CERN Bulletin

Issue No. 01-02-03/2023 – 12 January 2023
http://home.cern/cern-people

ALICE estimates how transparent the Milky Way is to antimatter

The finding will help space- and balloon-based searches for antimatter that may have originated from dark matter measured two Standard Model processes: the production of Z bosons and top-quark pairs

Artist's impression of the ALICE study of the transparency of the Milky Way to antimatter (Image: ORIGINS Cluster, Technical University Munich)

The antimatter counterpart of a light atomic nucleus can travel a long distance in the Milky Way without being absorbed, shows the international ALICE collaboration in an article published on 12 January 2022 in Nature Physics. The finding, obtained by feeding data on antihelium nuclei produced at the Large Hadron Collider (LHC) into models, will help space- and balloon-based searches for antimatter that may have originated from dark matter.

Light antimatter nuclei such as antideuteron and antihelium have been produced on Earth, at particle accelerators, but they have yet to be observed with certainty coming from outer space. In space, such antinuclei, as well as antiprotons, could be created in collisions between cosmic rays and the interstellar medium, but they could also be produced when hypothetical particles that may make up the dark matter that pervades the Universe annihilate each other.

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Space-based experiments such as AMS, which was assembled at CERN and is installed on the International Space Station, are therefore looking for light antimatter nuclei in an effort to search for dark matter, as will the upcoming GAPS balloon mission.

To find out whether dark matter is the source behind any potential detections of light antinuclei from outer space, physicists need to determine the number, or more precisely the "flux", of light antinuclei that is expected to reach the near-Earth location of these experiments. This flux depends on features such as the exact type of antimatter source in our Galaxy and the rate at which it produces antinuclei, but also on the rate at which the antinuclei should later disappear through annihilation or absorption when they encounter normal matter on their journey to Earth.

The latter is where the new study from the ALICE collaboration comes in. By investigating how antihelium-3 nuclei1 produced in collisions of heavy ions and of protons at the LHC interact with the ALICE detector, the ALICE researchers were able to measure, for the first time, the rate at which antihelium-3 nuclei disappear when they encounter normal matter. In this analysis, the ALICE detector's material serves as the normal matter with which the antinuclei interact.

Next, the ALICE researchers incorporated the obtained disappearance rate into a publicly available computer programme called GALPROP, which simulates the propagation of cosmic particles, including antinuclei, in the Galaxy. They considered two models of the flux of antihelium-3 nuclei expected near Earth after the nuclei's journey from sources in the Milky Way. One model assumes that the sources are cosmic-ray collisions with the interstellar medium, and the other describes them as hypothetical dark-matter particles called weakly interacting massive particles (WIMPs).

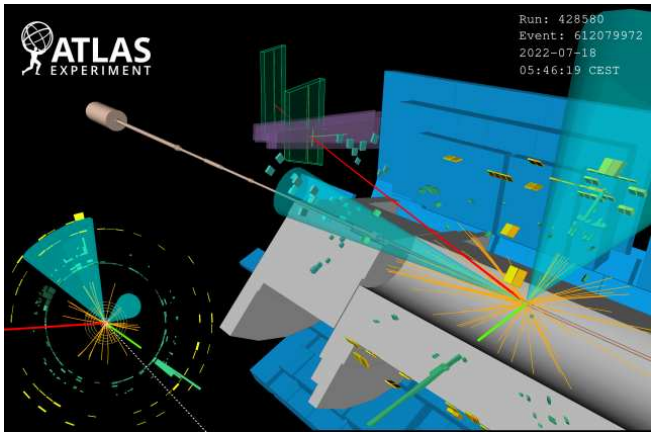
For each model, the ALICE team then estimated the transparency of the Milky Way to antihelium-3 nuclei, that is, the Galaxy's ability to let the nuclei through without being absorbed. They did so by dividing the flux obtained with and without antinuclei disappearance.

For the dark-matter model, the ALICE researchers obtained a transparency of about 50%, whereas for the cosmic-ray model the transparency ranged from 25% to 90% depending on the energy of the antinucleus. These transparency values show that antihelium-3 nuclei originating from dark matter or cosmic-ray collisions can travel long distances – of several kiloparsecs2 – in the Milky Way without being absorbed.

"Our results show, for the first time on the basis of a direct absorption measurement, that antihelium-3 nuclei coming from as far as the centre of our Galaxy can reach near-Earth locations," says ALICE physics coordinator Andrea Dainese.

ATLAS moves into top gear for Run 3

In their first Run 3 results, the ATLAS collaboration measured two Standard Model processes: the production of Z bosons and top-quark pairs



Event display of a pair of top quarks decaying, recorded in the ATLAS detector on 18 July 2022. (Image: CERN)

After over three years of upgrade and maintenance work, the Large Hadron Collider began its third period of operation (Run 3) in July 2022. Since then, the world's most powerful particle accelerator has been colliding protons at a record-breaking energy of 13.6 TeV. The ATLAS collaboration has just released its first measurements of these record collisions, studying data collected in the first half of August 2022.

The researchers measured the rates of two well-known processes: the production of top-quark pairs and the production of a Z boson, which

proceed through strong and electroweak interactions, respectively. The ratio of their cross sections is sensitive to the inner structure of the proton, and their measurement sets constraints on the relative probabilities that reactions are initiated by quarks and gluons.

These early measurements also validate the functionality of the ATLAS detector and its reconstruction software, which underwent many improvements in preparation for Run 3.

Physicists focused on Z-boson decays to electron and muon pairs, and on top-quark decays to a W boson and a jet – collimated sprays of particles – originating from a bottom quark. The W boson subsequently decays into one electron or muon and an invisible neutrino. As the analysis uses very early Run 3 data, physicists relied on preliminary calibrations of the leptons, jets and luminosity. These were derived promptly after the first data became available.

ATLAS measured a top-quark pair to Z boson production ratio that is consistent with the Standard Model prediction within the current experimental uncertainty of 4.7%.

The calibration and corresponding uncertainties will be improved as more data is processed. Future updates of the calibration will allow researchers to measure the cross sections with greater precision.

To validate their results, physicists performed a series of cross-checks. These included measuring the ratio of the cross section each time the LHC was injected with a new fill of protons for a data-taking run.

More analyses using the Run 3 data will follow, exploiting the unprecedented energies and the increased LHC data set.

Make your voice heard through the 2023 CERN survey

CERN's next survey is coming up – staff members and fellows should not miss this opportunity to give input on their experience at CERN with a view to improving working conditions across the Organization

Only three years have passed since the last surveys for staff and fellows were launched, yet the world looks very different than it did in 2019. Our community, like society at large, is recovering from the effects of a long pandemic and is now dealing with the consequences of the military invasion of Ukraine and difficult economic conditions. On a brighter note, the transition from the second long shutdown (LS2) to Run 3 has been very successful, shifting resources across the Organization to focus on the operation of our flagship collider and the next large upgrade of our infrastructure for the High-Luminosity LHC in 2026–2028. These events have shaken up the way we work, warranting the launch of a new survey at CERN.

Surveys are just one of the tools the Organization's Management uses to gather input from its community. By making your voice heard, you help identify what matters to you in your work environment, which, in turn, allows the Management to better understand potential areas for improvement and what motivates and engages the personnel.

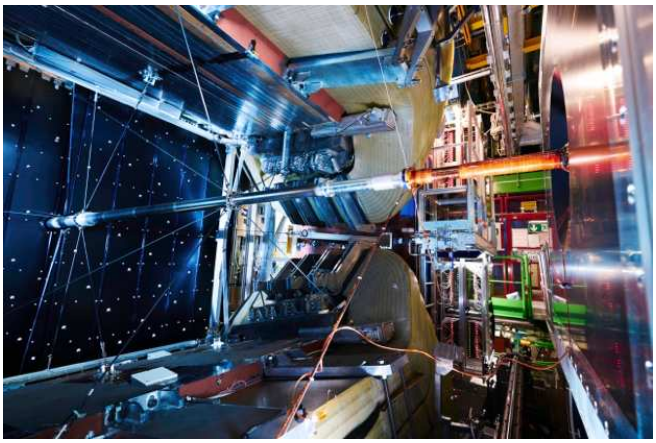
This year's survey comprises a condensed questionnaire, which should not take more than 15 minutes to complete, and aims to paint a comprehensive picture of your experience at CERN by focusing on four key themes: "my work", "my management", "the Organization" and "the future of CERN". Staff members and fellows will be invited to share their feedback on these four themes, highlighting the Organization's strengths as well as the areas where improvement is still needed.

The importance of this exercise cannot be overstated: the findings will be used to shape improvements and prioritise actions for the coming years. With that in mind, be on the lookout for the launch of the survey, which should reach your inbox by the end of the month and will also feature in the next issue of the CERN Bulletin.

We thank you in advance for your collaboration and look forward to your input.

LHCb brings leptons into line

Simultaneous measurements of rare B-meson decays using the full LHC Run 1 and 2 data samples agree with the predictions of the Standard Model, superseding previous results that had indicated intriguing departures from the 50-year old theory



The LHCb experiment (Image: CERN)

Today (20 December 2022) the international LHCb collaboration at the Large Hadron Collider (LHC) presented new measurements of rare particle transformations, or decays, that provide one of the highest-precision tests yet of a key property of the Standard Model of particle physics, known as lepton flavour universality. Previous studies of these decays had hinted at intriguing tensions with the theoretical predictions, potentially due to the effects of new particles or forces. The results of the improved and wider-reaching analysis based on the full LHC dataset collected by the experiment during Run 1 and Run 2, which were presented at a seminar at CERN held this morning, are in line with the Standard Model expectation.

A central mystery of particle physics is why the 12 elementary quarks and leptons are arranged in pairs across three generations that are identical in all but mass, with ordinary matter comprising particles from the first, lightest generation. Lepton flavour universality states that the fundamental forces are blind to the generation to which a lepton belongs. In recent years, however, an accumulation of results from LHCb and experiments in Japan and the US have suggested that this might not be the case, generating cautious excitement among physicists that a more fundamental theory – perhaps one that sheds light on the Standard Model's mysterious flavour structure – might reveal itself at the LHC.

Interest in the "flavour anomalies" peaked in March 2021, when LHCb presented new results comparing the rates at which certain B mesons, composite particles that contain beauty quarks, decay into muons and electrons. According to the theory, decays involving muons and electrons should occur at the same rate, once differences in the leptons' masses are accounted for. But the LHCb results hinted that B mesons decay into muons at a lower rate than predicted, as indicated by the results' statistical significance of 3.1 standard deviations from the Standard Model prediction.

The new LHCb analysis, which has been ongoing for the past five years, is more comprehensive. It considers two different B-meson decay modes simultaneously for the first time and provides better control of the background processes that can mimic the decays of B-mesons to electrons. In addition, the two decay modes are measured in two different mass regions, thus yielding four independent comparisons of the decays. The results, which supersede previous comparisons, are in excellent agreement with the principle of lepton flavour universality.

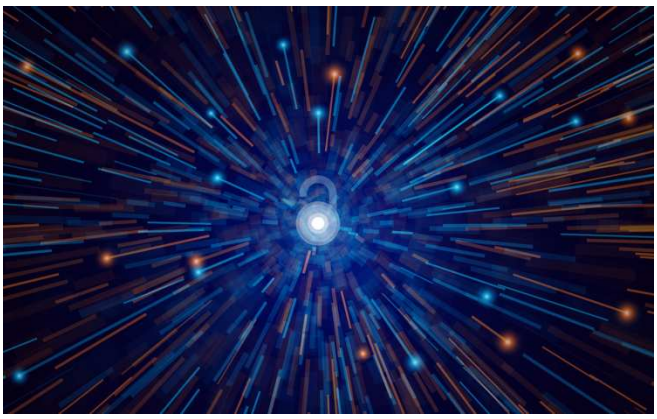
"Measurements of the ratios of rare B-meson decays to electrons and muons have generated much interest in recent years because they are theoretically 'clean' and show consistency with a pattern of anomalies seen in other flavour processes," explains LHCb spokesperson Chris Parkes of the University of Manchester and CERN. "The results shown today are the product of a comprehensive study of the two main modes using our full data sample and applying new, more robust techniques. These results are compatible with the expectation of our theory."

New datasets will allow LHCb – one of the four large experiments at the LHC at CERN – to investigate lepton flavour universality further, in addition to conducting a wider research programme that includes studies of new hadrons, including the search for exotic tetraquarks and pentaquarks and investigation of the differences between matter and antimatter. An upgraded version of the experiment now in operation for

LHC Run 3 will collect larger datasets that will allow even higher-precision tests of rare particle decays.

"Earlier LHCb indications of anomalies concerning lepton flavour universality triggered excitement," says theoretical physicist Michelangelo Mangano of CERN. "That such anomalies could potentially have been real shows just how much remains unknown, since theoretical interpretations exposed a myriad of unanticipated possible phenomena. The latest LHCb findings take nothing away from our mission to push the boundary of our knowledge further, and the search for anomalies, guided by experimental hints, goes on!".

CERN supports open access publishing for books



(Image: CERN)

Ever since the open access (OA) publication of peer-reviewed primary research articles from CERN authors was made a policy requirement in 2014, CERN has made great strides forward in opening its research to anyone around the world. This has been achieved thanks to a variety of mechanisms implemented by the CERN Scientific Information Service (SIS), ranging from a series of Read & Publish agreements signed with major publishers to CERN's participation in the SCOAP3 consortium, which has arranged for automatic OA to research in high-energy physics (HEP).

Books (including monographs and textbooks) have often been left out of such agreements and schemes. However, more and more monographs are now being published OA, thanks in part to historical and recent initiatives supported by CERN. The latest of these initiatives, SCOAP3 for books, has made dozens of books available in OA since its inception in 2022.

CERN's commitment to OA for books is nothing new: CERN authors have long benefitted from the Organization's support to help them make their monographs and reports freely accessible to anyone. As a result, ever since the OA publication of the first Yellow Reports in 1955, many monographs by CERN authors have followed suit. CERN's efforts in this direction have recently been completed by the Organization's participation in the MIT's Direct to Open programme, through which libraries around the world shift from buying monographs from the MIT Press to funding them for everyone.

On top of all that, SCOAP3 for books looks set to bring about an enduring change in the publishing landscape for books in HEP and related disciplines. The initiative, which represents an expansion of the regular activities of the CERN-coordinated SCOAP3, has so far made more than 60 academic books (including monographs and textbooks) available open access. Voluntary contributions from hundreds of SCOAP3 member institutions fund the programme, opening education and research in HEP to the world.

Books published in OA thanks to the SCOAP3 for books initiative can be accessed on the publishers' websites and through a dedicated collection on the OAPEN Library.

Enjoy your reading!

For any questions, please contact open-access-question@cern.ch.

CERN Scientific Information Service

New ALICE management takes over from January 2023

New ALICE management: Marco van Leeuwen (centre) with Kai Schweda (left) and Bedangadas Mohanty (right) (Image: CERN)

Marco van Leeuwen, senior scientist at Nikhef (Netherlands), has taken over from Luciano Musa as ALICE spokesperson as of early January 2023. He will lead the collaboration for the coming three years. Elected by the ALICE Collaboration Board, Marco comes to the position after serving as the upgrade coordinator for the last three years, and as ALICE physics coordinator prior to that. The new management team includes deputy spokespersons Kai Schweda, senior scientist at the GSI Helmholtz Centre in Darmstadt, Germany, and Bedangadas Mohanty, professor of physics at the National Institute of Science Education and Research in Bhubaneswar, India.

The new team is looking forward to collecting several large data samples with the upgraded ALICE detector during Run 3, including the first heavy-ion data taking of Run 3 later this year, as well as preparing for the ITS 3 and FoCal upgrades and the ALICE 3 programme.

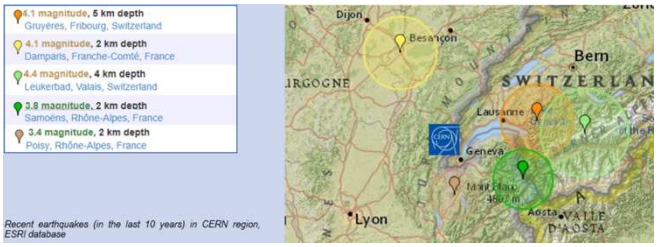
Celebrating 25 years of service to CERN in 2022

Staff members who marked 25 years of service to CERN in 2022 were invited by the Director-General to the traditional ceremony in their honour held on 22 November 2022.

The photos from the ceremony and the list of the 67 staff members concerned can be viewed in this album (https://cds.cern.ch/record/2841720 - restricted access).

We thank them all warmly for their commitment and wish them continued success at CERN !

Assessing the seismic safety of CERN's installations



Recent earthquakes in the last 10 years in the CERN region (Image: ESRI database)

Surrounded by the Alps, the Jura and Lake Geneva, CERN is located in a particularly complex geological setting, which also happens to be a non-negligible earthquake-prone region. Compared to the rest of Europe, Switzerland has a moderate seismic risk, but the Swiss Seismological Service (SED) indicates that earthquake activity is not evenly distributed throughout the country: the Valais region is the most prone, followed by Basel and Geneva.

To gain a better understanding of the seismic risk, CERN has, since 2021, been running dynamic seismic analyses on some of the concrete blocks

used to shield people from ionising radiation in most of the experimental areas, in order to be able to predict the mechanical behaviour of this type of structure.

Current regulations in matters of seismic risk cover ordinary buildings, but not complex research facilities like those of CERN. Further, shielding block configurations are not covered by European or Swiss norms. In the light of this gap, and in order to provide a means for CERN to assess seismic activity in relation to such configurations, a project was set up to develop an ad hoc assessment methodology compatible with the criteria for seismic safety in the Host States.

This project is being led jointly by Luca Sironi (SCE-SAM-TG) and Marco Andreini (HSE-OHS-IB), alongside the Beams department. Other renowned institutes, such as the California Institute of Technology (Caltech), the Swiss Federal Institute of Technology Lausanne (EPFL), the University of Montpellier and the European Centre for Training and Research in Earthquake Engineering (EUCENTRE), are also participating.

A report on the proposed assessment methodology for typical CERN shielding block configurations will soon be presented to the management of the SCE department and the HSE unit. The objective is to integrate this methodology into routine operations, including the conceptual design of new facilities and the consolidation of existing ones. Having calibrated the open-source software LMGC-90 (developed by the University of Montpellier) in 2021 based on experimental results collected in 2019 at EUCENTRE (Pavia-Italy), CERN is now further refining its seismic safety assessment methodology, based on incremental dynamic analysis, in the spirit of the continuous improvement of safety at the Laboratory. The main objective is to run this analysis on real block configurations at the beginning of 2023.

Until now, studies have been mainly theoretical and have lacked the support of experimental tests. This work has now not only been validated by experimentation, but can be used routinely from now on, representing a new competency at CERN. The Seismic Safety Project will now enter its next phase of development, with some case studies in the pipeline. Luca and Marco underline the potential of this research: “Thanks to the collaboration between institutions, it has been possible to work at the forefront of the research in matters of seismic safety. The research findings can be extended to similar structural typologies for other laboratories around the world.”

Find out more about the project on this poster (sign-in required).

HSE unit & SCE department

Computer Security: When auto-update is not so auto

With more and more random software installed on our laptops, tablets, smartphones and other devices, more and more security risks creep in. Every piece of software is a security risk. Every piece of software comes naturally in an imperfect state, with human-implemented weaknesses and vulnerabilities to be discovered. Fortunately, many software vendors (but far from all) have put systems in place to fix discovered vulnerabilities and weaknesses as soon as possible. And with “auto-update” enabled, your device might just install that new version and keep you safe. Unfortunately, not every auto-update is so auto.

What is meant by “auto” can vary widely. Usually, it is expected that, with “auto-update”, new versions are discreetly installed in the background. In other cases, the update process might be verbose with pop-ups and message windows, or even require a reboot. But some “auto-updates” don’t even self-launch. They’re actually not that “auto” at all, but require you to take action – to take responsibility and get it going by scheduling and launching the update process yourself. And this is where the process fails. Lazy people as we are. And so, lazily, we put the security of our devices at risk.

We shouldn’t. Our digital life depends heavily on the security of our devices (see our Bulletin article on apartments). Just think of the mess you’d be in if a malicious, evil attacker got access to your

device(s) – to your hard disk, documents, photos and files. To your camera and microphone. To your keyboard and the keys you type. Malicious access obtained. Data gone. Passwords gone. Privacy gone. Confidentiality gone. Your digital life gone. And with it your work, and the security of CERN. Terminated. Game over. Bye-bye.

For the sake of protecting our digital life – for the sake of protecting our Organization, too! – we should secure our devices as thoroughly as we can. We should ensure that our entire installed software stack is always up-to-date. We should ensure that "auto-update" really means "auto" and is configured to be "auto". We should allow software demanding to be updated to launch its update process as soon as possible, whether immediately or overnight. And we should refrain from postponing updates forever. Ignoring them. Suppressing them. Because a missing update implies an unfixed weakness and vulnerability. Because a missing update poses a risk – to your digital life and to the Organization. Intervening manually to make "auto-update" really "auto" would reduce that risk. Thank you for securing your digital life. And CERN.

Computer Security team

Official news

Preparing for the unlikely event of a blackout at CERN

While a blackout this winter is unlikely, CERN is prepared. Here's some information about what you should do if CERN's energy supply is cut

In response to the ongoing energy crisis in Europe, CERN has examined a range of potential scenarios that could occur at CERN over the coming winter. These include the unlikely event of a complete blackout on all sites, which would arise only if both the French and the Swiss electricity supplies were cut off at the same time. If this were to happen, CERN's diesel generators can provide emergency electricity, but this would not be sufficient to keep everything running. Each department has therefore put in place plans for dealing with a blackout, which have consequences for everyone working on the CERN sites. If this concerns you, please take a few minutes to acquaint yourself with the key points below.

First and foremost, please keep in mind that CERN's sites are intrinsically safe. Therefore, although most systems at CERN depend on electricity, a blackout is not a cause for alarm. If you are working underground, you should evacuate to the surface as soon as possible, after ensuring that any equipment you may have been using is left in a safe state.

Information, including the time of the start of the blackout, will be provided via CERN's mobile phone network and by email. Direct wired or wireless internet access is likely to be unavailable, but the mobile phone networks will continue to operate for up to two hours on the CERN sites. Although the Drupal web servers will not be running, it is planned that a simple web page will be available at home.cern, giving basic information about what you should do. Please note that Mattermost is unlikely to be available.

Leaving the sites will understandably be on everyone's mind if a blackout occurs during working hours and lasts more than 30 minutes. Nevertheless, unless you have pressing reasons, such as picking up children from a crèche or school, please do not leave immediately.

<u>If you are working on the Meyrin site</u>

In order to ensure a smooth flow of traffic, if you are not required by your department to remain on site and are leaving by car, please do so according

to the table below, based on the last digit of your CERN Person ID number, as shown at the bottom of your access card. Jo Public, for example, should leave the site 35 minutes after the start of the blackout. When leaving, please ensure that any equipment you are responsible for is left in a safe state.
Gates A and E will be open for vehicles leaving the CERN site, while gate B will be open for entering the site. All the other gates will be closed to allow the security agents to be deployed at the other gates on the other sites.

When (min)	Who (last Person ID digit)
0 to 30	Anyone needing to leave the site for urgent reasons
30	0
35	1
40	2
45	3
50	4
55	5
60	6
65	7
70	8
75	9

If you are working on the Prévessin site

Those whose Person ID number ends with the digit 0, 1, 2, 3 or 4 should leave no earlier than 30 minutes after the start of the blackout, while those whose number ends with the digit 5, 6, 7, 8 or 9 should leave no earlier than 40 minutes after the start of the blackout.
If you are working on any other site, you may leave at your convenience if electricity has not been restored within 30 minutes.

Pedestrians and cyclists

Bicycle turnstiles will not be powered, so cyclists will have to use the car lanes. On the Meyrin site, they may use gates A, B or E but should be aware that traffic through gate B could be disrupted if the blackout affects the traffic lights.
Pedestrians leaving the Meyrin site may use gates A, B, C or E, as well as the Jura turnstile gate close to Building 33. It will not be possible to leave via the CERN reception area in Building 33.

Further information

A document containing full details of which services will be maintained, drawn up by the SCE department, is accessible on EDMS to anyone with a CERN account. A list of the services that the IT department expects to keep running can be consulted here. In the event of a blackout, up-to-date information on which services are actually running will be available on the IT service board.

CERN remuneration calendar in 2023

To all members of the personnel in receipt of remuneration from CERN

In 2023, net monthly remuneration will be paid into individual bank accounts on the following dates:

- Wednesday 25 January
- Friday 24 February
- Friday 24 March
- Tuesday 25 April
- Thursday 25 May
- Monday 26 June
- Tuesday 25 July
- Friday 25 August
- Monday 25 September
- Wednesday 25 October
- Friday 24 November
- Thursday 21 December

FAP department

Official holidays in 2023 and end-of-year closure 2023/2024

(In accordance with Articles R II 4.38 and R II 4.39 of the Staff Regulations)

Official holidays in 2023 (in addition to the special leave during the annual closure):

-Monday, 2 January
(compensation granted for 1 January, New Year)
-Friday, 7 April
(Good Friday)
-Monday, 10 April
(Easter Monday)
-Monday, 1 May
(1 May)
-Thursday, 18 May
(Ascension day)
-Monday, 29 May
(Whit Monday)
-Thursday, 7 September
("Jeûne genevois")
-Monday, 25 December
(Christmas)
-Tuesday, 26 December
(compensation granted for 24 December, Christmas Eve)
-Friday, 29 December
(compensation granted for 31 December, New Year's Eve)

Annual closure of the site of the Organization during the end-of-year holiday period:

The Laboratory will be closed from Saturday, 23 December 2023 until Sunday, 7 January 2024 inclusive (without deduction of annual leave). The first working day in the New Year will be Monday 8 January 2024.

Pensions payment dates in 2023

Friday 6 January
Tuesday 7 February
Tuesday 7 March
Thursday 6 April
Monday 8 May
Wednesday 7 June
Friday 7 July
Monday 7 August
Wednesday 6 September
Friday 6 October
Tuesday 7 November
Thursday 7 December

CERN Health Insurance Scheme (CHIS): new Rules as of 1 January 2023

The new Rules of the CERN Health Insurance Scheme (CHIS) came into force on 1 January 2023. The change concerns the addition of Article I. 1.07:
"**I. 1.07 GUARANTEE OF BENEFITS**
CERN guarantees the benefits acquired under the CHIS Rules by the Scheme's Members until the cessation of the rights of the last Member.
In the event of the Organization's dissolution, the CERN Council will take the measures needed to guarantee the rights acquired on the date of dissolution."

Staff rules and regulations - 11th edition: Modification No. 20

In accordance with recommendations made by the Finance Committee and decisions taken by Council in December 2022 (CERN/FC/6630-CERN/3692 and CERN/FC/6631-CERN/3693), please find below the pages of the Staff Rules and Regulations which have been updated further to the modifications coming into force on 1 January 2023:

Cover Page
Preliminary note (modification of page i)
Preamble (modification of pages ii and iv)
Chapter I – General provisions
Section 1 – Staff Rules and Regulations (modification of page 1)
Section 2 – Categories of members of the personnel (modification of pages 2 and 3)
Section 3 – Conduct (modification of pages 4 to 6)
Section 4 – Privileges, immunities and protection (modification of pages 7 and 8)
Section 5 – Intellectual property (modification of pages 9 and 10)
Chapter II – Conditions of Employment and Association
Section 1 – Employment and association (modification of pages 11 to 15)
Section 2 – Classification and merit recognition (modification of pages 16 to 18)
Section 3 – Learning and development (modification of pages 19 and 20)
Section 4 – Leave (modification of pages 21 to 27)
Section 5 – Termination of contract (modification of pages 28 and 29)
Chapter III – Working Conditions
Section 1 – Working hours (modification of pages 30 to 32)
Section 2 – Safety (modification of pages 35 and 36)
Chapter IV – Social Conditions
Section 1 – Family and family benefits (modification of pages 37 and 38)
Section 2 – Social insurance cover (modification of pages 39 and 40)
Chapter V – Financial Conditions
Section 1 – Financial benefits (modification of pages 41 to 47)
Section 2 – Taxation (modification of pages 48 and 49)
Chapter VI – Settlement of disputes and discipline
Section 1 – Settlement of disputes (modification of pages 50 to 54)
Section 2 – Discipline (modification of pages 55 to 58)
Chapter VII – Relations with the personnel, (modification of pages 59 and 60)
Chapter VIII – Final provisions, (modification of page 61)
Annex A 1 - (modification of pages 62 to 64)
Annex R A 1 - (modification of page 66)
Annex R A 2 - (modification of page 67)
Annex R A 3 - (modification of page 68)
Annex R A 4 - (modification of pages 69 and 70)
Annex R A 5 - (modification of page 71)
Annex R A 6 - (modification of page 72)
Annex R A 7 - (modification of page 73)
Annex R A 8 - (modification of page 74)
Annex R A 9 - (modification of page 75)
Annex R A 10 - (modification of page 76)
Annex R A 11 - (modification of pages 77 and 78)

The complete updated electronic version of the Staff Rules and Regulations is accessible via CDS (https://cds.cern.ch/record/1993099?ln=en).

Operational Circular No. 5 (Rev.1) – Use of CERN computing facilities

Operational Circular No. 5 (Rev.1) entitled “Use of CERN computing facilities”, approved by the Director-General, is now available via the following link.

This revision cancels and replaces Operational Circular No. 5 entitled “Use of CERN computing facilities” dated October 2000.

In line with the Organization’s commitment to diversity and inclusion in the workplace, the

proposed modifications, of an editorial nature only, are as follows:

- to rephrase all articles containing “he”, “his” and “him” with gender-neutral formulations.
- to replace all words or phrases considered outdated with words / phrasing consistent with the times and with other recently revised administrative and operational circulars.

As always, each proposed new formulation is drafted in such a way that the legal integrity and substantive intent of each article is maintained.
The revised Circular will enter into force on 1 January 2023.

Amendment to Safety Code E: “Fire protection”

Integrating installation of axial-feed hose reels

Safety Code E, “Fire Protection”, was published in 1995. Article 3.2.2 of Annex VI concerning “Extinguishing appliances usable by those on the spot” stipulates that: “At least one axial-feed hose reel (referred to as robinet d’incendie armé (RIA) in France and poste incendie in Switzerland) must be fitted in any building with a wall 40 m or more long”.
This requirement is no longer in line with the Host States’ fire safety regulations* and has been subject to repeated requests for clarifications and derogations at CERN. Safety Code E is currently under revision and will be replaced by a fire safety rules cluster in the coming years. In the meantime, article 3.2.2 of Annex VI of Safety Code E has been amended, complete with a descriptive table, as follows: “Axial-feed hose reels shall be installed if required, following a fire risk assessment carried out by the Department or Large Experiment concerned, in accordance with the guidelines below [see table]. Such risk assessments shall be submitted to the HSE Unit for approval.”
This amendment entered into force on 6 December 2022 and can be consulted here. It does not apply to CERN buildings open to the public, for which article 6.2.3 of Safety Code E continues to apply.
For any further clarification, please contact the HSE Fire Safety Engineering team at hse-fset@cern.ch

**Cf. French Décret n° 2008-244 du 7 mars 2008 and, in particular, article R4227-30 of the Code du Travail (https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000018532077) and changes made to Swiss AEAI norms and directives in 2015.*

Annual adjustments to financial benefits with effect from 1 January 2023

In accordance with recommendations made by the Finance Committee and decisions taken by Council in December 2022, the following financial benefits have been adjusted, with effect from 1 January 2023:
A 2.38% increase to the scale of basic salaries paid to Staff Members and to the scale of stipends paid to Fellows and Graduates (Annexes R A 5 and R A 6 of the Staff Regulations).
A 2.68% increase to the subsistence allowances (Annex R A 7 of the Staff Regulations), family, child and infant allowances (Annex R A 3 of the Staff Regulations) and to payment ceilings of education fees (Annex R A 4 of the Staff Regulations)
The index of 11.02% for home leave has already been applied as of June 2022.
The new ceiling of education fees will be applied to the entire school year 2022-2023.

The amended text of the Staff Regulations is available on the Web at: CERN Staff Rules and Regulations (https://cds.cern.ch/collection/Staff%20Rules%20and%20Regulations?ln=en).

Implementation procedure for the 2023 crisis levy

For staff members only

In accordance with the decisions taken by the Council at its Session in December, a crisis levy of 2.5% will be applied to staff members' basic salaries in 2023 and compensated by five days of annual leave that must be taken in 2023. The implementation procedure can be found in the Admin e-guide, at https://admin-eguide.web.cern.ch/en/procedure/crisis-levy.
The members of the personnel concerned are deemed to have taken note of this information.

CERN Health Insurance Scheme (CHIS) – Monthly contributions as of 1 January 2023

As the CHIS contribution rates are unchanged for 2023, the CHIS contributions have evolved with the change in the relevant Reference Salary (see Chapter XII of the CHIS Rules). Thus, as of 1 January 2023, the lump-sum monthly contributions based on Reference Salary II will be as follows:
Lump-sum contributions for voluntary members
The monthly contribution for voluntary members (e.g. users and associates) with the normal health insurance will be 1 268 CHF per month, whilst for those with the reduced health insurance it will be 634 CHF.

Lump-sum contributions for post-compulsory members other than beneficiaries of the CERN Pension Fund
For post-compulsory members other than beneficiaries of the CERN Pension Fund, the monthly contribution will be 1 354 CHF in the case of former staff members who have chosen a deferred pension and former spouses continuing their affiliation, whilst in the case of formerly dependent children continuing theirs it will be 542 CHF.

HR department

Entering and living in Switzerland: new in 2022

The guidelines concerning the issuance of legitimation cards to the staff of international organisations (see https://www.eda.admin.ch/content/dam/mission-onu-omc-aele-geneve/en/documents/Lignes-directrices-Organisations-internationales_EN.pdf) are updated regularly. The latest updates are as follows:

Entering Switzerland (point 3 of the guidelines)
"Third-country nationals"* who hold:
a valid residence permit issued by a Schengen country**

and a valid recognised travel document
are no longer required to obtain a visa if they are travelling to Switzerland to take up employment or join their family.
The same rule applies to those who hold a valid D-type visa issued by a Schengen country and a valid recognised travel document.
Australian citizens are exempt from the obligation to obtain a long-stay visa to take up employment or join their family in Switzerland.

Dependent spouses and relatives in the ascending line (point 2.6 of the guidelines)
Type-H legitimation cards are now issued to dependent spouses and relatives in the ascending line, for an initial duration of three months from the date of entry into Switzerland, and are subsequently renewed for one year. This period is designed to allow them to complete the necessary formalities with respect to health insurance, social insurance and taxation in Switzerland.

Foreign nationals holding a Swiss residence permit (point 4.1 of the guidelines)
Members of the personnel who have exchanged their Swiss residence permit for a legitimation card may recover their permit at the end of their period of service. In addition, the number of years they have spent in Switzerland as holders of a legitimation card since 15 December 2021 only are taken into consideration in determining their right to a C permit (settlement permit). This entitlement does not apply to family members, who can opt to retain their Swiss residence permit when the member of the personnel takes up employment.

In addition, two information notices have been modified as follows:

Access to the Swiss labour market for family members (Ci permit)
(See
https://www.dfae.admin.ch/missions/mission-onu-geneve/en/home/manual-regime-privileges-and-immunities/introduction/manual-family/access-labour-market-family-staff.html)
An exception to the requirement to live in the same household as the principal beneficiary may be granted where a family member works in a region of Switzerland that is far from the beneficiary's place of residence and daily commuting is therefore impossible. The family member must nonetheless provide a written commitment to return to the beneficiary's home every weekend.
Family members who work from home for an employer based outside Switzerland must also obtain a Ci permit.

Remaining in Switzerland at the end of the period of service
(See
https://www.dfae.admin.ch/missions/mission-onu-geneve/en/home/manual-regime-privileges-and-immunities/introduction/manual-stay/staying-end-functions.html)

Depending on their nationality, the staff of international organisations who meet the conditions for obtaining a C permit (see https://www.ge.ch/demander-permis-c, in French only) may also be required to meet the criteria for successful integration, including language requirements, defined by Swiss legislation (https://www.sem.admin.ch/sem/en/home/integration-einbuergerung/mein-beitrag/zugewandert/sprache.html). Their family members are also subject to this requirement.

Relations with the Host States service
relations.secretariat@cern.ch
www.cern.ch/relations/

**Non-Swiss and non-EU/EEA nationals*
*** See*
https://www.europarl.europa.eu/news/en/headlines/security/20190612STO54307/schengen-a-guide-to-the-european-border-free-zone

Schengen Area – Entry, stay and exit – Documents required – Reminder

When crossing a border to enter or leave the Schengen Area, as well as when travelling from one country to another within the Schengen Area (including crossing the local borders between the canton of Geneva and the départements of Ain and Haute-Savoie), it is essential to carry an identity document (e.g. passport) that is recognised by the country you are entering. Unless they are specifically exempt, all nationals of countries other than the Member States of the European Economic Area and Switzerland must also carry a valid residence permit (residence or settlement permit issued by a Schengen state or passport containing a Schengen visa). In the absence of these documents, entry into the country concerned may be refused.

As is the case for everyone travelling within the Schengen Area, members of the CERN personnel may be subject to an identity check and must be able to present a recognised identity document.

The carte de légitimation issued by the Swiss Federal Department of Foreign Affairs and the titre de séjour spécial issued by the French Ministry for Europe and Foreign Affairs are residence permits, not identity documents. They allow travel within the Schengen area for up to a maximum period of three months (90 days). Official specimens of the documents are available at:

https://www.sem.admin.ch/dam/data/sem/rechtsgrundlagen/weisungen/visa/vhb/sh-anh20p2-f.pdf and https://www.consilium.europa.eu/prado/fr/prado-documents/FRA/H/D/docs-per-type.html.

When leaving the Schengen Area, nationals of countries other than the Member States of the European Economic Area and Switzerland who hold those documents must check that they are valid for the duration of their stay outside the Schengen Area. If the documents have expired or you are unable to present them, you may be refused entry on your return.

In case of difficulties at the borders, immigration authorities of the Schengen area may contact:

for Switzerland, the International Security Police at Geneva Airport, tel. +41 22 427 58 30 (until midnight) or tel. n° +41 22 427 92 20 (24 hours a day);

for France, the Protocol of the Ministry for Europe and Foreign affairs, tel. +33 (0)1 53 69 30 20 (diplomatic privileges and immunities) / +33 (0)1 53 69 37 69 (consular privileges and immunities), on working days and hours.

More information on:

https://www.dfae.admin.ch/missions/mission-onu-geneve/en/home/manual-regime-privileges-and-immunities/introduction/manual-visas/schengen-visas-entry-exit-travel.html (§7)

https://www.diplomatie.gouv.fr/en/the-ministry-and-its-network/protocol/ (part II, chapter 1)

Host-States Relations Service

Extension of the pre-retirement programmes

Following a recommendation by the Standing Concertation Committee at its meeting on 22 November 2022 and approval by the Director-General, please note that:

the Part-Time Work as a Pre-retirement Measure Scheme and the Progressive Retirement Programme have been extended by one year, from 1 January 2023 until 31 December 2023.

Further information is available on the following links:

Progressive retirement programme: https://admin-eguide.web.cern.ch/en/procedure/progressive-retirement-programme-prp

Part-time work as a pre-retirement measure: https://admin-

eguide.web.cern.ch/?destination=/en/procedure/part-time-work-pre-retirement-measure-ptp&check_logged_in=1

Announcements

Courier Webinar: "SLAC at 60: past, present, future" - 17 January

Join the audience for a live CERN Courier webinar at 4 p.m. Central European Time on 17 January 2023 to celebrate 60 years of SLAC.
This year, SLAC celebrates its remarkable past while continuing its quest for a bright future. This presentation takes a look at how it all started with the lab's two-mile-long linear accelerator and accompanying groundbreaking discoveries in particle physics; explores how the lab's scientific mission has evolved over time to include many disciplines ranging from X-ray science to cosmology; and discusses the most exciting perspectives for future research, from developing new quantum technology to pushing the frontiers of our understanding of the universe on its largest scales.
To find out more and to register, visit the CERN Courier's website. (https://cerncourier.com/a/slac-at-60-past-present-future/)

Alumni event on 19 January: R1 Talk with Elias Noschis on Bitcoin

Is bitcoin the future of money or a fad?
This talk ("Bitcoin: the new Amazon or Netscape of 1994?") will explain what bitcoin is, how it compares to other forms of money and cryptocurrencies and, for those who dare, how to invest in it.
19 January 2023 6 p.m. - 7 p.m.
Online - Register to receive Zoom details

About the speaker: Elias Noschis holds a Ph.D. in physics and an MBA. He has been working for the semiconductor, watchmaking, automotive and financial industry. He has been investing privately for almost a decade and is eager to share his insights.
Find out more on the CERN Alumni website. (https://alumni.cern/events/101011).

Courier Webinar: "The axion search programme at DESY" - 26 January

Join the audience for a live webinar at 3 p.m. on 26 January 2023 exploring the ongoing axion search activities at DESY.

The worldwide interest in axions and other weakly interacting slim particles (WISPs) as constituents of a dark sector of nature has strongly increased

over the last years. A vibrant community is developing, constructing and operating corresponding experiments, so that most promising parameter regions will be probed within the next 15 years.
Many of these approaches rely on WISPs converting to photons. At DESY in Hamburg,

larger-scale projects are pursued: the “light-shining-through-a-wall” experiment, ALPS II in the HERA tunnel, will start data taking soon. The solar helioscope BabyIAXO is nearly ready to start construction, while the dark matter haloscope MADMAX is in the prototyping phase.
This webinar will introduce the physics cases and focus on the axion search activities ongoing at DESY.
To find out more and to register, visit the CERN Courier's website (https://cerncourier.com/a/the-axion-search-programme-at-desy/).

CERN Accelerator School: RF for Accelerators | 18 June - 1 July 2023

Registration is now open for the CERN Accelerator School’s course on "RF for Accelerators", 18 June – 1 July 2023, Berlin, Germany. This course is organised in collaboration with the Helmholtz-Zentrum Berlin (HZB).
This unique 2-week residential course will mainly be of interest to staff in accelerator laboratories, university departments or companies involved in producing RF equipment for accelerators. The course will include a review of the RF technology presently used in the field of particle accelerators as well as a recapitulation of the theoretical fundamentals.
Different RF equipment and RF technologies will be discussed along with their practical applications for various types of accelerators. Dedicated "hands-on" afternoon courses and seminars will complete the programme.
Due to the afternoon courses the maximum number of participants will be limited. The principle of "first come first served" will be applied.
For more information and to register, visit this Indico page: https://indico.cern.ch/event/1212689/

How can particle accelerators address environmental issues? A 10-day challenge for multidisciplinary teams of young people!

We invite students to take part in an EU-funded challenge to imagine new multidisciplinary solutions to address environmental issues by using particle accelerators. This challenge will be tackled by multidisciplinary teams invited to stay, all expenses covered (*), for 10 days at the European Scientific Institute (ESI) on the France-Geneva border.
Some particle accelerators such as the Large Hadron Collider (LHC) at CERN are the largest scientific tools on Earth. But beyond driving large scientific discoveries, many smaller accelerators are used in medicine to cure cancer and they also have many other applications in our daily lives.
For 10 days, students with different academic backgrounds will join teams of six to imagine innovative solutions on how can particle accelerators be used to tackle environmental challenges. On the 10th day, they will present their work to a jury of experts at CERN.
To help in this task, students will be offered high-level seminars on particle accelerators, on environmental challenges and on innovation as

well as a stimulating environment to discuss these issues.
This initiative is put forward by the I.FAST project, funded by the European Union's Horizon 2020 research and innovation programme. It stems from the historic collaboration between the ESI, CERN and others partners to run the Joint Universities Accelerator School.
More details can be found at: http://www.ifast-cbi.particle-accelerators.eu
Who can apply?
Applications are welcome from all applicants. Preference will be given to students in the second cycle of university studies (typically between the 3rd and 5th year of university) and priority will be given to those studying in universities located in countries members of I.FAST (see list at: https://ifast-project.eu/participants).
Language:
All activities will be held in English.

How to apply?
To apply fill the form at: http://www.ifast-cbi.particle-accelerators.eu/application/

Application deadline:
The application form has to be submitted before Monday 28 February 23:59, Geneva time.

Calendar:
28 February 2023: Application deadline
1 May: Successful applicants are notified.
3 July: Online meeting, "Getting to know each other".
5-22 July: Series of online seminar to learn about accelerators and their environmental applications.
25 July - 3 August: Stay at the European Scientific Institute in Archamps (including a visit at CERN).
3 August: Presentation at CERN and award ceremony.

* Travel expenses in economy class will be reimbursed within a limit of €300.

This project has received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement No 101004730.

The January/February issue of the CERN Courier is out

The ambitious Phase II upgrades of the ATLAS and CMS detectors, necessary to deal with the tenfold increase in data to be delivered by the High-Luminosity LHC, are pushing detector technologies to new heights. This issue (https://cds.cern.ch/record/2845914) also looks back on the discovery of the W and Z bosons and on the origins of the SESAME light source, showcases the latest applications of accelerator technology in radiotherapy and aviation, and reports on the latest results from LHCb concerning the flavour anomalies.

Obituaries

Rémi Voirin (1990 – 2022)

We are deeply saddened to announce that Mr Rémi Voirin died on 23 December 2022.Rémi Voirin, born 26 July 1990, worked in the Beams department and had been at CERN since 1 December 2017.
The Director-General has sent a message of condolence to his family on behalf of the CERN personnel.

Social Affairs service
Human Resources department

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Rémi started working at CERN just over 5 years ago, as a Computing Infrastructure Engineer in the Beams Controls group. With his friendly attitude and engineering talent, he quickly made a very positive impression and went on to contribute to the support and development of mission critical and strategic aspects of the Controls for CERN's particle accelerator complex. He forged many positive and meaningful collaborations with hundreds of colleagues from across CERN.
Aside from work, Rémi developed strong friendships and embarked on many activities, including aviation, stand-up paddle, and running. He recently completed a "Mud Day" run with his CERN friends, and was preparing for the Geneva half-marathon in May.
Before the year-end closure, Rémi expressed how much he enjoyed his work, how he loved being part of the BE-CSS-ISA team, and a member of the BE-CSS group. We can say without any doubt that the feelings that Rémi expressed towards CERN were strongly reciprocated by everyone he came into contact with. Rémi was a beautiful person and an outstanding engineer. He has gone too soon and we will always miss him.

Rémi would not want us to be sad at his passing, so we should remember all of the good moments and his positive contributions towards CERN's mission. Looking forward, BE-CSS will build on the solid technical foundations that Rémi laid out for the future of Controls infrastructure, and in doing so, continue to honor his hard work and dedication.
Thank you for everything, Rémi, and rest in peace.

His friends and colleagues

Ombud's corner

Mutual learning: let's give it a chance in 2023!

As 2023 starts, let me wish you all a great year and assure you all of my support!

The CERN community is very keen – and rightly so – to underline that collaboration is in our DNA. This is something that I am particularly proud of, having worked all these years in a Laboratory that places collaboration first, in the pursuit of such a noble fundamental research mission.

Collaboration is indeed a requirement to solve today's global challenges, whether scientific, technical, economic, environmental or societal. It is only by working together that we can design solutions.

Working together in a group, team or unit is not always easy. The visitors to my office share with me, from their perspective, situations that sometimes make me think I'm watching a "CERNFLIX"* series… Huge egos, uncompromising divas, fierce competition, false promises, abuse of power, lack of respect, theft of ideas, plots against each other, etc., all seem to take place in our Laboratory and may severely undermine collaboration.

In his great book, The Skilled Facilitator, Roger Schwarz opposes two mindsets: one, which undermines effective collaboration, is referred to as unilateral control. The other mindset, which enhances effective collaboration, is mutual learning. Although the author proposes this model in the context of facilitating group discussions, I think it works remarkably well to improve collaboration.

I'd like to share with you how, by choosing to operate in our team, group, section, etc., from a mutual learning mindset, each of us can enhance collaboration and, just as importantly, boost our well-being.

Let's start with the unilateral control mindset. If, within your team, you operate from a unilateral control mindset, you would generally act on the following principles:

. Win, don't lose, whatever the cost.

. Be right, always.

. Minimise any expression of negative feelings.

. Always act rationally.

You would also, consciously or not, make the following assumptions:

. I understand the situation, those who disagree with me don't.

. I'm right and those who disagree with me are wrong.

. I have pure motives; those who disagree with me have questionable motives.

. My feelings and behaviour are justified.

. I'm not contributing to the problem.

As a combination of those principles and assumptions, the chances are that you would also demonstrate the following behaviours within your team:

. State your views without asking for other's views.

. Withhold relevant information.

. In meetings, speak in general terms and don't agree on what important words mean.

. Keep your reasoning private and not ask others about their reasoning.

. Focus on positions, not on interests.

. Act on untested assumptions and inferences as if they were true.

. Control the conversation.

. Avoid, ease into or save face on difficult issues.

The bad news is that this unilateral control mindset will have a negative impact on your and your team's work, whether in terms of performance (low-quality decisions, less innovation), working relationships (decreased trust, reduced learning and unproductive conflicts) or even your personal satisfaction (reduced motivation, increased stress).

We all operate from this ineffective mindset from time to time, as no one is perfect and we have created habits in our way of working together. Also, admittedly, this mindset may have served our objectives in the past, at least in the short term.

Still, a unilateral control mindset undermines the collaboration spirit that we are so proud of. So, why not take a hard look at this and try to shift our mindset to a mutual learning one?

If, within a team, you operate from a mutual learning mindset, then you would put into practice the following values:

. transparency and curiosity,

. informed choice and accountability,

. and, very importantly, empathy and compassion.

In line with these values, you would make the following much more useful and productive assumptions:

. I have information, so do other people.

. Each of us see things that others don't.

. People may disagree with me and still have pure motives.

. Differences are opportunities for learning.

. I may somehow be contributing to the problem.

Naturally, if you combine these values and assumptions, you would demonstrate these collaborative behaviours:

. State views and ask genuine questions.

. Share all relevant information.

. Use specific examples and agree on what important words mean.

. Explain your reasoning and intent.

. Focus on interests and not on positions.

. Test assumptions and inferences to make sure they're correct.

. Jointly design the next steps with your colleagues.

. Discuss undiscussable issues.

The benefits of consciously choosing the mutual learning mindset are huge, in terms of both performance (high-quality decisions and greater innovation, shorter implementation time) and working relationships with others (greater commitment and trust, reduced defensiveness, productive conflicts, healthy dependence on others).

Moreover, you'll see the effects of this mindset on your individual well-being – with renewed motivation, increased satisfaction and reduced stress.

Let's give it a chance it in 2023 and, if you're in doubt about how to apply it to a specific situation, don't hesitate to contact the Ombud. It will be a pleasure to discuss it with you – in the spirit of mutual learning!

Laure Esteveny