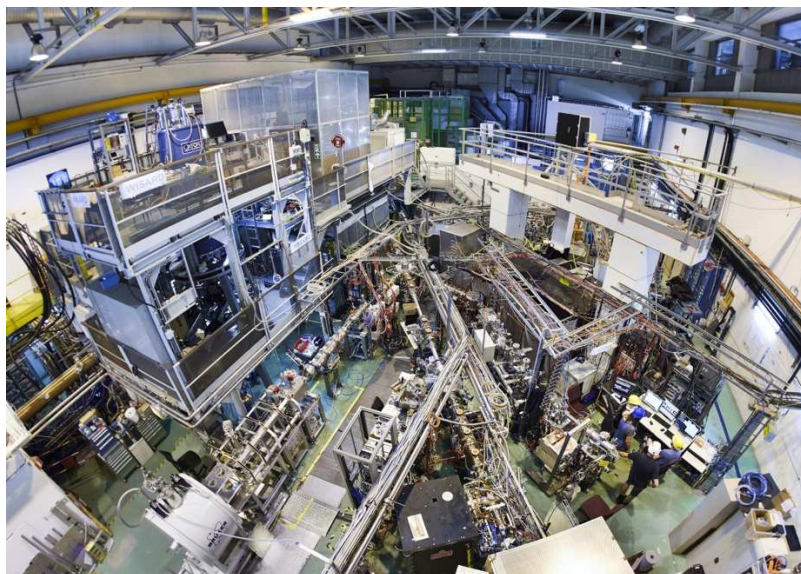


ISOLDE takes a solid tick forward towards a nuclear clock

The observation at CERN's nuclear physics facility of a long-sought decay of the thorium-229 nucleus in a solid-state system is a key step towards a clock that could outclass today's most precise atomic clocks



The ISOLDE facility seen from above. (Image: CERN)

Atomic clocks are the world's most precise timekeepers. Based on periodic transitions between two electronic states of an atom, they can track the passage of time with a precision as high as one part in a quintillion, meaning that they won't lose or gain a second over 30 billion years – more than twice the age of the Universe.

In a paper published on 24 May 2023 in *Nature*, an international team at CERN's nuclear physics facility, ISOLDE, reports a key step towards building a clock that would be based on a periodic transition between two states of an atomic nucleus – the nucleus of an isotope of the element thorium, thorium-229.

Such a nuclear clock could be more precise than today's most precise atomic clocks, thanks to the different size and constituents of a nucleus compared to those of an atom. In addition, it could serve as a sensitive tool with which to search for new phenomena beyond the Standard Model, currently the best description there is of the subatomic world. For instance, it could allow researchers to look for variations over time of fundamental constants of nature and to search for ultralight dark matter.

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Ever since 2003, when Ekkehard Peik and Christian Tamm proposed a nuclear clock based on the transition between the ground state of the thorium-229 nucleus and the first, higher-energy state (called an isomer), researchers have been racing to observe and characterise this nuclear transition.

In the two decades, researchers have measured with ever increasing precision the isomer's energy, the precise value of which is required to develop lasers to drive the transition to the isomer. However, despite much effort, they have not succeeded in observing the light emitted in the transition from the isomer to the ground state. This phenomenon, known in nuclear physicists' parlance as the radiative decay of the isomer, which has a relatively long lifetime, is a key ingredient in developing a nuclear clock, because it would allow, among other things, the isomer's energy to be determined with higher precision.

A team working at ISOLDE has now achieved this feat by producing thorium-229 nuclei in the isomeric state in a novel way and investigating the nuclei using a technique called vacuum-ultraviolet spectroscopy. The wavelength of the observed light corresponds to an isomer's energy of 8.338 electronvolts (eV) with an uncertainty of 0.024 eV – a value that is seven times more precise than the previous most precise measurements.

Significant to the team's success was the production of isomeric thorium-229 nuclei via the

so-called beta decay of actinium-229 isotopes, which were made at ISOLDE and incorporated in calcium fluoride or magnesium fluoride crystals.

"ISOLDE is currently one of only two facilities in the world that can produce actinium-229 isotopes," says the main author of the paper, Sandro Kraemer. "By incorporating these isotopes in calcium fluoride or magnesium fluoride crystals, we produced many more isomeric thorium-229 nuclei and increased our chances of observing their radiative decay."

The novel approach of producing thorium-229 nuclei also made it possible to determine the lifetime of the isomer in the magnesium fluoride crystal. Knowledge of this lifetime is needed to predict the precision of a thorium-229 nuclear clock based on this solid-state system. The long lifetime that was measured, namely 16.1 minutes with an uncertainty of 2.5 minutes, confirms theoretical estimates and indicates that a clock precision competitive with that of today's most precise atomic clocks is attainable.

"Solid-state systems such as magnesium fluoride crystals are one of two possible settings in which to build a future thorium-229 nuclear clock" says the team's spokesperson, Piet Van Duppen. "Our study marks a crucial step in this direction, and it will facilitate the development of the lasers needed to drive the periodic transition that would make such a clock tick."

Accelerator Report: Full house in the LHC

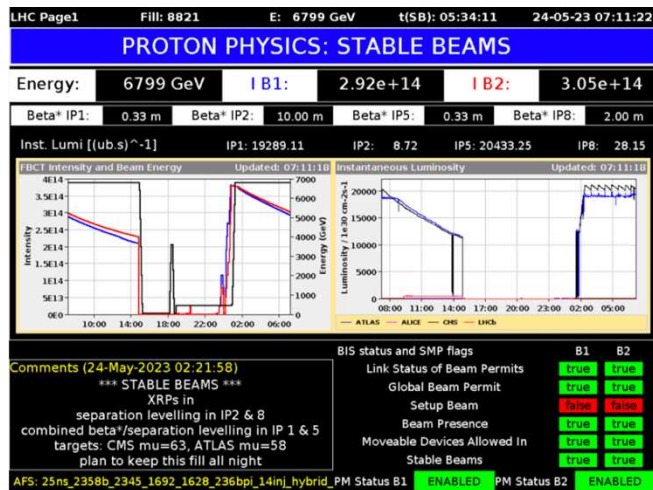
On 11 May, four days before the original schedule had set a target of 1200 bunches per beam, the LHC made its final intensity ramp-up step to 2400 bunches per beam.

In fact, the intensity ramp-up step to 2400 bunches does not mean that there are exactly 2400 bunches in each beam, as the precise number depends on the filling scheme used. For the fill of 11 May, the actual number of bunches was 2347, which lasted close to 11 hours and contributed, with an intensity of 1.3×10^{11} protons

per bunch, 0.48 fb^{-1} to the integrated luminosity goal of 75 fb^{-1} for 2023.

The filling scheme is defined according to the needs of the experiments, but it also depends on the beam production scheme selected in the injectors and the needs of the LHC machine itself – such as leaving sufficient empty space for the dump kickers to rise, or choosing specific bunch patterns to reduce the production of electron clouds. Therefore, it may be adapted during the run to maximise the production of luminosity

within the given constraints of the LHC and the injectors.



LHC page 1 with the filling scheme indicated in the bottom left-hand corner of the display. This is a different filling scheme to the one mentioned in the article – over to you now to decipher the cryptic code! (Image: CERN)

One of the filling schemes defined for 2023 has 2374 bunches per ring. In the left-hand bottom of the LHC page 1 the filling scheme is indicated with what looks like a cryptic code and is described as:

25ns_2374b_2361_1730_1773_236bpi_13inj_hybrid_2INDIV

The first number, “25ns”, indicates the spacing between the bunches, while the second, “2374b”, is the total number of bunches per beam. The following three figures specify the number of bunches that will collide in each of the four LHC experiments: “2361” is the number of bunches out of the 2374 bunches that will collide in ATLAS (IP1) and CMS (IP5); “1730” is the number of bunches that will collide in ALICE (IP2); and “1773” is the number of bunches colliding in LHCb (IP8).

The remainder of the cryptic code is an indication of the beam production scheme used. “236bpi”

indicates that the maximum bunch train length coming from the SPS and injected into the LHC contains 236 bunches, but shorter bunch trains may be injected too. “13inj” means that the LHC will inject 13 bunch trains per beam with a maximum length of 236 bunches each. The very last part of the cryptic code contains some special information: “hybrid” means that the bunch train of 236 bunches is produced in the injectors through the so-called hybrid scheme, which is a combination of different bunch patterns; “2INDIV” means that two individual or single bunches are also injected.

The hybrid scheme is produced in the injectors and provides the 236-bunch train with a pattern of seven batches, each with an “8b4e” bunch pattern of 8 bunches and 4 empty buckets (56 bunches). This is then followed by 5 batches of 36 bunches (180 bunches), resulting in the total length of the bunch train of 236 bunches. This hybrid scheme was chosen to maximise the luminosity production while keeping the heat load on the LHC beam screen, which is induced by the production of electron clouds, within acceptable limits. Leaving more gaps in the bunch train by introducing the four empty buckets will lower the total number of bunches that collide, but also limits the heat load, while leaving room to increase the number of protons per bunch from 1.3×10^{11} to the goal of 1.8×10^{11} .

Today, the LHC is in full production with ~2400 bunches, and the next step is the gradual increase of the number of protons per bunch. As I write, the intensity per bunch has reached 1.6×10^{11} protons and the integrated luminosity in ATLAS and CMS is 10 fb^{-1} out of the 75 fb^{-1} targeted.

Rende Steerenberg

Fireball at HiRadMat

CERN's HiRadMat facility restarts this week with a new experiment nicknamed "Fireball", which will give new insights into extreme astrophysical phenomena such as gamma-ray bursts



The plasma cell for the Fireball experiment, ready to be transported to HiRadMat's irradiation area. (Image: CERN)

Fireball (officially "HRMT-62"), a new experiment at the SPS HiRadMat facility, will receive its first beam this week. It is designed to study the micro-instabilities of a high-intensity electron-positron beam interacting with low-density plasma. The electron-positron beam is produced when a 440 GeV/c proton beam from the SPS impinges on a special target. The resulting beam propagates through the plasma and creates a highly unstable system: fluctuations of the magnetic field in the plasma cause charge separation in the beam, and this separation consequently causes further magnetic fluctuations in the plasma. This gives rise to non-linear phenomena and plasma emissions that have never been studied in this way before. This study should give new insights into extreme astrophysical phenomena, in particular blazar jets and gamma-ray bursts (GRBs). GRBs are among the most energetic phenomena in the Universe and, even though they have been observed in distant galaxies, the enormous amount of energy they release can disrupt radio communications on Earth – some theories even suggest that they affected the evolution of life on Earth.

However, the fundamental physical processes involved in GRBs are still not understood.

"Without the unique HiRadMat facility, it would not have been possible to implement Fireball; it will be the first accelerator-driven experiment of this kind", says Gianluca Gregori, the experiment's spokesperson from the University of Oxford. "Fireball will help lift the veil on the microphysics processes that are not observable with satellites or ground-based telescopes and are impossible to simulate numerically."

The experiment includes various instruments designed to study the formation of plasma instabilities and magnetic fields, in particular a custom-made magnetic spectrometer with a dipole magnet. "In order to power the magnetic spectrometer in a flexible and cost-effective way, along with SY/ABT and SY/EPC groups we disconnected one of the quadrupoles of the HiRadMat beamline and the optics were recalculated", explains Nikos Charitonidis, HiRadMat facility coordinator. "The collaboration within CERN has once again been key to implementing all the necessary modifications in terms of beam and infrastructure. I'd really like to thank all the CERN groups involved for their collaborative effort in running this unique facility." Since its commissioning in 2011, HiRadMat has taken part in several European Transnational Access programmes, which have made the facility accessible to users from all over the world.

For more information on the HiRadMat facility, read the article published for its 10th anniversary. (<https://home.cern/news/news/experiments/flexible-and-accessible-hiradmat-facility-celebrates-its-tenth-anniversary>)

Collaboration with CERN – an asset for scientific communities in the Middle East

Across the Middle East and North Africa region, CERN has set up scientific collaborations to promote access to education and innovation



Magnets are tested and assembled at CERN before delivery to the SESAME facility as part of the CESSAMAG project in 2015. (Image: CERN)

Ever since its creation, CERN has sought to forge peaceful ties between countries all over the world, particularly through scientific collaboration, and the Middle East and North Africa (MENA) region is no exception. Today, the Organization is seeking to strengthen its links with countries in the region against the unique political backdrop.

Partnerships between universities and the large LHC experiments (ATLAS, CMS, ALICE and LHCb) are central to CERN's strategy in the MENA region. Although the level of involvement varies widely from one country to another, Martin Gastal, adviser for relations with the MENA region, notes strong interest across the region: "How a collaboration develops depends on many factors, in particular the country's administrative and financial situation. Nevertheless, all the countries have demonstrated a desire to collaborate more closely with the CERN experiments."

Morocco, which was the first country in the region to sign an international cooperation agreement with CERN, in April 1997, is a prime example: its partnership with ATLAS has since evolved into diplomatic relations with the Organization. These relations look set to continue to intensify as the country is considering joining CERN as an Associate Member State. The same is true for Egypt, which signed an international cooperation agreement in 2006, as the Egyptian Minister of Higher Education has also expressed a desire for Egypt to become an Associate Member State of CERN. In addition,

CERN is on the receiving end of fruitful initiatives by various other countries, such as Bahrain, which, in summer 2022, offered its services to build a piece of equipment for the CMS detector – an aluminium access frame for the tracker region and the associated installation jig.

Leaving aside the machines, these agreements have an impact on countless individual careers, giving dozens of students the opportunity to cut their teeth at CERN. Every year, summer students from the region are invited to visit the LHC experiments, where they are shown round by colleagues from their region and get to see the contributions made by MENA universities to particle physics research.

In parallel, efforts to prevent a brain drain from the MENA region are a lynchpin of CERN's involvement there. By building up the capacity of local institutes, CERN helps make the countries in the region attractive hubs for particle physics research and for science and technology in general. An obvious example of this is the donation of IT equipment, such as the servers donated in 2019 to An-Najah National University in the West Bank, which paved the way for the university to join the ATLAS collaboration in March 2022, opening up career opportunities for dozens of Palestinian students and researchers. Similarly, CERN sent a large quantity of computer servers to Lebanon following a fundraising campaign for the High-Performance Computing for Lebanon (HPC4L) project, which aims to support the Lebanese scientific community. These donations support students and researchers in their work in the fields of artificial intelligence, algorithm development and machine learning for experimental physics.

In 2017, CERN was granted the status of Observer to the Council of SESAME, the International Centre for Synchrotron Light for Experimental Science and Applications in the Middle East. This organisation, based in Jordan, is the latest to have applied the CERN governance model to particle physics. Transcending political barriers, the

laboratory has for the first time given representatives from countries across the region, including Iran and Israel, the opportunity to reach shared positions on scientific cooperation. “The common denominator is science, which makes the bridge of peace easier to cross – they are able to speak freely,” says Martin Gastal.

CERN’s involvement in SESAME is just one of several avenues being explored by the Organization to promote science in the MENA region. Its intention is to tap into the enthusiasm

of the region’s countries and scientific communities to chart a path forward with them.

Reema Altamimi

Reema Altamimi is from Nablus in Palestine. She is currently studying for a Masters degree at the University of Paris II, and spent a period as an intern in the Education, Communication and Outreach group at CERN in 2022, thanks to a grant from the Sharing Knowledge Foundation.

Lebanon inaugurates the computer servers donated by CERN

The computing equipment, which will shore up scientific capacities in Lebanon, was inaugurated in the presence of the country’s Prime Minister and a CERN/CMS delegation



H.E. Mr. Najib Mikati, Prime Minister of Lebanon, saluted the efforts of all involved in the HPC4L project during a ceremony in Beirut’s Grand Sérail. (Image: Office of the President of the Council of Ministers of Lebanon)

On 23 May 2023, European and Lebanese stakeholders gathered in the Grand Sérail of Beirut – the headquarters of the Prime Minister of Lebanon – to inaugurate the computing equipment donated by CERN to the country’s academic institutes as part of the High-Performance Computing for Lebanon (HPC4L) project. The ceremony was the conclusion of a long journey whose many obstacles, on the backdrop of an economic crisis, have been overcome thanks to a staunch determination from all involved and an inspiring show of international solidarity.

The ceremony was attended by Swiss representatives and a CERN and CMS delegation.

Enrica Porcari, Head of the CERN IT department, Patricia McBride, spokesperson of the CMS delegation and Martin Gastal, CERN advisor for the Middle East, each gave talks to an audience composed of Lebanese scientists and policymakers. Prime Minister H.E. Mr. Najib Mikati concluded the ceremony by saluting the remarkable efforts achieved by all involved in the HPC4L project.

The success of this project, initiated in 2016 by Martin Gastal, was made possible thanks to the unwavering commitment of the CMS collaboration, which, along with the Sharing Knowledge Foundation, launched a fundraising campaign to cover the cost of shipping the hardware, purchasing the equipment required to install it and training Lebanese technical staff at CERN. This knowledge transfer to the country’s scientific community, which was organised by CMS, will ensure the smooth operation of the equipment in Lebanon.

The 144 computing servers and 24 disk servers donated by CERN as part of HPC4L have been installed in a dedicated computing centre run by a public–private consortium. This equipment will support the Lebanese academic community for all kinds of research activities, including high-energy physics. Crucially, 20% of the servers’ computing power will be dedicated to the Worldwide LHC Computing Grid (WLCG), a network of computing

centres in 42 countries around the world used to store and analyse data from the LHC experiments – thereby bringing Lebanon closer to the LHC community.

Since 2012, CERN has regularly donated computing equipment that no longer meets its highly specific requirements on efficiency but is still more than adequate for less exacting environments. To date, a total of 2524 servers and 150 network switches have been donated by CERN to countries and international organisations,

namely Algeria, Bulgaria, Ecuador, Egypt, Ghana, Mexico, Morocco, Lebanon, Nepal, Palestine, Pakistan, the Philippines, Senegal, Serbia, and the SESAME laboratory in Jordan. CERN strives to maximise its positive impact on society: these donations can play an important role in providing opportunities for researchers and students in their home countries, thus helping to avoid so-called 'brain-drain' scenarios.

Thomas Hortala

Let's quantum

A first-of-its-kind workshop at CERN saw high-school students coming to the Laboratory to discover the fascinating field of quantum science and technology



Alberto Di Meglio, coordinator of the CERN QTI, speaking to students at the workshop. (Image: CERN)

On 6 May, CERN hosted its first-ever workshop for high-school students on all things quantum. The event was organised jointly by CERN's Quantum Technology Initiative (QTI) and Finland's QPlayLearn team in the context of World Quantum Day 2023.

A total of 30 enthusiastic students from local schools in France and Switzerland attended the workshop. During the half-day event, the students, aged 15 to 18, were introduced to the fascinating field of quantum science and technology.

The workshop kicked off with a lecture held in French by Su Yeon Chang, a doctoral student in quantum computing at CERN. In her lecture, Chang explained what quantum physics is and how its

fundamental concepts work. She also covered the basic principles of quantum computing and its potential and current challenges.

An interactive "Learn-by-Play" session followed this introductory lecture and was set up as a tournament. Split into small groups of three, the students rotated through seven quantum-game stations, gathering points based on the number and the complexity of the levels they completed in the games. Each game corresponded to one quantum physics concept, such as quantum states, quantum superposition, quantum entanglement and quantum tunnelling. While following the instructions provided and playing the games, the students built up intuition about the various principles of quantum physics. Supervised by mentors at each station, they were able to ask questions and expand their understanding of a particular concept before going on to the next game.

"We learned a lot in just half a day, starting with a lecture and continuing with fun and interesting games," says William Schwager, a student from the Collège Sismondi in Geneva. "I would certainly recommend this event to anyone who is interested in science."

At the end of the workshop, three winning teams were announced and were awarded first-, second- and third-place certificates. Quantum-themed

giveaway items were also handed out to every participant to encourage further exploration of the various aspects of quantum science and technology.

“Promoting early quantum-physics education is essential to ensure that we can form a generation of researchers and engineers that is able to develop and use quantum technologies in the future”, says Alberto Di Meglio, coordinator of the CERN QTI. “By allowing students to explore topics that are new or supplementary to their curriculum, in a way that is both accessible and interesting to them, we help build the quantum experts and quantum ecosystems of tomorrow.”

The event was a great success, and it would not have been possible without the support of QPlayLearn, which provided content for the Learn-

by-Play session. QPlayLearn is a team of quantum physicists, educational and social scientists and professional communicators working to teach the beauty of quantum physics and the impact of quantum technologies in an engaging and clear, yet accurate, way to everyone.

“We believe in the importance of science education and scientific literacy for our society. We also believe that the learning process can be fun as well as effective, and should always take into account multiple needs and backgrounds,” says Caterina Foti, coordinator of QPlayLearn. “Development of innovative interactive tools for multilevel education for all possible audiences lies at the core of our mission.”

Anastasiia Lazuka

Eleven successful years and counting for the Be a Scientist project

For 684 budding scientists from schools in the local area, the 11th edition of the Be a scientist project wrapped up on Thursday, 11 May 2023



The 11th edition of Be a scientist in CERN's Globe of Science and Innovation. (Image: CERN)

For four months, 30 teachers and 684 schoolchildren aged from 7 to 12 from the Geneva, Ain and Haute-Savoie regions were initiated into the scientific research process. Like scientists looking for particles that are invisible to the human eye, the pupils came up with hypotheses, collected data and conducted experiments to try to work out what was inside mystery boxes provided by CERN. All they had been told was that they mustn't open or damage the boxes in the process.

As the project unfolded, the 30 classes taking part used a collaborative web platform to share how their investigations were progressing. They also had the chance to visit CERN and the University of Geneva's PhysiScope. Their thinking and research was enhanced by being immersed in the laboratory environment and talking to scientists. The project rounded off in style with a final conference in CERN's Globe of Science and Innovation on Thursday, 11 May 2023. Pupils from three classes in Geneva shared their findings in the form of an animated film, posters and exhibition stands. After months of suspense, the pupils also finally found out what was inside the boxes.

The Be a Scientist project, which was launched in 2011, is an education programme based on a collaboration between the University of Geneva (the Physiscope and the Laboratory of Didactics and Science Epistemology), the Geneva Department of Education and the French Ministry of Education.

Are you a teacher and want to take part in a future programme? Visit : <https://voisins.cern/en/be->

Computer security: A bank *à la CERN*

When doing cybersecurity, protective measures must be adapted to your environment and needs. For a bank, it's obvious that protecting physical and digital money, and confidential data about customers, is of the utmost importance. Hence, security is tight, well controlled and comes with lots of restrictions, giving attackers a very small attack surface to penetrate through. For CERN, with its open environment and academic freedom, the "bank" approach definitely doesn't work. But what if we were to build a bank *à la CERN*?

First, our bank would have many entrances: through CERN's outer perimeter firewall or via GSM, but also allowing people to connect to the Wi-Fi network once they're registered. Instead of having single entrances, like one Windows Terminal server cluster or one LXPLUS cluster, our bank has both. Plus the possibility to tunnel through using Windows Gateways or "SSHUTTLE". Similarly complex and diverse is the situation for entering the Technical Network used for accelerator controls and technical infrastructure: Terminal servers, Linux gateways, access for selected and approved virtual machines, web proxies allowing tunnelling, etc. On the way out, a bank would have locked you out. No news pages. No Facebook or Instagram. No Amazon. Internet access is tied down, strictly controlled, and reserved for professional purposes only. Tolerance of "personal use" just doesn't exist.

Secondly, our bank would be crowded with strangers: "bring your own device" (BYOD) is a common standard at CERN. A bank would strictly keep out any devices that are not centrally managed. There, you wouldn't have your personal laptop or smartphone on par with its internal network; you wouldn't have admin rights on any of your professional devices; the operating system and applications would be imposed on you; and any personal use would be blocked.

Thirdly, our bank wouldn't know who you really are – in the digital sense. At the CERN bank, you log in with your account and a password, but that's it. There's no strong verification to check whether the person who's logging in and knows the password is really who they claim to be. A real bank would have put in place two-factor authentication for each and every access, as well as tight access controls and a tight lock-out procedure in case you're logging in from an "unusual location". No exceptions even if you left your second factor, your smartphone, at home. You'd have to run home and get it.

Fourth, our bank would have flying ads and posters from other companies all over the walls. As we don't distinguish between personal and professional usage, our bank's email addresses can be used for other things. Signing up on for a social media account? Sure! Registering with your local grocery store? Done deal. Buying theatre tickets? There you go. Plus, messages can be automatically forwarded to any third-party mail provider if you believe their mail service is better. All of that's a no-go in a real bank. Its email address is for professional business only. And all emails remain on their mail servers to guarantee confidentiality. Reading emails on your personal device is blocked.

Fifth, our bank's systems accept any currency transaction. Importing the newest Python library from Anaconda? Downloading a fancy container image from Docker? Running NPM to update local code? All easily possible and all eventually pushed into production. Without checks, curation or control. A real bank applies maximum due diligence and a tight authoring process. While that slows down any deployment, it reduces the risk that "counterfeit money" makes it into their vaults.

So, would you trust our bank with your money? Better not. Fortunately, we're not a bank. And our

balance between academic freedom, accelerator and experiment operations, and “security” is definitely not the same as that between “finance” and “security”. In fact, a bank-like balance, a bank-like security posture, would kill our academic freedom and inhibit our efficient and effective operations. Still, don’t you think we could do better? We could:

Ensure that our entrances, our gates, are consolidated and better controlled. While our internet gate is well guarded, initial discussions on reviewing the interaction and inter-dependency between IT services, developers and the Technical Network have just started and need your commitment;

Improve the protection of our pool of BYOD, as BYOD is the only way for the Organization to accommodate thousands of researchers coming and going, connecting locally and remotely every month. Therefore, additional protective means

have been made available for BYOD and for devices owned by CERN;

Make (wider) use of two-factor authentication to protect our computing accounts and their passwords from any malicious use;

Definitely be more vigilant and careful with CERN email addresses and when browsing the web. Just “STOP – THINK – DON’T CLICK” before risking too much; and

Put in place a better software development process, in particular when importing packages, libraries, virtual images and containers from third-party sources.

Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report. For further information, questions or help, check our website or contact us at Computer.Security@cern.ch.

The Computer Security team

Official news

Family benefits – Obligation to provide information

Members of the personnel are reminded that, pursuant to Articles R V 1.38 and R V 1.39 of the Staff Regulations, they are obliged to declare the following in writing to the Organization within 30 calendar days:

- any change in family situation (marriage, civil partnership, birth or adoption of a child, divorce or dissolution of a partnership, death of a spouse or dependent child);
- any change in the situation of a dependent child (end of studies, start of paid employment, military service, marriage or civil partnership, change of residence or dependence status of a spouse’s child);
- the amount of any financial benefit of a similar nature to those stipulated in the Staff Regulations (e.g. family allowance, child allowance, infant allowance, non-resident allowance or international

indemnity) to which the member of the personnel or a family member may be entitled from a source other than CERN.

The procedures to be followed are available in the Admin e-guide: <https://admin-eguide.web.cern.ch/en/procedure/change-family-situation>

The Human Resources department also remains at your disposal to answer any questions: HR-Family.Allowance@cern.ch.

Members of the personnel are also reminded that any false declaration or failure to make a declaration with a view to deceiving others or achieving a gain resulting in a financial loss or loss of reputation for the Organization constitutes fraud and may lead to disciplinary action in accordance with Article S VI 2.01 of the Staff Rules.

HR department

CERN Health Insurance Scheme (CHIS) - Obligation to provide information

Staff members, graduates and fellows are reminded that, pursuant to Article IV 2.02 of the CHIS Rules, they are obliged to declare the following information concerning their spouse in writing to the Organization:

- any other primary health insurance scheme of which the spouse is a member; and
- in the event that the spouse does not have adequate primary health insurance, the amount of any income received by the spouse deriving from a professional activity and/or a retirement pension.

This declaration must be made within the 30 calendar days following any change in the spouse's:

- professional activity (e.g. start or end of employment contract, change of employer);
- health insurance (we remind you that a change of country of residence may lead to a change in your spouse's health insurance);
- gross income, if this results in a change of income bracket (see the table here).

Declarations must be made using the "SHIPID" (<https://edh.cern.ch/Document/Personnel/SHIPID>)

D) (Spouse Health Insurance & Professional Income Declaration) form.

The Human Resources department therefore advises staff members, graduates and fellows to check with their spouse that the details submitted in their latest declaration are still up-to-date and, if this is not the case, to make a new declaration using the "SHIPID" form without delay. We remain at your disposal to answer any questions about the SHIPID form via the following e-mail address: chis.shipid@cern.ch

Members of the personnel are also reminded that any false declaration or failure to make a declaration with a view to deceiving others or achieving a gain resulting in a financial loss or loss of reputation for the Organization constitutes fraud and may lead to disciplinary action in accordance with the provisions of Article V 5.03 of the CHIS Rules and Article S VI 2.01 of the Staff Rules.

HR department

Announcements

Group visits to Science Gateway



CERN Science Gateway in April 2023

Bookings are now open for group visits to CERN Science Gateway. More information and a link to the booking form are available [here](https://visit.cern/group-bookings) (<https://visit.cern/group-bookings>).

Aimed at engaging audiences of all ages, CERN Science Gateway will include immersive exhibition spaces, laboratories for hands-on experiments, and a large auditorium to host events for the scientific community and the general public.

Setting priorities for safety through dedicated objectives

CERN sets its annual and longer-term occupational health, safety and environment objectives

CERN has a robust safety organisation in place, underpinned by the Safety Policy, which spans all areas of occupational health and safety, including environmental protection and the safe operation of CERN's facilities.

In line with the Safety Policy and Safety Regulation SR-SO, which defines the responsibilities and organisational structure in matters of safety, CERN regularly sets safety objectives for the whole of the Organization.

Benoît Delille, head of the HSE unit, explains the importance of this approach: "This annual exercise is a powerful means of setting priorities in matters of safety in all respects. It is based on lessons learned, trends and feedback from the Safety Officers and link persons, who bring crucial information from the field."

The annual CERN-wide HSE objectives for 2023/2024, which were presented at the Enlarged Directorate meeting of 11 April, cover not only health and safety (HS) but also the "E" of HSE, i.e. the environment. In addition to the traditional annual objectives, longer-term ones for implementation in 2025 and at the start of the third long shutdown (LS3, currently expected to start in 2026) have also been set. "Looking further ahead, the longer-term objectives will enable us to prepare for LS3 and make the improvements needed to ensure that it unfolds optimally," explains Delille.

The objectives are the result of close collaboration between HSE and the departmental safety officers of other departments. The Safety Policy Committee (SAPOCO) has also contributed.

The environment objectives, which will be implemented around the end of Run 3 and the start of LS3, were first set in 2018 in CERN's first public-facing environment report. They include objectives to limit the increase in electricity consumption to 5%, reduce Scope 1 emissions by 28% and limit the increase in water consumption to below 5% with respect to 2018. The 2023/2024 objectives concern the minimisation of effluents discharged into watercourses from CERN

worksites and, in line with the Organization's noise policy, the mitigation of the impact of noise emanating from CERN installations on neighbouring towns, in order to reduce complaints to a minimum.

In the area of occupational health and safety, CERN aims to have 40% of its personnel trained in life-saving actions by LS3. The corresponding short and accessible course is an essential cornerstone in the Organization's medical emergency response strategy.

Electrical safety reinforcement is another priority. A dedicated project will strive, inter alia, to increase awareness and reduce incidents of electrical origin.

Another objective is to reduce the number of incidents and incivilities on CERN's roads and foster a culture of their safe, courteous and respectful use, whatever the mode of transport (see the recent dedicated Bulletin article).

As far as radiation protection is concerned, the long-term goal is to continue to limit the maximum annual personal dose to 3 mSv (i.e. half of the regulatory limit of 6 mSv for category B radiation workers) and to reduce the production of radioactive waste by taking it into account from the start in the design of upgrades and new facilities. For 2023/2024, the aim is to identify the old accelerator and experimental equipment that is currently in storage and perform radiological controls on it.

Emergency preparedness is another important long-term priority for the Organization, with specific actions planned before LS3, such as evacuation exercises in all accelerator and experimental areas and in the most-populated buildings, including the restaurants and hotels.

CERN's HSE objectives provide a clear, CERN-wide framework for setting safety priorities. Our commitment at every level is key to achieving these goals. Making CERN a safe place to work starts with each and every one of us.

For more detail on how these objectives will be implemented and tracked, see this webpage: <https://hse.cern/safety-objectives>.

HSE unit

It could get hot out there...

CERN implements an Organization-wide heatwave action plan

Heatwaves have become increasingly common at our latitude in the past few years. Recent trends show that heatwaves are now more frequent and more intense: it is no longer a matter of 'if' we will have one, but rather when it will occur, how hot it will be and how long it will last.

Heat may have an adverse impact on our health and work. A rapid rise in ambient temperature compromises the body's ability to auto-regulate its own temperature and metabolic processes. Heat can cause dizziness and headaches, a sore throat, cramps, dehydration, exhaustion and changes in our behaviour.

The majority of these adverse health effects generally occur when the average temperature over 24 hours is high (above 25°C) and remains high for several consecutive days. Such a meteorological context is the first indicator that a heatwave might be around the corner: MeteoSwiss declares a heatwave when average temperatures exceeding 25°C are forecast for at least three consecutive days. This is also the context in which CERN would implement its new "heatwave action plan", as described below. For reference, if this plan had been in place in 2022, it would have been triggered three times for a total of 16 calendar days.

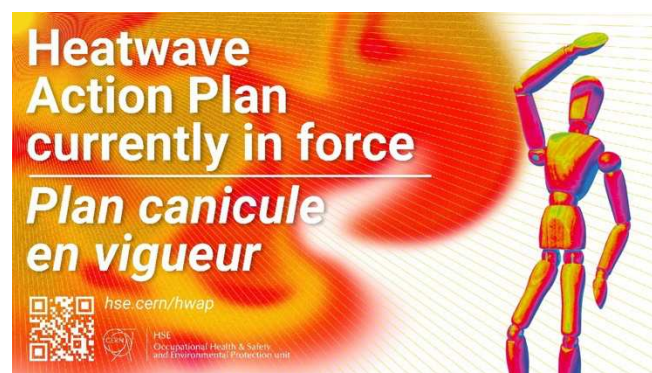
In addition to individual measures that are communicated during the heat awareness campaigns organised by HSE (see below*), CERN has developed an Organization-wide heatwave action plan consisting of a set of preventive and corrective measures designed to mitigate the effects of sustained high temperatures on its personnel during a heatwave. They will only apply during heatwave periods defined according to official meteorological forecasts, which are monitored closely by the HSE unit, and when deemed compatible with the needs of individual services.

During a heatwave period, personnel will be offered the option of specific flexible measures, such as the possibility of extended teleworking (under OC 7 per chapter II. 7 – heatwaves will be

considered a "specific circumstance"), as well as possible adjustments to the eight-hour working day between 7 a.m. and 8 p.m. (excluding shift work provisions). Hourly recuperation and hydration breaks may also be organised. These measures will of course be discussed with or defined by supervisors, depending on the individuals concerned, the workplace context and the activity.

Furthermore, the main air-conditioned (A/C) and ventilated auditoriums and meeting rooms may be booked in the afternoons to provide temporary space for office-related tasks. Installation on a large scale of A/C is not planned, given legal constraints but also environmental considerations (A/C units lead to increased energy consumption and greenhouse gas emissions), as well as health and safety issues.

The activation and end of the heatwave action plan will be announced on the home.cern and hse.cern websites, as well as on posters displayed on restaurant screens (shown below) and in messages on the site entrance screens.



Poster to be displayed on restaurant screens when the heatwave action plan is in force. (Image: CERN)

For full details of the heatwave action plan and measures, see this webpage.

Safety comes first, whatever the weather.

* How to beat the heat

We all feel the heat differently. Whenever high temperatures in the work environment become difficult to bear, the following 'Beat the heat' tips can help avoid unpleasant symptoms:

- keep windows and blinds closed during the day;
- use an office fan;
- hydrate yourself regularly;
- take regular breaks;
- seek a cooler environment, if possible. The maximum difference in temperature between indoor and ambient (outdoor) conditions should not exceed 8oC;

-keep heavy physical tasks to the minimum during the warmest hours, and wear light clothing, if compatible with your work.

-When working outside, wear sunglasses, sunscreen and appropriate clothing.

If you are pregnant or breastfeeding or suffer from a chronic illness, we advise you to consult your doctor to define any additional measures that may be appropriate.

HSE unit

Celebrate 6 years of the CERN Alumni Network on 8 June

The CERN Alumni network invites you to a special virtual event on 8 June. This event will be hosted on CERN's LinkedIn page and simultaneously streamed on other social media platforms.

The speakers will celebrate this milestone and focus on highlighting how an experience at CERN

serves as a transformative springboard for one's career.

Visit the CERN Alumni website (<https://alumni.cern/networks/events/115738>) for more information.

The CERN MusiClub invites you to “Music on the Lawn” on 10 June

The CERN MusiClub invites you to join us for “Music on the Lawn”, which will take place on Saturday, 10 June on the terrace of Restaurant 1 on the Meyrin site.

“Music on the Lawn” is an informal, free concert featuring bands from the CERN MusiClub. This year's event will feature live music from:

Blast from the Past

Old Gits, Young Bloods

Les Croque Monsieur

CoverOps

Nameless.

The music will start at 2.00 p.m. and last until around 7.00 p.m. Please note that, as on any other

day, a CERN access card will be required to enter the site. We hope to see you there!

Don't forget, as previously announced, the CERN MusiClub is also planning this year's Hardronic Music Festival, which will be held on 8 July on the terrace of Restaurant 3 on the Prévessin site. We invite you to save the date and stay tuned for full details, which will be coming soon.

The MusiClub would like to thank the Staff Association and the CERN Management for supporting these events.

CERN MusiClub

Working without pain: learn the best practices to adopt

How awareness of our posture and movements can improve our health

Musculoskeletal health refers to the performance of the locomotor system, which comprises our muscles, bones, joints and adjacent connective tissues. The term “musculoskeletal disorders” (MSDs) covers more than 150 different diseases and conditions, characterised by locomotor system impairments, often persistent pain and limitations in mobility and dexterity. These can reduce our capacity to work, our levels of well-being and our ability to participate in society.

MSDs are on the rise and are the leading contributor to disability worldwide, with lower back pain being the single leading cause. The World Health Organization (WHO)* estimates that approximately 1.71 billion people have musculoskeletal conditions worldwide. In France, MSDs have increased by 60% since 2003**.

The origin of most MSDs lies in a mismatch between the external load and the capacity of the human body to resist biomechanical and physiological strain. Ergonomics, but also rest and recovery, nutrition, hydration and fitness all play an important role in mitigating the risk of developing MSDs.

We are all potentially exposed to MSDs, whatever the nature of our work. We can actively help reduce the risk for ourselves by being aware,

adopting a few simple habits and making sure our workplace is correctly designed and organised.

The prevention of MSDs falls within the remit of the CERN Medical Service, which offers workplace visits, provides dedicated advice and runs awareness campaigns.

In this context, the Medical Service is organising an awareness campaign on 1 June in Restaurant 1, from 10 a.m. to 3 p.m. The event will include advice on posture and demonstrations of simple tricks and ergonomic adjustments that may help improve comfort and health at work. Further, a series of short muscular awakening exercise classes will take place on 6 June from 8.30 a.m. to 12.30 p.m. in Building 40.

All the details of the 1 June campaign and the schedule for the 6 June muscular awakening exercise, as well as brochures and further information, can be found at: <https://hse.cern/content/ergonomics>.

* <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>

** Comprendre les troubles musculo-squelettiques | ameli.fr | Assuré (Comprendre les troubles musculo-squelettiques | ameli.fr | Assuré)

CERN Medical Service

Learning sessions on the Scientific Information Service (Library & Open Science)

New sessions are available on the CERN Learning Hub

Would you like to find out how to use CERN Library services and resources available at CERN (accessing e-books and e-journals, borrowing books, requesting documents, etc.)?

Do you want to learn how to publish following the Open Access policy and get some insight into Open Science?

If so, enrol for one of the short information sessions

(https://lms.cern.ch/ekp/servlet/ekp?PX=N&TEACHREVIEW=N&PTX=&CID=EKP000044158&TX=FORMAT1&LANGUAGE_TAG=en&DECORATEPAGE=N) offered by the CERN Scientific Information Service every three months. The next session will take place on 13 June and is open to anyone working at CERN.

For any questions, feel free to reach out: library.desk@cern.ch

Between two infinities: Our place in the Universe – a conference by Gianfranco Bertone on 1 June

Spectacular advances in modern astronomy have opened our horizon to an unexpected cosmos: a dark, mysterious universe, populated by enigmatic entities we know very little about, such as black holes, dark matter, and dark energy.

In this public conference, Gianfranco Bertone – Professor of Theoretical Astroparticle Physics at the Center of Excellence in Gravitation and Astroparticle Physics, University of Amsterdam (GRAPPA) – will discuss how the new science based on gravitational waves may hold the keys to unlocking these mysteries. Bertone will highlight the surprising connections between the study of

the universe on the largest scales and the physics of the infinitely small.

The talk is a fascinating introduction to cutting-edge findings in recent cosmology, that could soon revolutionise our understanding of the universe and of the role we humans play in it.

For more information and registration, visit the event's [Indico page](https://indico.cern.ch/event/1282460/) (<https://indico.cern.ch/event/1282460/>).

1 June 2023 | 8 p.m. to 9.00 p.m.

**Globe of Science and Innovation, CERN
Presentation in English | Event recorded)**

L&D micro-talk - "Excellenceism vs. Perfectionism"

Micro
talk #3



HR Learning & Development invites you to an intriguing micro-talk lead by a mental health expert speaker.

You will explore perfectionist tendencies, their impact on our lives and how to strive for excellence instead, to benefit mental health.

It's time to give up unhealthy perfectionism!



Human Resources
Learning and Development

Excellenceism vs. Perfectionism

Micro-Talk 60 min + 15 min Q&A

Experts: Alessandra Patti, Founder, Trainer and Mental Wellbeing Strategist, FindYourWay Coaching.

2 June 2023 - 14:00 – 15:15

In English / Zoom and recorded

For more information and registration: <http://cern.ch/go/B8jM>

“Long COVID”: the HUG seek volunteers for a new study

The COVID-19 pandemic might seem like a distant memory for most of us, but the effects unfortunately linger for some: many people infected with COVID-19 have medium or long-term symptoms. If these symptoms last for at least three months after infection, we speak of “long COVID” (“post-COVID” or “COVID long” in French). To date, no pharmacological treatment has been found. The Hôpitaux Universitaires de Genève (HUG) are undertaking a post-COVID study to evaluate the effectiveness of a new

immunotherapy drug called temelimab. They are seeking 200 volunteers to take part in this study, as uptake has so far been low.

If you are suffering from post-COVID symptoms and would like to take part in the study, you can find out more on the HUG’s dedicated webpage (in French):

<https://www.hug.ch/actualite/participez-etude-sur-levaluation-dun-traitement-du-post-covid>).

HSE unit

Library – Chicago Manual of Style

Did you know that the CERN Library grants you access to the Chicago Manual of Style?

The Chicago Manual of Style will provide you with general guidelines for preparing books and articles, along with citation, spelling, punctuation and abbreviations guidelines. You can access it here (<https://www-chicagomanualofstyle-org.ezproxy.cern.ch/home.html>)

For any question, please contact: library.desk@cern.ch

Note that CERN also has its own style guides in English and French, developed by the CERN Translation and Minutes Service. You can access them here (<https://translation-council-support-group.web.cern.ch/style-guides>)

CERN Library

Take part in the Auvergne-Rhône-Alpes region’s Mobility Challenge

On 1 June, take part in the Challenge Mobilité by opting for an environmentally friendly way to get to work – on foot, in a carpool, by bike or on public transport – it’s entirely up to you. The challenge is an initiative of the Auvergne-Rhône-Alpes region where the French parts of the CERN site are located.

So, on 1 June, why not hop on your bike, don your running shoes or consult the bus timetable? And if you want to go a step further, try out some of the highly original extra challenges suggested here (<https://challengemobilite.auvergnerhonealpes.fr/defis/> in French only).

Alumni event on 25 May: "News from the lab" with CERN KT on digital applications

This "News from the lab" event will focus on digital applications, one of the five target areas of the Knowledge Transfer Group. The talk will briefly remind the CERN KT approach, method and tools before giving some insights on opportunities for CERN digital technologies. It will provide various

examples of successful projects and collaborations undertaken with industry.

25 May - 6 p.m.

Registration on the Alumni website
(<https://alumni.cern/networks/events/114776>)

CERN Service Management Forum – 8 June

The CERN Service Management support team (SM team) is pleased to invite you to the 4th Service Management Forum at CERN. The event will take place on Thursday, 8 June at 10.30 a.m.. It will be an exciting opportunity to discover the latest updates in Service Management at CERN, featuring informative presentations and a useful hands-on workshop.

You can find a detailed agenda of the event as well as a Zoom link on the Indico page.

The forum will focus on the ServiceNow integration with CERN-specific software such as JIRA, InforEam, JOB, and data sources, which allows you to maximise the benefits of the ServiceNow tool as an interface with users and your fit-for-purpose tool.

The event will also address the CERN Service Status Board and the Outages, to help you stay up

to date with service incidents, interventions, and changes. This will allow you to take appropriate actions in a timely manner in the event of a service disruption.

The forum will once again provide an excellent opportunity to find out how colleagues have leveraged ServiceNow functionality to its fullest potential. In this vein, Gilles Bollinger and Vincent Gilquin will share their experiences, their tips and best practices with Site Services, Mobility Services, and Housing Services.

Finally, a hands-on session will allow you to learn how to configure your service keywords to optimise the results of the CERN Service Portal.

We look forward to seeing you at the forum!

Service management teams

Obituaries

Klaus Bätzner (1936 – 2022)



It was with great sadness that we recently learned that our friend and former colleague Klaus Bätzner passed away in December 2022.

Klaus devoted his career to CERN. Among the many projects he worked on were the

Proton Synchrotron (PS) and increasing the energy

of the Super Proton Synchrotron (SPS) to 400 GeV. As a physicist and engineer, he made substantial contributions to some major projects.

On top of that, Klaus was an iconic CERN guide, who was passionate about his work, knew CERN inside out and showed people of all ages and nationalities, from all walks of life, around the Laboratory. He received special honours for the impressive number of public talks and guided tours he had given (watch part of one of Klaus's tours here). We even had to remind him to temper his enthusiasm from time to time.

His natural kindness made it a pleasure and a privilege to work with him.
A final round of applause to you, Klaus, we shall deeply miss your friendship.

In the control room at CERN's Super Proton Synchrotron in June 1976, as the beam reaches its design energy. Klaus Bätzner (centre, with dark t-shirt) and his colleagues celebrate with project leader John Adams (centre, with tie). (Image: CERN)



His colleagues and friends from the Visits service and CERN

Ombud's corner

Let's talk about excellence

I recently published an article in which I explained that infringements of the Code of Conduct had been observed in all of the situations brought to my attention in 2022.

I appreciate the comments that I've received from some of you since its publication. They revolved in particular around this question: "Didn't you forget to mention excellence among CERN's values?"

It's true that the word "excellence" wasn't mentioned in the article, but I'd like to share a few thoughts about this with you.

First, let me underline that excellence is not described as a value in the Code of Conduct but rather as a goal to be achieved by upholding our values: "Furthering excellence at CERN through integrity, commitment, professionalism, creativity and diversity."

The Oxford English Dictionary defines excellence as: "The state or fact of excelling; the possession chiefly of good qualities in an eminent or unusual degree; surpassing merit, skill, virtue, worth", which is a good reflection of the goal to be achieved.

Excellence is an aspiration. We can put the value of integrity into practice but we can only strive for excellence.

The Code of Conduct explains how we – the CERN contributors – can live and work in accordance with the five CERN values. But it doesn't say how we can achieve excellence. Excellence is therefore seen as a concept that needs no explanation.

An excellent (the right choice of adjective!) article in the journal *Gestion de HEC Montréal* asserts that excellence gives teams involved in a project a

shared sense of meaning and purpose. It brings together the “what” – achieving results – with the “how” – the attitudes and behaviour that are prized in achieving those objectives.

Excellence therefore implies making overall progress towards a goal while setting out a way to achieve it.

The article is particularly relevant because it also emphasises that “excellence” fosters the involvement and collaboration of team members, as opposed to “performance”, which cultivates competition.

Most of my colleagues are proud of the slogan “Excellence first!”, because it propels our Laboratory towards an ideal. But watch out – this constant demand for excellence may discourage people if it’s interpreted as a level of operational performance that we must each individually attain.

Here are some tips that the article offers in order to develop our excellence in terms of interpersonal relations, collaboration and team management.

Cultivate patience and humility rather than trying to get everyone to think the same way and do things our way.

Be open-minded and curious rather than trying to be right, persuade others and keep control.

Encourage people to take the initiative, take risks and make mistakes. Some mistakes should be seen as learning opportunities rather than as setbacks that lead to blame and hinder collaboration and teamwork.

See the detours required by the circumstances and challenges as milestones on the road to success and shared achievement rather than as risks that spark the fear that things are not going as planned. Demonstrate vulnerability, which allows us to be authentic and rigorous, without being overly strict with ourselves and others. Vulnerability allows us to take action in the full awareness that everything is perfectly imperfect.

Let’s take excellence as it is: not a performance indicator but a path that guides us towards achieving our objectives while respecting others, ourselves, our strengths and our weaknesses – in short, our diversity.

On this very subject, **I recommend you check out the online talk being organised by our colleagues in HR-LD, “excellenceism vs. perfectionism” (<https://home.cern/news/announcement/cern/ld-micro-talk-excellenceism-vs-perfectionism>) on 2 June at 2.00 p.m.**

The Laboratory is brimming with the potential for excellence – it’s up to us to unleash it! Upholding CERN’s values and Code of Conduct at every level – both individual and collective and in our procedures, management and communications – is a prerequisite for excellence.

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/>.