

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?

Portraits of women scientists in the field of MAP

On 8 March (International Women's Day) the [Mathematics, Astronomy and Physics Platform](#) (MAP) of [SCNAT](#) launched a [portrait series](#) of women scientists in Switzerland that will be published monthly during 2021. This initiative shows how women succeeded in the formerly male-dominated fields of mathematics, astronomy and physics, and aims to encourage young women to pursue an academic career.



The [first issue](#) of this series is dedicated to Ruth Durrer, Professor at the University of Geneva, and first woman to take an assistant professorship in theoretical physics at the University of Zürich. The story of Professor Durrer is very inspiring, but despite her personal success, she cautions: "Women's careers in science are still far from being evident."

Picture of Prof. Ruth Durrer (from the [MAP portrait](#)).

Publication of an Open Access book in honor of Prof. K. A. Müller

An [Open Access book](#) dedicated to the lifework of Professor Karl Alexander Müller was published earlier in March. The book is titled "From Quantum Paraelectric/Ferroelectric Perovskite Oxides to High Temperature Superconducting Copper Oxides" and it collects the articles appeared on a [Special Issue](#) of the journal *Condensed Matter*. The content of these papers covers the main topics of the research work of Prof. Müller, from the study of the quantum paraelectric behavior of SrTiO_3 , to the investigation of the Jahn-Teller effect that played a key role in the discovery of high-temperature superconductivity in cuprates in 1986, recognized with the Nobel Prize in Physics together with Georg Bednorz in 1987.

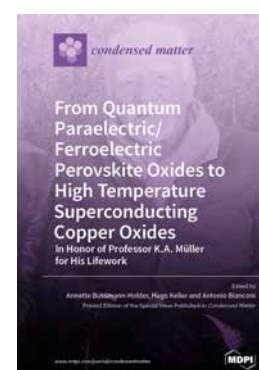
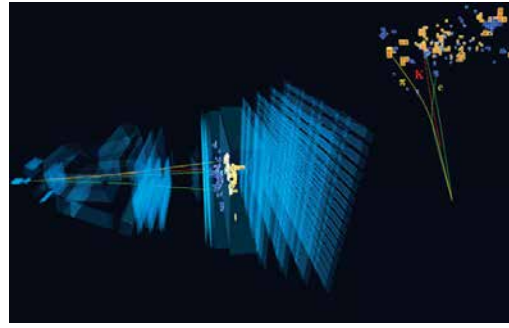


Image: cover of book.

Publication of an intriguing result from the LHCb experiment at CERN

The LHCb experiment at the CERN's Large Hadron Collider (LHC) [released](#) on 23 March a recent result that might have far reaching implications on the current understanding of the interactions between fundamental particles.



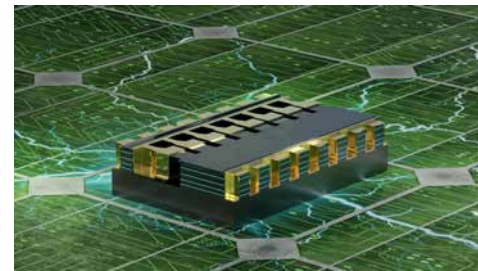
The study compares two decay modes of the beauty-quark produced in proton-proton collisions at the LHC: one involving the electron and the other involving the muon. According to the Standard Model of particle physics, these two decays, after taking tiny effects due to the different masses of electrons and muons into account, have equal probability to occur, an effect known as Lepton Flavor Universality. The data collected by LHCb presents a deviation from this rule with a statistical significance of 3.1 standard deviations. If this result is confirmed with a higher significance following new data to be collected and analyzed with the LHCb detector in the coming years, it will imply discovery of physics beyond the Standard Model.

The LHCb news is available [here](#), and the preprint [here](#). To know more about the theoretical consequences of Lepton Flavor Universality violation it is worth reading [an article](#) published in 2018 in the *SPS Communications* Nr. 54 by Prof. Gino Isidori (University of Zürich).

Image of the rare decay of a beauty meson involving an electron and positron observed at LHCb (Source: CERN)

New transistors improve the efficiency of power converters

A group of researchers of the [EPFL POWERlab](#) published in [Nature Electronics](#) the results of a study on the behavior of a new transistor design that could improve the energy efficiency of power AC to DC converters, key components of several devices including electric vehicles and solar panels. They developed a transistor based on



semiconducting nanowires, a technology usually employed for low-power applications, that has half as much resistance as conventional high-power transistors and can hold voltages of more than 1000 V. The key innovations of this technology are the use of a smart geometry for multiple nanowires in parallel, and the choice of gallium nitride, a semiconducting material ideal for power applications.

Image from [EPFL press-release](#).

WHAT'S UP IN EUROPE?

No blind “EU First” Approach in EU Research & Innovation Policy

[The League of European Research Universities \(LERU\)](#) is concerned about the “EU First” attitude that seems to drive the European Commission’s approach to some Research&Innovation partnerships, initiatives or draft work programmes, especially in areas involving new technology, security and space. The EC is right to consider carefully with which countries to partner for activities related to EU strategic assets, interests, autonomy or security. Nonetheless, LERU warns against an equal treatment for all non-EU member states. Countries that are strong R&I performers, that share EU values and that have been trustworthy partners for decades should be able to participate in the above mentioned type of activities. Next to the EEA countries (Norway, Liechtenstein and Iceland), LERU advocates for the list of preferred partners in R&I to at least include the UK, Switzerland and Israel. The full article is available [here](#).



WHAT'S UP IN THE WORLD?

UNESCO prize for girls' and women's education

UNESCO is pleased to announce the launch of the call for nominations of the [2021 UNESCO Prize for Girls' and Women's Education](#). Funded by the Government of the People's Republic of China, the Prize annually awards USD 50,000 to two laureates to continue their work in providing girls and women the education they deserve.



Interested candidates meeting the [selection criteria](#) are invited to contact their Permanent Delegations to UNESCO, National Commissions for UNESCO, or NGOs in official partnership with UNESCO to participate. The [nomination process](#) takes place via an online platform, accessible to UNESCO Member States and NGOs in official partnership with UNESCO. The deadline to submit nominations is 26 May 2021.

A Model of the Cosmos in the ancient Greek Antikythera Mechanism

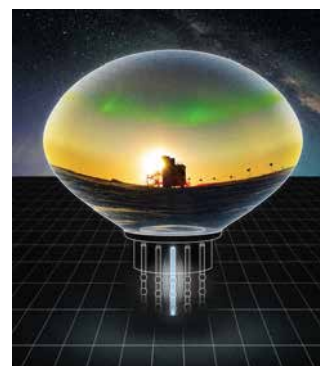
A group of researchers from universities in London (UK), Doha (Qatar) and Nicosia (Cyprus) [published](#) a new model of the Cosmos in the Ancient Greek Antikythera mechanism, an astronomical calculator, discovered in 1901. The mechanism of this device has been the object of several investigations in the past decades, and the researchers are still working on solving this complex 3D puzzle. In 2005, the fragments of the Antikythera Mechanism, which includes 30 corroded bronze gearwheels, have been studied using the Microfocus X-ray Computed Tomography (X-ray CT), a technique that revealed inscriptions describing the motion of the Sun, the Moon and the planets known at the time. This new model sheds light on the functioning of this mechanism, and reveals a creation of genius—combining cycles from Babylonian astronomy, mathematics from Plato's Academy and ancient Greek astronomical theories.



Image of a computer model of the cosmos display, from the [paper](#) published in Scientific Reports.

IceCube detects extremely high-energy neutrinos proving a 60-years-old theory

The IceCube Neutrino Observatory, buried in the Antarctic glacier, [detected](#) a Glashow resonance event, a phenomenon predicted in 1960 by the Nobel Laureate Sheldon Glashow. This effect involves the interaction of a high-energy antineutrino with an electron, and the production of W^- boson. The Glashow resonance requires antineutrinos with an energy of 6.3 PeV (petaelectronvolts), a value out of range of operating and future particle accelerators, but that can be reached in extreme cosmic events. An antineutrino with such an energy was detected by the sensors of IceCube on 8 December 2016, and the data published in [Nature](#) on 10 March 2021. This result proves the feasibility of neutrino astronomy and the role of IceCube in multi-messenger particle astrophysics.



In the image is an artistic representation of the signal detected by a photomultiplier of IceCube with a South Pole scene of the IceCube Laboratory against a backdrop of auroras displayed inside. [Credit: IceCube Collaboration \(ICL photo by Yuya Makino, IceCube/NSF\).](#)

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