

Dear Reader,

This Newsletter is intended for all SPS members, researchers, industries, students, interested specialists and physics friends. Feel free to share this Newsletter within your community, and follow this [link](#) if you want to add a person to our mailing list.

If you wish to give your contribution with news or suggestions, please do not hesitate to contact me at: margherita.boselli@cern.ch

Kind regards,

Margherita Boselli

WHAT'S UP IN SWITZERLAND?

Sabine Süsstrunk elected president of the SSC

On August the 12th, the Federal Council [elected Sabine Süsstrunk](#), Professor at the EPFL Faculty of Computer and Communications Sciences, as [President of the Swiss Science Council \(SSC\)](#). She will take over from Gerd Folkers on January the 1st 2021.



Sabine Süsstrunk is full Professor at EPFL, where she leads the Laboratory of Image and Virtual Representation and the Digital Humanities Institute, belonging to the EPFL Humanities College. She is an excellent connoisseur of the Swiss education, research and innovation system, and she is very familiar with the funding instruments and practice in Switzerland.

The SSC is an extra-parliamentary commission, regulated by the Law on the Promotion of Research and Innovation, whose members and president are elected by the Federal Council. It is committed to the continuous improvement of education, research and innovation in Switzerland, and it advises the Federal Council about all matters related to research and innovation policies. SSC currently consists of fifteen members with recognised interdisciplinary expertise in science, vocational training and innovation.

Sabine Süsstrunk, Image from [CSS website](#).

Two EPFL professors won a prestigious quantum research grant

Two professors of the EPFL's School of Basic Sciences, **Nicolas Grandjean** and **Tobias J. Kippenberg**, are listed among eighteen international research teams sharing a **grant for quantum research and innovation**, awarded by the US Air Force Office of Scientific Research.



[Nicolas Grandjean](#) directs the [Laboratory of Advanced Semiconductors for Photonics and Electronics](#); his research explores quantized structures based on emerging semiconductors in both photonics and electronics, from fundamental studies around light-matter interaction in microcavities and nanostructures, to photonic devices such as blue lasers and light-emitting diodes (LEDs). He is mainly interested in III-V nitride

semiconductors, which are promising materials for novel electronic and optoelectronic technologies, e.g. quantum microcavities, quantum dots and nanostructures, photonic crystals, and short-wavelength optoelectronics.

[Tobias J. Kippenberg](#) is the head of the [Laboratory of Photonics and Quantum Measurements](#). His research interest lies in experimental and theoretical photonics, notably high quality-factor (Q) optical microcavities, and their use in cavity quantum optomechanics and frequency metrology. His group is very well known for the discovery of the chip-scale Kerr frequency comb generation, and they observed radiation pressure back-action effects in microresonators, that are now applied into the field of cavity optomechanics.

On the left Professor Grandjean and on the right Professor Kippenberg, image from the [EPFL official press release](#).

CERN publishes its first public Environment Report

On **September the 9th**, CERN releases its first **public Environment Report**, this documents covers the period 2017-2018, and it was prepared according to the Global Reporting Initiative Sustainability Reporting Standards. It describes the current status of CERN's environmental footprint, and it sets the goals for the coming years. This document highlights the CERN's commitment to environmental protection, both in term of development of innovative technologies and in term of minimization of the CERN's research environmental impact. The full press release is available [here](#).



Image from [CERN press release](#).

Geneva high-school students will take part in the Beamline for Schools final event

A team of physics enthusiast students from the "[International School of Geneva](#)" won the [Beamline for Schools](#) 2020 competition, and will take part in the final event, held at DESY, Hamburg, between **September the 23rd and October the 6th**. The team, named "Nations' Flying Foxes", with the help of two teachers and two CERN's researchers wrote the proposal for an experiment aiming at measuring the decay of the Δ^+ baryon, an excited state of the proton. This proposal was selected out of 198 other proposals from 47 different countries. The Swiss Science Academy published an article about their adventure available [here](#).



The experiments will be performed at DESY, but unfortunately the "Foxes" won't be able to travel to Hamburg, as Geneva is listed as a Covid-19 risky area by the German authorities. Nevertheless, the Swiss team will have the opportunity to spend two weeks at CERN, where they will follow their experiments remotely, they will perform data analysis, and they will be part of the CERN's scientific community. We wish to the "Nations' Flying Foxes" a successful beamtime!

The "Nations' Flying Foxes" team, image from [SCNAT](#)

WHAT'S UP IN THE WORLD?

International Physics tournament

The **International Physicists' Tournament (IPT)** - the largest team competition in physics for university students - this year will be held **online** (due to COVID pandemic) from on **September the 26th and 27th**. The tournament will be streamed online on the official [IPT YouTube channel](#), and more information can be found on the [IPT Webpage](#) and [Facebook group](#).



The tournament will be followed by a conference, where the participants will present in more detail the most interesting solutions from the [IPT 2020 problem list](#).

If you wish to participate in the **next year's edition** (hopefully, in the traditional "offline" format) - please get in touch with the Swiss IOC representative evgenii.glushkov@epfl.ch!

2D materials under pressure

An international team, led by scientist from [EPFL](#) and the [University of Fribourg](#) have discovered a **new striking behavior of layered transition metal chalcogenides under pressure**. This class of materials are of great scientific and engineering interest because of the possibility to isolate atomically thin crystalline planes, giving scientists endless ways to explore new physics in low dimensions.

The materials studied in [this work](#), ZrS_2 and $ZrSe_2$ are semiconductors at ambient conditions, but, when an intense mechanical deformation is applied, they suddenly change structure. As the crystalline lattice changes, the electronic properties are considerably modified. In the special case of $ZrSe_2$, the initial layered structure collapses into a 3D structure, resulting in a semiconductor to metal transition.

One of the most promising feature of layered materials is their extreme flexibility when their thickness is reduced to a few layers. This property is of great interest to create flexible devices, such as foldable screens. Moreover, the effect of mechanical stresses on the electronic properties has promising applications in photovoltaic devices.

A new way to search for Dark Matter reveals hidden materials' properties

A [study](#) performed by scientists of the University of Chalmers, Sweden, and the ETH Zurich suggests a **promising way** to face one of the main challenges of astroparticle physics: **detecting Dark Matter particles**, the components of about 80% of our Universe's matter.



In the global search for dark matter, large detectors have been built deep underground to try to catch the particles as they bounce off atomic nuclei. So far, these mysterious particles have escaped detection. According to the Chalmers researchers, a possible explanation could be that dark matter particles are lighter than protons, and thereby do not cause the nuclei to recoil. A promising way to overcome this problem could therefore be to shift focus from nuclei to electrons, which are much lighter. The researchers describe how dark matter particles can interact with the electrons in atoms. Very interestingly their research reveals that the dark matter could unveil material properties impossible to investigate using any of the particles available today.

The press release of this study from the University of Chalmers is available [here](#).

Composite image of the mass distribution in the bullet cluster of galaxies, from Chandra X-Ray Observatory, NASA/CXC/M. Weiss/Wikimedia Commons

ANNOUNCEMENTS

Open positions at the Institute for Artificial Intelligence and Fundamental interactions

At the end of August the US National Science Foundation announced the creation of five national **Artificial Intelligence Institutes**, including the [Institute for Artificial Intelligence and Fundamental Interactions](#). The IAIFI aims at advancing physics knowledge and galvanizing AI research innovation. The IAIFI is comprised of both [physics and AI researchers](#) at MIT, Harvard, Northeastern, and Tufts.

In this context, an exciting [IAIFI Fellows Program](#) started. It consists of competitive three-year IAIFI postdoctoral fellowships, anchored at MIT. Fellows will spark vital interdisciplinary, multi-investigator, multi-subfield collaborations, and will have substantial

freedom in choosing their research focus; scientific movement of fellows within the institute will be quite free. The deadline to apply is **October the 20th**.

Post-doctoral positions available at the University of Pavia

Two Post-doctoral positions are available in the [Photovoltaic Group](#) of the Chemistry department of the **University of Pavia**, lead by Prof. Giulia Grancini. The research of Prof. Grancini focuses on materials for new generation photovoltaics devices based on hybrid perovskites. The ideal candidates should have a background in Physics/Optics, experience with optical experimental setups, ability to address physico-chemical problems related to photo-induced processes, and/or experience with surface characterization techniques, such as Atomic Force Microscopy.

More information can be found [here](#). For applications contact **Giulia Grancini at:** giulia.grancini@unipv.it.

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