

SUPERCONDUCTING MAGNETS OF THE FUTURE IN THE MAKING AT CERN

The latest CERN Courier details the promises and challenges of the new superconducting magnets being developed for increasing accelerator's energy and luminosity



A niobium-tin cable (Nb₃SN), showing the single strands, partially unwrapped (Image: Maximilien Brice/CERN)

Over the past thirty years, the exploration of the infinitely small has gone hand-in-hand with advances in superconducting magnets. The increasingly powerful hadron colliders, from the Tevatron, commissioned in 1983, to the LHC in 2008, have led to spectacular discoveries thanks to superconducting magnets used on an unprecedented scale. Accelerator experiments, pioneering the use of superconducting magnets, have also benefited from superconductivity, while stimulating their developments.

The experiments and accelerators have so far used the niobium-titanium composite

material, whose performance limits have been reached with the LHC. Increasing the luminosity or energy of the colliders requires higher magnetic fields and, therefore, new superconductors. This is the path that CERN has embarked on with the High-Luminosity LHC, developing magnets based on the niobium-tin compound that generate stronger fields.

The May/June issue of the *CERN Courier* devotes its cover and a feature article to developments in superconducting magnets.

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SUPERCONDUCTING MAGNETS OF THE FUTURE IN THE MAKING AT CERN

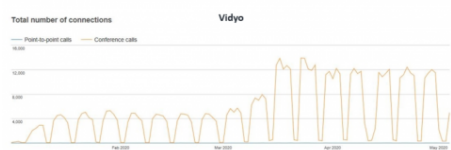
Luca Bottura, Head of CERN's Magnets, Superconductors and Cryostats Group, reports on the progress of superconductor technology, the promises and challenges of niobium-tin for the HL-LHC and the FCC, and, beyond that, the potential of high-

temperature superconductors. With several niobium-tin magnets undergoing tests or ready for installation, and major developments in progress, CERN is a pioneering laboratory in this technological adventure.

Read the feature article: Taming the superconductors of tomorrow (<https://cerncourier.com/a/taming-the-superconductors-of-tomorrow/>).

THE IT DEPARTMENT: ARCHITECTS OF CONTINUITY

Between keeping infrastructure up-to-date and ensuring optimum working conditions, the information technology services have had a lot on their plates



Evolution of the use of the Vidyo service over the lockdown period

It might seem unnecessary to remind you of the importance of IT systems to an organisation like CERN. These systems are required not only to process the data supplied by the experiments, but also for the smooth running of the activities of all CERN's departments, from engineering to administration and human resources. For the last two months, the IT department, which is responsible for all of these services, has in addition been ensuring the continuity of CERN's activities by providing the community with the infrastructure and connections that allow us to work remotely. Let's take a look at what that means for the day-to-day work of the 310 or so members of the department.

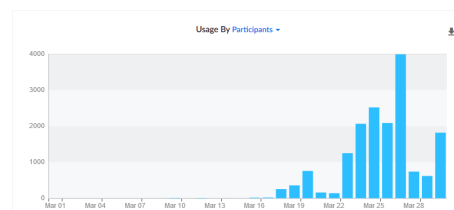
Frédéric Hemmer, head of the IT department, is satisfied that CERN was as prepared as it could have been for the lockdown, but the situation has drastically increased the workload of those in his department. Fortunately, the needs of the particle physics community, with scientists scattered around the world, have long required CERN to have the appropriate licences to hold videoconferences attended simultaneously by hundreds of people.

Nevertheless, the explosion in demand for videoconferences, which has quadrupled, has really put the IT department's systems and personnel to the test. They have had to add new servers, install systems allowing scientists to remotely access their workstations at CERN and renegotiate contracts with telecommunications operators and suppliers of audio-video services (the introduction of the Zoom videoconferencing app to the community had to be fast-tracked). And all this came in addition to the usual work to fix bugs and other IT problems. Frédéric Hemmer also emphasises that the resolution times for IT problems raised by personnel have accelerated.

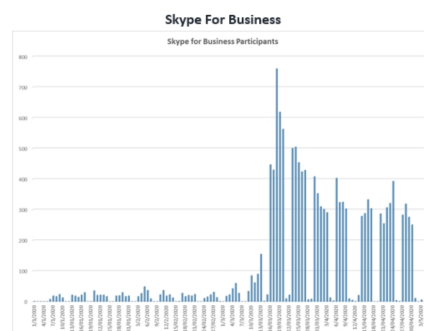
Most members of the department are working remotely. The constraints of IT services require some to work outside normal hours, for example at the weekend to install new licences while the rest of us are offline. In parallel, the helpdesk technicians have remained on-site at CERN to ensure the continuity of IT services. Every Monday and Wednesday morning at 6.30 a.m., technicians and engineers have been coming in to replace ageing routers: an essential job that involves more restrictions than usual at present.

The workload involved in keeping the IT systems afloat comes on top of the IT department's ongoing projects. The renewal of servers in the CERN Data Centre and of the Laboratory's stock of laptop computers, as well as work to make the Main

Auditorium ready for action are essential projects. Happily, according to Frédéric Hemmer, this work hasn't gone unnoticed: "Our department is used to working in the shadows. This period has given our work new prominence and that can only be a good thing. We are also conscious of the critical role we have to play during this difficult period."



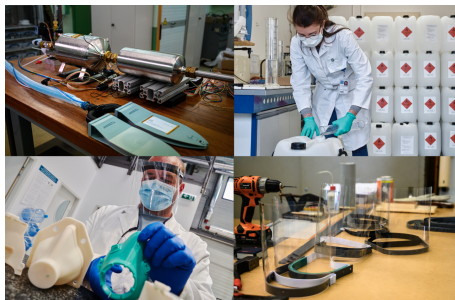
Evolution of the use of the Zoom app in March 2020



In total, across all systems, videoconference connections quadrupled during Stage 3 of CERN's COVID-19 response

CERN AGAINST COVID-19 SEMINAR

Members of the CERN against COVID-19 Task Force presented the work of the Task Force in an online seminar on 20 May



Equipment developed at CERN as part of the CERN against COVID initiative. Clockwise from top left: High-Energy Ventilators, sanitizer, face shields, 3D-printed masks (Image: CERN)

Established at the end of March, the CERN against COVID-19 Task Force was charged with coordinating the efforts of the CERN community in the fight against the COVID-19 coronavirus. Since then, the work of the group has been organised largely into three strands: Medical devices, IT initiatives and Support to society.

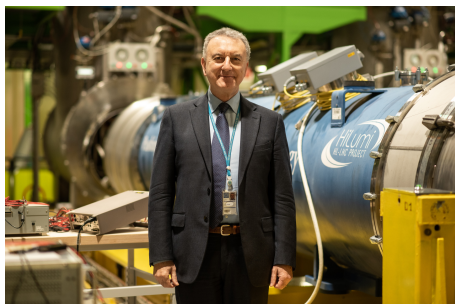
overview of the impressive amount of work that has been carried out in the fight against COVID-19 by some 150 members of the CERN community.

If you wish to consult the slides of the presentation, you will find them here: <https://indico.cern.ch/event/916953/>.

Following a welcome by the Director General and an introduction from Task Force Chair, Beniamino Di Girolamo, Task Force members gave a comprehensive

LUCIO ROSSI RECEIVES A PRIZE FROM THE EUROPEAN PHYSICAL SOCIETY

The High-Luminosity LHC project leader has been awarded the EPS-AG Rolf Widerøe Prize for his major contributions to the field of applied superconductivity for accelerators



Lucio Rossi in front of one of the new superconducting dipole magnets for the High-Luminosity LHC being tested in the SM18 hall (Image: Michael Struik/CERN)

The accelerator group of the European Physical Society (EPS-AG) announced the winners of its 2020 prizes during the International Particle Accelerator Conference (IPAC'20), organised by the GANIL laboratory in Caen, France, which took place remotely.

Lucio Rossi, the leader of the High-Luminosity (HL-LHC) project, was awarded the EPS-AG Rolf Widerøe Prize for his outstanding contributions to the accelerator field. The jury recognised his “pioneer-

ing role in the development of superconducting magnet technology for accelerators and experiments, its application to complex projects in High Energy Physics, including strongly driving industrial capability, and for his tireless effort in promoting the field of accelerator science and technology”.

Having begun his career in plasma physics, Lucio Rossi moved into the field of applied superconductivity for accelerators in the early 1990s. He contributed to the development of the superconducting magnets for the superconducting cyclotron at INFN Catania, the solenoid magnet of the ZEUS experiment at DESY's HERA accelerator and the ATLAS superconducting toroid magnet. He headed the INFN-LASA team, which in 1990 began work on the first prototype superconducting dipole magnet for the LHC, which was delivered to CERN in 1994.

In 2001, he became the leader of CERN's Superconducting Magnets and Cryostats group, which was responsible for developing and launching the industrial production of the superconducting magnets needed

for the LHC. No less than 300 000 km of superconducting wire had to be produced for the 1700 or so main superconducting dipole and quadrupole magnets and for the several thousand corrector magnets, whose manufacture involved the transfer of complex technology to industry. With tireless energy, unfailing optimism and contagious passion, he led his team to meet that challenge, surely one of the most epic feats in CERN's history.

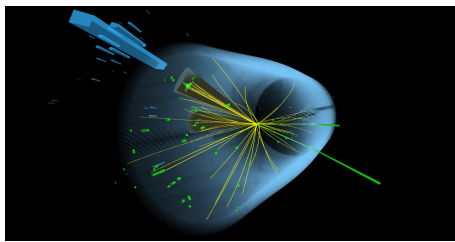
Since 2012, Lucio Rossi has been the leader of the High-Luminosity LHC project, where the complex implementation of niobium-tin superconducting technology poses a fresh challenge for the field. He is also a tireless promoter of science and technology, as the EPS jury recognised in its award citation.

To find out about the other EPS-AG 2020 winners, see the article in the CERN Courier (<https://cerncourier.com/a/eps-announces-2020-accelerator-awards/>).

Corinne Pralavorio

THE HIGGS BOSON: WHAT MAKES IT SPECIAL?

Our second story in the LHC Physics at Ten series visits the LHC's most important discovery so far



(Image: CMS Collaboration/CERN)

As a layman I would now say... I think we have it.

"It" was the Higgs boson, the almost-mythical entity that had put particle physics in the global spotlight, and the man proclaiming to be a mere layman was none other than CERN's Director-General, Rolf Heuer. Heuer spoke in the Laboratory's main auditorium on **4 July 2012**, moments after the CMS and ATLAS collaborations at the Large Hadron Collider announced the discovery of a new elementary particle, which we now know is a Higgs boson. Applause reverberated in Geneva from as far away as Melbourne, Australia, where

delegates of the International Conference on High Energy Physics were connected via video-conference.

So what exactly is so special about this particle?

Read the latest feature in the "LHC Physics at 10" series (<http://news/series/lhc-physics-ten/higgs-boson-what-makes-it-special>) to find out.

Achintya Rao

Official communications

HUMAN RESOURCES DEPARTMENT: 2018-2019 ANNUAL REPORT ON THE SETTLEMENT OF DISPUTES AND DISCIPLINE

The 2018-2019 Annual Report from the HR Department concerning the settlement of disputes and discipline under Chapter VI of the Staff Rules and Regulations

The Organization is committed to a fair and respectful work environment. Behavioural concerns or administrative disputes brought to the attention of the Organization are addressed in a timely manner using, whenever possible, informal resolution mechanisms such as mediation. In cases where informal resolution is not achievable or appropriate, the Organization or the member of personnel concerned may decide to initiate formal proceedings under the Organization's settlement of disputes procedure or conduct-related frameworks, as applicable¹. This report provides an overview of the cases handled under Chapter VI of the Staff Rules and Regulations.

Introduction

The Annual Report under Chapter VI ("Settlement of Disputes and Discipline") of the Staff Rules and Regulations serves to report on:

- requests for review;

- internal appeals;
- cases in which disciplinary action was taken; and
- complaints before the Administrative Tribunal of the International Labour Organization (ILOAT).

Requests for review and internal appeals

Under Article S VI 1.01 of the Staff Rules, members of the personnel may challenge an administrative decision by the Director-General where it adversely affects the conditions of employment or association that derive from their contract or from the Staff Rules and Regulations.

If permitted by the Staff Rules and Regulations, a decision may be challenged internally within the Organization:

- through a review procedure; or
- through an internal appeal procedure. In this case, the Joint Advisory Appeals Board (JAAB) shall be con-

sulted by the Director-General prior to taking any final decision on the merits.

Disciplinary Action

Under Article S VI 2.01 of the Staff Rules, the Director-General may take disciplinary action against members of the personnel who, whether intentionally or through carelessness, are guilty of a breach of the Rules and Regulations or of misconduct that is to the detriment of the Organization.

Article S VI 2.02 of the Staff Rules stipulates that, having regard to the gravity of the breach or misconduct in question, the disciplinary action shall be:

- a warning;
- a reprimand;
- suspension without remuneration or pay for a period not exceeding six months;
- downward adjustment of the staff member's salary;

- demotion;
- dismissal.

The Director-General shall consult the Joint Advisory Disciplinary Board (JADB) prior to taking any disciplinary action other than a warning or a reprimand (Article S VI 2.04 of the Staff Rules). In cases of particular serious misconduct, the Director-General may decide to dismiss without notice and without consulting the JADB (Article S VI 2.05 of the Staff Rules).

Complaints before the Administrative Tribunal of the International Labour Organization (ILOAT)

A decision may be challenged externally by filing a complaint before the ILOAT:

- when internal procedures have been exhausted and the decision is final;
- when an internal challenge is not permitted by the Staff Rules and Regulations; or
- when the complainant is authorised to proceed directly to the Tribunal.

Requests for review :

From 1 January to 31 December 2018, there were four requests for a review of administrative decisions taken by the Director-General:

- One staff member requested a review of the decision to qualify their performance as “fair” for the reference year 2017. This decision was maintained.
- One staff member requested a review of the decision to qualify their performance as “insufficient” for the reference year 2017. This decision was maintained.
- One staff member requested a review of the decision not to grant reimbursement of medical expenses at 100% (occupational rate). The reimbursement had been declined on the basis that the accident in question had been consolidated for a period of more than 10 years. The decision was maintained. The staff member also requested the payment of an additional indemnity for further permanent deterioration of physical health due to a relapse, however this element was not considered applicable.

- One staff member requested a review of the decision for them to be reassigned to new functions within the same department, entailing a change of supervisor and objectives. This request was deemed inadmissible.

From 1 January to 31 December 2019, there were seven requests for a review of administrative decisions:

- One staff member requested a review of the decision to request partial reimbursement of education fees that had been erroneously granted by the Organization. The impugned decision was cancelled.
- One staff member requested the review of the decision to be reassigned to another position within their department. The reassignment decision was confirmed.
- One staff member requested a review of the decision to refuse their request for a career review. The refusal was on the basis that the functions and activities had not changed significantly in the short period since the staff member's previous review. This decision was maintained.
- Three staff members requested a review of the decision to qualify their performance as “fair” for the reference year 2018. Two decisions were maintained; one request was deemed inadmissible.
- One staff member requested a review of the decision, taken in the context of a professional illness classification, concerning the illness consolidation date and the indemnity rate for deterioration of physical health. The decision has been suspended pending a procedure for the settlement of a dispute of a medical nature.

Internal appeals (Joint Advisory Appeals Board (JAAB)) :

During the period from **1 January to 31 December 2018 :**

- Final decisions were taken regarding the 14 internal appeals introduced against the decisions taken by Council in 2015 (as a result of the five-yearly review of financial and social conditions) to modify the career structure and salary grid and the corresponding individual administrative decisions. The Director-General de-

cided to follow the recommendation of the JAAB to reject the appeals.

- A final decision was taken concerning an appeal introduced by a staff member in 2017 against the decision to qualify their performance as “fair” for the reference year 2016. The Director-General decided to follow the recommendation of the JAAB to reject the appeal.
- An appeal was introduced by a staff member against the decision, further to a career review, not to award a promotion or change of benchmark job. The Director-General decided to follow the recommendation of the JAAB to reject the appeal.
- An appeal was introduced by a staff member against the refusal to grant reimbursement of medical expenses at 100% (occupational rate). The reimbursement had been declined on the basis that the accident in question had been consolidated for a period of more than 10 years. The staff member also requested the payment of an additional indemnity for further permanent deterioration of physical health. By mutual agreement, this appeal was suspended pending the revision of Administrative Circular No. 14. The conclusion is expected in the first half of 2020.

During the period from **1 January to 31 December 2019 :**

- Four staff members introduced appeals against the outcome of their career reviews. The career reviews had been carried out further to a recommendation made in the context of their previous internal appeals. The outcome of these new appeals is expected in the first half of 2020.
- One staff member introduced an appeal against the decision not to be shortlisted in a selection procedure for an indefinite contract position. The Director-General decided to follow the JAAB's recommendation to reject the appeal.
- Two staff members introduced appeals against the decision not to be awarded an indefinite contract at the outcome of a selection procedure. The Director-General decided to follow the recommendation of the JAAB to reject the first of these appeals; the outcome of the second appeal is expected in the first half of 2020.
- One staff member introduced an appeal against the decision not to qual-

ify their commuting accident to the workplace as being of an occupational nature. The outcome of this appeal is expected in the first half of 2020.

- One staff member introduced an appeal against the decision to reject their request for the removal of personal information from their CERN medical file. The outcome of this appeal is expected in the first half of 2020.
- One staff member introduced an appeal against the decision to qualify their performance as “fair” for the reference year 2018. The outcome of this appeal is expected in the first half of 2020.
- One staff member introduced an appeal against the decision to qualify their performance as “insufficient” for the reference year 2018. The outcome of this appeal is expected in the first half of 2020.

Warnings and reprimands :

In 2018 and 2019, the Organization issued four warnings and five reprimands, as follows:

- Three warnings were issued to staff members for their inappropriate use of CERN computing facilities via e-groups to diffuse inappropriate and offensive comments concerning groups or individuals.
- A warning was issued to a staff member for the unauthorised removal and displacement of bicycles belonging to other members of personnel.
- Three reprimands were issued to two users and one technical student further to their unauthorized access to restricted areas of the CERN site, provoking a safety risk and beam interruption.
- A reprimand was issued to a user who provided incorrect registration information regarding their percentage presence at CERN.
- A reprimand was issued to a staff member who made inappropriate and derogatory comments towards a colleague during a meeting in the presence of internal colleagues and external collaborators.

The Joint Advisory Disciplinary Board (JADB) :

In 2018 and 2019, the JADB was convened to examine three cases:

- One disciplinary procedure concerned the diffusion, by a staff member, via e-groups from a CERN computer account of inappropriate and offensive e-mails to colleagues. The Director-General decided to follow its recommendation of a downward salary adjustment of 2% of the grade midpoint.
- One disciplinary procedure followed a fraud investigation in which one staff member and several associated members of personnel were implicated in alleged schemes resulting in, *inter alia*, misappropriation of funds. In relation to the staff member, the JADB considered that the activity in question did not amount to fraud, but did give rise to breach of conduct. The Director-General decided to follow the recommendation of the Board and to issue a reprimand for breach of conduct².
- One procedure was introduced, with regard to a staff member, following the outcome of a harassment investigation. The outcome of the disciplinary procedure is expected in the first half of 2020.

Dismissal notified during the probation period :

In 2018 and 2019, no staff member employment contracts were terminated due to insufficient performance during the probation period (as per Article S II 5.01 g of the Staff Rules).

Particularly serious misconduct :

In 2019, the following actions were taken pursuant to Article S VI 2.05 of the Staff Rules:

- A user's contract of association was terminated further to an investigation by CERN computer security team concerning the User's misuse of the Organization's computer facilities for cryptocurrency mining activities.
- A user's contract of association was terminated further to an investigation by CERN computer security team concerning the misuse of the Organization's computer facilities for inappropriate and illegal internet browsing.

In addition, one registration as an external participant was closed due to the use of the Organization's computer facilities for cryptocurrency mining activities.

Additional information :

With regard to the fraud investigation into alleged schemes resulting in, *inter alia*, misappropriation of funds, based upon the facts identified by the investigation, the Director-General decided to take the administrative measure to terminate the contracts of association of three associated members of the personnel.

Complaints before the Administrative Tribunal of the International Labour Organization (ILOAT) :

During the period from **1 January to 31 December 2018 :**

- In March 2018, a former staff member filed a complaint with the ILOAT against the Director-General's decision to terminate their employment at the end of the probation period, due to unsatisfactory performance. The Tribunal's ruling is expected early 2020.
- In November 2018, seven current or former staff members filed individual complaints with the ILOAT against the Director-General's decision to reject their internal appeals:

- all seven complainants challenged CERN's decision to modify the career structure;
- six challenged their classification in the new structure;
- one of the complainants also challenged the decision to qualify their performance as “fair” for the reference year 2016.

The Tribunal's ruling is expected in 2020.

The ILOAT ruled in one case involving the Organization, which had been filed in 2017:

- In a case filed by a former staff member, who is in receipt of a total disability pension, against the decision not to recognise the illness as being of occupational origin, the Organization prevailed on the merits of the case. The Tribunal did, however, identify a procedural shortcoming and awarded a small amount of compensation in respect thereof.

The complainant subsequently, unsuccessfully, sought review of this judgment.

During the period from **1 January to 31 December 2019** :

- In February 2019, a staff member filed a complaint with the ILOAT against the Director-General's decision to follow the recommendation of the Joint Advisory Rehabilitation and Disability Board not to recognize them as having a disability resulting in an incapacity for work. The Tribunal's ruling is expected in late 2020 or early 2021.
- In July 2019, a beneficiary of the Pension Fund filed a complaint

against the Organization, challenging the decision of the Pension Fund Governing Board (PFGB) to reject their internal appeal as time-barred. The matter was subsequently resolved and the complaint withdrawn.

- In August 2019, a beneficiary of the Pension Fund filed a complaint against the Organization, challenging the decision of the PFGB to reject their internal appeal regarding the need to purchase a surviving spouse pension for their spouse, married following retirement, pursuant to Article II 5.09 of the Fund's Rules, as well as the applicable methodology. The Tribunal's ruling is expected in late 2020 or early 2021.

¹ See Chapter VI of the Staff Rules and Regulations on "Settlement of Disputes and Discipline", also OC9 on "Principles and procedures governing complaints of harassment"; OC10 on "Principles and procedure governing investigation of fraud".

² For the outcome of the procedure with regard to the associated members of the personnel, please refer to the 'Additional information' section.

HR Department

Announcements

BACK TO A FORTNIGHTLY CERN BULLETIN

From 27 May onwards, the *CERN Bulletin* will be sent out every two weeks, as it used to be before CERN went into stage 3 in response to the COVID-19 pandemic.

The purpose of publishing a weekly *Bulletin* was to keep in touch with the community

and to provide the most up-to-date information about CERN in a period of great uncertainty and isolation. However, with the restart of activities and the subsequent gradual return of personnel to the CERN sites, the *CERN Bulletin* will return to its normal schedule.

As a reminder, you can access news for the CERN community at any moment on the dedicated page (<https://home.cern/cern-community>) on home.cern.

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REGISTER NOW FOR THE NEUTRINO 2020 ONLINE CONFERENCE

The conference will take place between 22 June and 2 July 2020 and will include both plenary talks and poster sessions

Registration is now open for the Neutrino 2020 online conference. Half-day sessions will take place from Mondays to Thursdays between 22 June and 2 July, and will include both plenary talks and poster sessions. A block schedule is posted on the conference webpage and a detailed agenda will be available soon.

Please note that registration for the online conference is required even if you had previously registered for the in-person event. There is no registration fee to attend. **Please register before June 8.**

Over the past few weeks, we have received 570 poster abstracts for the online conference. Instructions on poster preparation are also now available for presenters on the conference webpage.

We appreciate that everyone is experiencing the present COVID-19 situation in different ways. We look forward to bringing the community together, despite these challenging times, as a chance to talk about neutrino physics and hopefully make some new connections.

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