right" or "I would never have believed that of her", it's likely that there has been a misunderstanding. In such cases, Simon should ask Patricia what she meant by asking for example: "This is what I heard, and I'm surprised/saddened/disappointed. Could you explain what you meant?"
If he doesn't check, the misunderstanding will remain there like a Lego brick upon which, without realising, Simon will build his future dealings with Patricia. If he's misinterpreted her intentions, it's highly likely that he won't approach their next interactions with the necessary objectivity and an open mind. One misunderstanding will lead to others.
What's more, Simon might end up spreading the misunderstanding. If he doesn't check with

Patricia what her true intention was, he'll repeat to others what he thought she said and colour her statements with his anger, surprise or disappointment.

Last but not least, taking the trouble to clarify a misunderstanding gives you the opportunity to preserve, or even develop, your relationship with that person. If Simon makes the effort to ask Patricia what she meant and what her intentions were, she will be made aware of the potential for being misunderstood and will pay more attention to communicating clearly.

You have everything to gain by not letting misunderstandings creep into your work relationships. Be mindful of possible misunderstandings. Don't hesitate to react, in a respectful and constructive way, if someone says something that makes you angry, surprised or disappointed. By checking what they meant, you will have a better working relationship with them in both the short and the longer term.

*Names have been changed

Laure Esteveny