

# Outreach Report



**15 October 2020**

**CHIPP Plenary – via zoom**

**Hans Peter Beck / Uni Bern**

**Outreach activities** within science are intended to inform the **political platform**, the **informed public**, or the **potential young physicist**.

In the view of the Swiss particle physics community, the **primary aim is to convey to young secondary school students:**

- ❑ The importance, excitement and fantasy of basic physics and in particular recent particle physics and related cosmology developments.
- ❑ The importance of a sound mathematical background, since physics is by definition a mathematical description of fundamental phenomena.



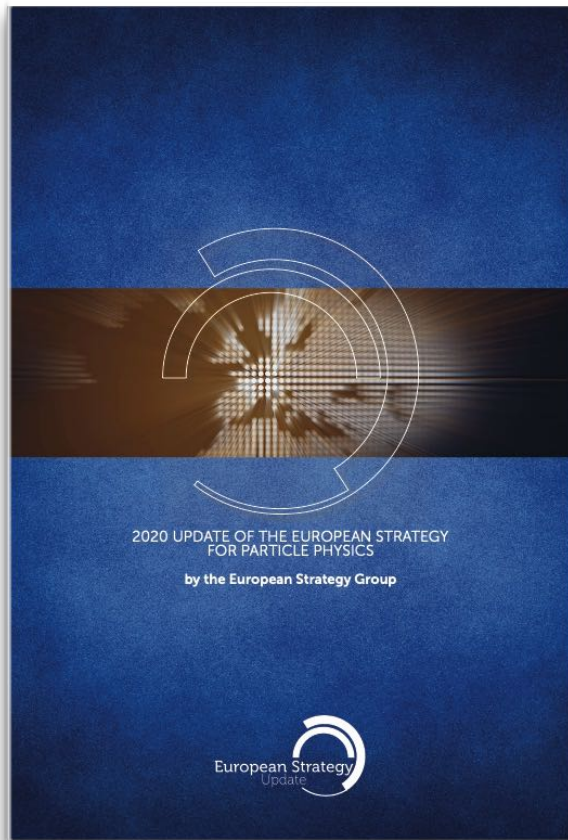
**CHIPP: Roadmap (2004)  
and updates in 2010**

☞ ensure adequate collaboration between Switzerland's high schools and universities on the vital question of outreach.

CERN-ESU-013

Update of the European Strategy for Particle Physics

by the European Strategy Group



- d) Exploring the fundamental properties of nature inspires and excites. It is part of the duty of researchers to share the excitement of scientific achievements with all stakeholders and the public. The concepts of the Standard Model, a well-established theory for elementary particles, are an integral part of culture. *Public engagement, education and communication in particle physics should continue to be recognised as important components of the scientific activity and receive adequate support. Particle physicists should work with the broad community of scientists to intensify engagement between scientific disciplines. The particle physics community should work with educators and relevant authorities to explore the adoption of basic knowledge of elementary particles and their interactions in the regular school curriculum.*

CERN-ESU-014

5 March 2020

**Deliberation Document**  
**on the 2020 update of the European Strategy for Particle Physics**

*The European Strategy Group  
 (prepared by the Strategy Secretariat)*

The **particle physics community** is highly active in public engagement, and the overall enthusiasm of the general public for the field testifies to the effectiveness of these actions. This high level of public engagement should be sustained, in both its bottom-up and top-down forms. **Many of the public engagement activities rely on the efforts of individuals**, and should be seen as an integral part of being a scientist and be properly valued in terms of career advancement. European **funding agencies** are urged to systematically and explicitly accompany research funding by providing resources for public engagement activities.

**Deliberation Document**  
**on the 2020 update of the European Strategy for Particle Physics**

CERN-ESU-014

5 March 2020

*The European Strategy Group  
(prepared by the Strategy Secretariat)*

**Good contacts between particle physicists and other research disciplines** will lead to better mutual understanding of the importance and urgency of the open scientific research questions and will create opportunities for inter- and cross-disciplinary research.

The **International Particle Physics Outreach Group (IPPOG)** has been established as a structural collaboration between countries to streamline particle physics education at the high-school level and its role could be further augmented to that of providing public engagement material. The **European Particle Physics Communication Network (EPPCN)** has proven to be an effective network for the professional communication of particle physics. Its effectiveness would be further improved if the vacancies for EPPCN representatives for all Member and Associate Member States were filled. **IPPOG and the EPPCN have excellent opportunities for synergy with APPEC.**

CERN has **thriving teachers and students programmes**, which are also capable of generating valuable data that should be made available to the education research community. Education and training of the next generation of particle physicists and engineers are crucial to sustaining the field in the long term. **Good particle physics university education is guaranteed by the many CERN users in academic positions.** Vocational education in the fields relevant for CERN should also be encouraged. It is important to be inclusive for all students, and initiatives to address under-represented groups should be supported.

**The Science Gateway, under construction at CERN, will offer a golden opportunity** to reinforce particle physics public engagement and education, which should be made to radiate across the whole of Europe.

# Update of CHIPP Roadmap underway

Chapter on **education and outreach** edited by the newly elect CHIPP outreach coordinator Katharina Müller (UZH)

## Contents

### 1. Impact on education and society

#### 1.1. Education

##### 1.1.1. Bachelor and master

##### 1.1.2. PhD

##### 1.1.3. High-schools

*CHIPP encourages high-school students to learn more about High-Energy Physics as an example of fundamental research*

##### 1.1.4. Universities of Applied Sciences

#### 1.2. Outreach activities in Switzerland

*It is important in outreach not only to talk to an already scientifically educated and endorsing audience, but also to address educationally distant audiences. The goal to strengthen the trust in science and its method of evidence based decision making to offer future generations a meaningful base that generates supportive structure in their life.*

##### 1.2.1. International outreach network

*IPPOG, EPPCN, ...*

#### 1.3. Support of young talents

#### 1.4. Service to society

#### 1.5. Summary

#### 1.6. Partners

*six pages in current draft*

This is one of several CERN Member State Thematic Forums. Their goal is to bring together CERN and Member State representatives who are experts in the relevant field to exchange information, share ideas and discuss the development of coherent strategies. Associate Member States may also participate.

The Teacher and Student Forum will focus on pre-university activities, both for teachers and for students.

## Contact

In case of any question, problem, or suggestion, please contact [TeacherAndStudentForum-Contact@cern.ch](mailto:TeacherAndStudentForum-Contact@cern.ch).



“There is nothing more enriching and gratifying than learning.” [Fabiola Gianotti, CERN Director-General]

Every year, CERN offers various professional development programmes for teachers to keep up-to-date with the latest developments in particle physics and related areas, and experience a dynamic, international research environment. All programmes are facilitated by experts in the field of physics, engineering, and computing and include an extensive lecture and visit itinerary.

Furthermore, CERN's teacher programmes enable you to meet with teaching colleagues from your country or from all around the world. We offer teacher programmes in English or in one of the national languages of CERN Member States, lasting between 3 days and 3 weeks. Take part!

[National Teacher Programmes](#) & [International Teacher Programmes](#)

## Members

Austria

Bulgaria

Czech Republic

Denmark

Finland

France

Germany

Greece

Hungary

Italy

Netherlands

Norway

Poland

Portugal

Slovakia

Switzerland

United-Kingdom

Pakistan

Serbia

Ukraine

Prof. Martin Hopf

Atanas Batinkov

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Prof. Ian Bearden

Dr. Kati Lassila-Perini

Dr. Nicolas Arnaud

Prof. Arnulf Quadt

Prof. Evangelos Gazis

Prof. Dezső Horváth

Prof. Pierluigi Paolucci

Marcel Vlastuin

Nils Hoimyr

Urszula Rybałtowska

Prof. Pedro Abreu

Dr. Zuzana Ješková

Prof. Andreas Müller

Elisabeth Cunningham

Falak Sher

Dr. Predrag Milenovic

Dr. Tetiana Hryn'Ova

## Swiss Teacher Programme

11 Nov 2019, 10:00 → 13 Nov 2019, 14:00 Europe/Zurich

CERN

Hans Peter Beck (Universitaet Bern (CH)), Andreas Müller (University Geneva), Jeff Wiener (CERN)

**Description** The **Swiss Teacher Programme 2019** will take place from 11-13 November 2019. Lectures, on-site visits, exhibitions, and hands-on workshops will introduce its participants to cutting-edge particle physics. We hope our participants will go back to Switzerland as ambassadors, who pass on the subject to our next generation of physicists, engineers, IT specialists ...

**Swiss Teacher Programme 2019:**

<https://indico.cern.ch/e/CHTP19>

**Teacher Programme Manager:**

Jeff Wiener: 0041 75 411 9010

**In case of emergency:**

CERN fire brigade: 0041 22 76 74444

**Administrative** ✉ [anita.bens@cern.ch](mailto:anita.bens@cern.ch)

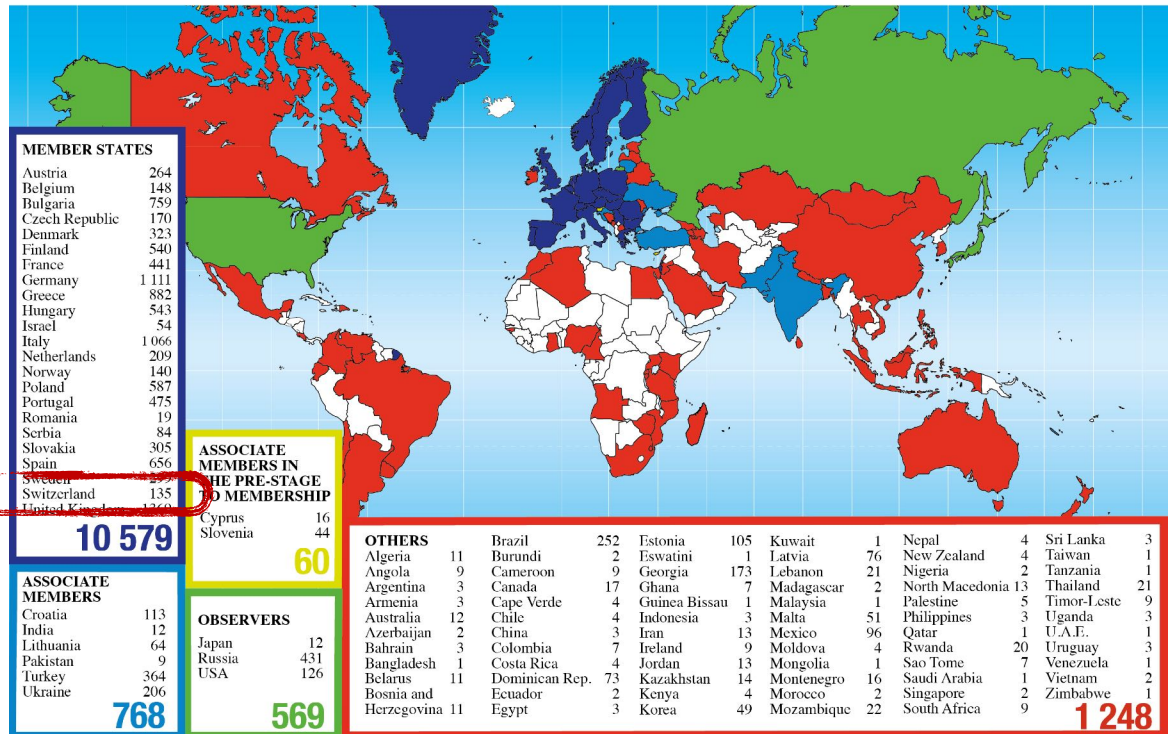
**Support:** ☎ +41 22 76 72775

Swiss teachers programme organised in November 2019

Talks and visits and social programme for physics teachers in CH.

8 Teachers participated, despite of huge communication campaign.

## Teacher Programme Participants 1998 - 2019 (Total: 13 224)



## High-School Students Internship Programme

Français English

<https://hSSIP.web.cern.ch/>

Since 2017 CERN invites high-school students to come to CERN for two weeks, to gain practical experience in science, technology, and innovation. Each student gets a project and a supervisor, eg. Secondary Beams and Experimental Areas, Vacuum Coatings, simulation ...

Switzerland takes part for the first time April 18 – May 1, 2021 (moved from October 2020)

Application deadline: March 31, 2020 → 65 applications from highly motivated students each student submitted a short statement, a motivation letter and a video

Selection committee with six members evaluated the applications → 24 candidates from all over Switzerland



Katharina Müller



## Participants and the media/institutes they represent:

1. Christian Speicher - Neue Zürcher Zeitung (NZZ) (CH)
2. Joachim Laukenmann - Tamedia AG (CH)
3. Benedikt Vogel - Dr. Vogel Kommunikation (CH)
4. Diana Hornung - Safety-Plus.ch (CH)
5. Marco Cattaneo - University of Geneva (CH)
6. Elise Frioud - SNSF (CH)
7. Andres Jordi - Swiss Academy of Sciences (CH)
8. Joan Plancade - Bilan (CH)
9. Sarah Sermondadaz - Heidi.news (CH)

Two intense days with representatives from CHIPP and invited Swiss Journalists at CERN

triggered a few articles in Swiss media (next slide)

## Thursday 23 January

- 11:30 - 12:30 **Introduction and welcome** word from Hans Peter Beck
- 12:30 - 13:50 **Lunch and free time** (Restaurant 1)
- 13:50 - 14:00 Transport to AD
- 14:00 - 14:45 **Visit of the AD**, guided by Michael Doser, accompanied by Saverio Braccini, Hans Peter Beck, Frederic Blanc, Christopher Grab, Ruth Durrer, Rainer Wallny, Angela Benelli
- 14:45 - 15:00 Walk to the Data Centre
- 15:00 - 15:10 Brief **introduction in the Data Centre** visitor point
- 15:10 - 16:00 **Visit inside the Data Centre**, guided by Tim Smith, accompanied by Christopher Grab, Saverio Braccini, Hans Peter Beck, Frederic Blanc, Ruth Durrer, Rainer Wallny, Anna Sfyrla, Angela Benelli
- 16:00 - 16:30 Transport to Point 8
- 16:30 - 17:30 **Visit of the LHC tunnel**, guided by Jorg Wenninger, accompanied by Rainer Wallny and Nicola Serra
- 17:30 - 18:30 **Visit of the LHCb cavern**, guided by Frederic Blanc, accompanied by Rainer Wallny and Nicola Serra

## Friday 24 January

- 09:00 - 09:30 Transport to CMS
- 09:30 - 10:30 **Visit of the CMS cavern**, guided by Günther Dissertori, accompanied by Hans Peter Beck, Lesya Shchutska, Rainer Wallny, Christopher Grab and Angela Benelli
- 10:30 - 11:00 Transport to Meyrin site
- 11:00 - 11:30 **Q&A session with Martin Steinacher**, Director for Finance and Human Resources, followed by
- 11:30 - 13:00 **Round table and time for individual interviews** if needed (with Rainer Wallny, Michele Weber, Christoph Grab, Hans Peter Beck, Nicola Serra, Federico Sanchez Nieto, Riccardo Rattazzi, Saverio Braccini, Gunther Dissertori, Ruth Durrer, Anna Sfyrla, Tobias Golling, Lesya Shchutska, Frederic Blanc and Gino Isidori)
- 13:00 - 14:00 **Lunch and end of the visit**

Wochentag

Neue Zürcher Zeitung

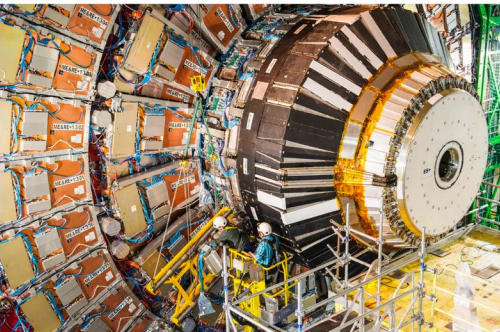
## Am Cern beginnt die Zukunft, bevor die Gegenwart zu Ende ist

Der Large Hadron Collider in Genf ist der weltweit grösste Beschleuniger. In zwanzig Jahren soll er einem noch leistungsfähigeren Collider weichen. Aber welchem?

Christian Speicher

08.02.2020, 05.30 Uhr

Hören Merken Drucken Teilen



Christian Beutler / KEYSTONE

Der CMS-Detektor (Compact Muon Solenoid) befindet sich 100 Meter unter der Erde. Im Vergleich zum Atlas-Detektor, dem anderen grossen Nachweisgerät, ist er kompakt.

Ein technologisches Monster sei das. Allzu gut kommt der Teilchenbeschleuniger am Cern nicht weg im Film «Les Particules» des Westschweizer Filmemachers Blaise Harrison. Nach einem Besuch des

34

## Wissen

### «Die Schweiz profitiert enorm»

Physik Teilchenforscher debattieren, welche Königliche Weltmaschine ihren Wünschen am besten entspricht. Dieser Beschleuniger können bis zu 28 Milliarden Franken kosten. Was lässt sich das rechtfertigen? ETH-Physiker Rainer Walry nimmt Stellung.

Joachim Lauermann

Milliardenschwer, künstliche Intelligenz – das sind die Themen, die uns heute bewegen. Da wird Teilchenphysik wie sonst nie gesehen. Wie lässt es sich rechtfertigen, Milliarden bis zu

28 Milliarden Franken für einen Beschleuniger zuzuschlagen? Ein gesellschaftliche Problem zu lösen, von dem die ganze Welt abhängt. Bisher, gibt es zwei Hauptkandidaten. Da ist einer die Fortentwicklung des LHC, die Entwicklung des ILC, die Beschleuniger der nächsten Generation, die Beschleuniger der nächsten Generation zu bringen. Das war die Forschungsstrategie vor zwei Jahren. Heute ist die Situation anders. Heute gibt es eine dritte Möglichkeit.

Die Beschleunigerstrategie CERN, auch wenn man eher wissenschaftliche Frage: Wie, wissenschaftlich einmal nicht mit einer Entscheidung zu tun hat, zeigt es sich, dass die Fortschritte beschleunigen können, die einen praktischen Wert haben.

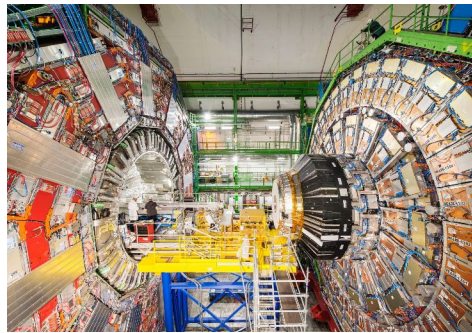
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Der Large Hadron Collider (LHC) am Cern. Die Tunnel sind 27 Kilometer lang und führen zu vier Beschleunigern, die Teilchen auf 99,9999991% der Lichtgeschwindigkeit beschleunigen. (Foto: CERN)

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## Au CERN, les habits neufs de l'accélérateur LHC pour 2021

par Sarah Sermondadaz



De quoi sera faite la science du futur au CERN (l'Organisation européenne pour la recherche nucléaire)? Son instrument phare, l'accélérateur de particules LHC est surtout connu pour avoir permis de confirmer l'existence du boson de Higgs en 2012. Une découverte qui a valu au physicien éponyme le prix Nobel en 2013. Mais au CERN, la recherche scientifique continue. L'accélérateur fait actuellement peau neuve: il est arrêté jusqu'à mi-2021 pour des travaux qui rendront possibles de nouvelles expériences.

NZZ 8 February 2020  
by Christian Speicher

Tages Anzeiger 3 February 2020  
by Joachim Lauermann

Heidi News 10 February 2020  
by Sarah Sermondadaz

11.11.2019 | News | Press r...

## Visiting the Japanese Super-Kamiokande detector (part 1)



...first six months, 100,000 visitors have been infected by the fascination of neutrino research. Author: **Benedikt Vogel** Interesting links: Information about the neutrino detector Super-Kamiokande: <http://www-sk.icrr.u-tokyo.ac.jp/sk/index-e.html> Information about the T2K experiment...

Image: CHIPP, Switzerland

17.9.2020 | News | Press r...

## Geneva school wins "Beamline for Schools" 2020 competition



...students will go regularly to CERN and participate in the experiments via video conference. Author: **Benedikt Vogel** The "Beamline for Schools" (BL4S) competition has been running since 2014. So far, 11'000 pupils from...

Image: CERN, Switzerland

8.7.2020 | News | Press rel...

## Zurich particle physicists make headlines with XENON collaboration

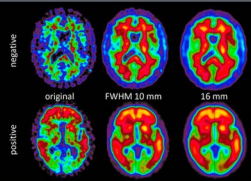


...three possible explanations applies - and whether we can actually observe axions in our detector". Author: **Benedikt Vogel** A centrepiece of the XENON1T detector: the time projection chamber. XENON detail XENON detail - 2 CHIPP...

Image: XENON collaboration

15.5.2020 | News | Press r...

## The start-up Positrigro uses findings from particle physics for the early diagnosis of Alzheimer's disease




...CHUV University Hospital (Vaud) and the Proton Therapy Centre of the Paul Scherrer Institute (Villigen/AG). Author: **Benedikt Vogel** PET image of brains without (top) and with (bottom) amyloid deposits. The deposits can be recognized...

Image: USZ/Alfred Buck, Jannis Fischer

20.4.2020 | News | Press r...

## Swiss research initiative CHART works on particle accelerators of the future

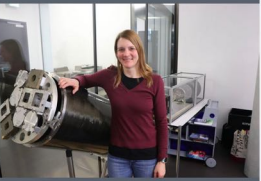


...thus makes an essential contribution to a scientifically and technically educated society in Switzerland". Author: **Benedikt Vogel** The scientists of the Paul Scherrer Institute with the demonstrator of the superconducting magnet, which was built within...

Image: CHART, Switzerland

19.3.2020 | News | Press r...

## University of Applied Sciences Northwestern Switzerland researches astroparticles of the Sun



...could be confirmed by the STIX mission." Further information: <https://stix.i4ds.net> and <https://sci.esa.int/web/solar-orbiter/home> Author: **Benedikt Vogel** They have developed the STIX X-ray telescope at the FHNW location Brugg-Windisch: Prof. Hans-Peter...

Image: B. Vogel, CHIPP, Switzerland

4.3.2020 | News | Press re...

## California-based neutrino researcher François Drielsma



...experiments - except perhaps that the hours here in the USA are counted less than elsewhere." Author: **Benedikt Vogel** The Muon Ionization Cooling Experiment (MICE) was conducted at the Rutherford Appleton Laboratory in United Kingdom. François...

Image: Caitlin Claassens, Arts District of Los Angeles

6.1.2020 | News | Press rel...

## About the movie "Les Particules" by Blaise Harrison.

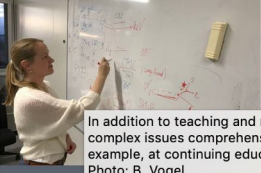


...graduate of L'École cantonale d'art de Lausanne (ECAL) after five documentary films. Author: **Benedikt Vogel** Film release in French-speaking Switzerland: September 2019 Film release in German-speaking Switzerland: January...

Image: CHIPP, Switzerland

13.12.2019 | News | Press r...

## Lesya Shchutka wants to prove the existence of heavy neutrinos



...particle physics professor at the EPFL. the scientist is to be

In addition to teaching and research, the 33-year-old scientist knows how to make complex issues comprehensible to a broad audience in a simple language - for example, at continuing education events for teachers or at the EPFL Open Day. Photo: B. Vogel

Image: CHIPP, Switzerland

*closed do to COVID-19*

**ART & SCIENCE**  
du 4 mai 2019 au 31 mars 2020

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**Pionniers of Cosmic Rays**      **Entdecker der kosmischen Strahlung**      **Pionniers des rayons cosmiques**

weather-baloon 30 000m

ISS - AMS experiment 400 000m, 2011 - ongoing

Bertrand Piccard World Tour 11 700m

Air plane traveling altitude 10 000m

Werner Kohlhörster 9300m 1914

Albert Gockel 4500m 1909

Victor Hess 5300m 1933

**Albert Gockel 1860 - 1927**  
Professor at University of Freiburg (D)

**Victor Hess - 1883 - 1964**  
Nobel Prize 1936  
German Academy of Sciences (Vienna), Member of the Prussian Academy of Sciences

**Werner Kohlhörster 1867 - 1946**  
Balloon flight 1914  
Professor at the Prussian Academy of Sciences

**Electrometer around 1909**

Eiger - Monch - Jungfrau 4158m

Jungfrauoch 3500m  
Sphinx Observatory 1931

IceCube South Pole - 2450m, 2005 - ongoing

Super Kamikande (I) -1000m, 1996 - ongoing

Pierre Auger Observatory (RA) 1400m, 2004 - ongoing

MAGIC, La Palma (E) 2200m, 2004 - ongoing



closed to COVID-19

## What are Cosmic Rays Was ist Kosmische Strahlung Que sont les Rayons Cosmiques



**1** **Fascinating** strikes of lightning, earthquakes, great storms, intense triches of plasmas and auroras, the stars and all other phenomena in the Universe are powered by the same force: the energy of cosmic rays. These rays are made up of particles from space that strike the Earth's atmosphere and create secondary particles that strike the ground. These secondary particles are made up of electrons, positrons, muons, pions, kaons, protons, neutrons, and other particles. These particles are produced in the atmosphere by the interaction of primary cosmic rays with the nuclei of atoms in the air. The primary cosmic rays are made up of protons, alpha particles, and heavy nuclei. They are produced in the atmosphere by the interaction of primary cosmic rays with the nuclei of atoms in the air. The primary cosmic rays are made up of protons, alpha particles, and heavy nuclei. They are produced in the atmosphere by the interaction of primary cosmic rays with the nuclei of atoms in the air.

**2** **Counting** the particles, measuring their energy, and identifying their composition are the main goals of cosmic ray research. This is done by using a variety of detectors, including ground-based air shower arrays, balloon-borne detectors, and space-based detectors. The detectors are designed to measure the flux of cosmic rays, their energy spectrum, and their composition. The flux of cosmic rays is the number of particles per unit area per unit time. The energy spectrum is the distribution of cosmic rays as a function of energy. The composition is the relative number of different types of particles in the cosmic ray flux.

**3** **The** flux of cosmic rays is highest at high altitudes and decreases as altitude decreases. This is because the atmosphere acts as a shield against cosmic rays. The higher the altitude, the less atmosphere there is above the detector, and the more cosmic rays will reach the detector. The flux of cosmic rays is also highest at the poles and lowest at the equator. This is because the Earth's magnetic field acts as a shield against cosmic rays. The magnetic field is strongest at the poles and weakest at the equator. The flux of cosmic rays is also highest during solar minimum and lowest during solar maximum. This is because the solar wind acts as a shield against cosmic rays. The solar wind is strongest during solar maximum and weakest during solar minimum.

## Discoveries with Cosmic Rays Entdeckungen mit Kosmischer Strahlung Découvertes avec des Rayons Cosmiques

**1** **Im** Teilchenbeschleuniger der Luft sind kosmische Strahlung, die aus hochenergetischen Teilchen besteht, die aus dem Weltall kommen. Diese Teilchen sind aus Protonen, Neutronen, Elektronen, Positronen, Myonen, Pionen, Kaonen, Protonen, Neutronen, Alpha-Teilchen und anderen Teilchen. Diese Teilchen sind aus dem Weltall gekommen und haben sich mit den Kernen der Luftmoleküle in der Atmosphäre getroffen. Dies hat zur Entstehung von Sekundärteilchen geführt, die als kosmische Strahlung bezeichnet werden. Diese Sekundärteilchen sind aus Elektronen, Positronen, Myonen, Pionen, Kaonen, Protonen, Neutronen, Alpha-Teilchen und anderen Teilchen. Diese Teilchen sind aus dem Weltall gekommen und haben sich mit den Kernen der Luftmoleküle in der Atmosphäre getroffen. Dies hat zur Entstehung von Sekundärteilchen geführt, die als kosmische Strahlung bezeichnet werden.

**2** **Ein** der Hauptziele der Kosmischen-Strahlungsforschung ist es, die Herkunft der kosmischen Strahlung zu verstehen. Dies ist eine große Herausforderung, da die kosmische Strahlung aus dem Weltall kommt und sich mit den Kernen der Luftmoleküle in der Atmosphäre getroffen hat. Die Forschung zeigt, dass die kosmische Strahlung aus dem Weltall kommt und sich mit den Kernen der Luftmoleküle in der Atmosphäre getroffen hat. Die Forschung zeigt, dass die kosmische Strahlung aus dem Weltall kommt und sich mit den Kernen der Luftmoleküle in der Atmosphäre getroffen hat.

**3** **Die** kosmische Strahlung ist eine wichtige Quelle von Informationen über die Teilchenphysik. Durch die Untersuchung der Eigenschaften der kosmischen Strahlung können wir mehr über die Eigenschaften der Teilchen erfahren, die aus dem Weltall kommen. Die kosmische Strahlung ist eine wichtige Quelle von Informationen über die Teilchenphysik. Durch die Untersuchung der Eigenschaften der kosmischen Strahlung können wir mehr über die Eigenschaften der Teilchen erfahren, die aus dem Weltall kommen.

## Particle Detection Teilchendetektoren DéTECTEURS DE PARTICULES

**Historic Technologies**

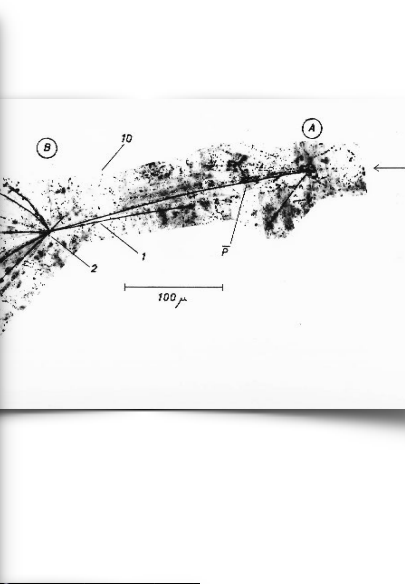
- 1819 Photographic emulsion
- 1908 Geiger-Müller Counter
- 1926 Cloud Chamber
- 1928 Wilson Chamber
- 1930 Cloud Chamber track picture

**Modern Technologies**

- Silicon Strip or Pixel Detector
- Micro Pattern Gaseous Detectors
- Electro-magnetic crystal calorimeter

**Particle Physics Spin-off**

- Medical Applications
- Proton Therapy



## Particle Accelerator Teilchenbeschleuniger Accélérateur de Particules

**1** **Die** Teilchenbeschleuniger sind die größten und komplexesten Maschinen der Welt. Sie beschleunigen Teilchen auf hohe Energien und lassen sie kollidieren. Die Beschleuniger sind in verschiedenen Formen und Größen erhältlich. Die größten Beschleuniger sind die Synchrotronen, die in einem Ring beschleunigen. Die kleineren Beschleuniger sind die Linearbeschleuniger, die in einer geraden Linie beschleunigen. Die Beschleuniger sind in verschiedenen Formen und Größen erhältlich. Die größten Beschleuniger sind die Synchrotronen, die in einem Ring beschleunigen. Die kleineren Beschleuniger sind die Linearbeschleuniger, die in einer geraden Linie beschleunigen.

**2** **Die** Teilchenbeschleuniger sind wichtige Werkzeuge für die Teilchenphysik. Sie ermöglichen die Untersuchung der Eigenschaften der Teilchen bei hohen Energien. Die Beschleuniger sind wichtige Werkzeuge für die Teilchenphysik. Sie ermöglichen die Untersuchung der Eigenschaften der Teilchen bei hohen Energien. Die Beschleuniger sind wichtige Werkzeuge für die Teilchenphysik. Sie ermöglichen die Untersuchung der Eigenschaften der Teilchen bei hohen Energien.

**3** **Die** Teilchenbeschleuniger sind auch wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt. Die Beschleuniger sind wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt. Die Beschleuniger sind wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt.

## Modern Particle Detectors Moderne Teilchendetektoren DéTECTEURS DE PARTICULES ACTUELS

**1** **Die** modernen Teilchendetektoren sind in der Lage, die Eigenschaften der Teilchen mit hoher Präzision zu messen. Sie sind in der Lage, die Energie, die Richtung und die Identität der Teilchen zu bestimmen. Die modernen Teilchendetektoren sind in der Lage, die Eigenschaften der Teilchen mit hoher Präzision zu messen. Sie sind in der Lage, die Energie, die Richtung und die Identität der Teilchen zu bestimmen.

**2** **Die** modernen Teilchendetektoren sind auch in der Lage, die Eigenschaften der Teilchen bei hohen Energien zu messen. Sie sind in der Lage, die Energie, die Richtung und die Identität der Teilchen zu bestimmen. Die modernen Teilchendetektoren sind auch in der Lage, die Eigenschaften der Teilchen bei hohen Energien zu messen. Sie sind in der Lage, die Energie, die Richtung und die Identität der Teilchen zu bestimmen.

**3** **Die** modernen Teilchendetektoren sind auch wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt. Die modernen Teilchendetektoren sind auch wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt.

## Particles & Interactions Teilchen & Wechselwirkungen des Particules & des Interactions

**1** **Die** Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken. Die Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken. Die Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken.

**2** **Die** Teilchen sind in der Lage, miteinander zu wechselwirken. Sie sind in der Lage, Energie zu übertragen und Teilchen zu erzeugen. Die Teilchen sind in der Lage, miteinander zu wechselwirken. Sie sind in der Lage, Energie zu übertragen und Teilchen zu erzeugen. Die Teilchen sind in der Lage, miteinander zu wechselwirken. Sie sind in der Lage, Energie zu übertragen und Teilchen zu erzeugen.

**3** **Die** Teilchen sind auch wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt. Die Teilchen sind auch wichtige Werkzeuge für die Medizin. Sie werden zur Behandlung von Krebs eingesetzt.

## Big Bang & evolution of the Universe

**1** **Die** Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken. Die Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken. Die Teilchen sind die Bausteine der Materie. Sie sind in der Lage, miteinander zu wechselwirken.

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$$\mathcal{L} = -\frac{1}{4}F_{\mu\nu}F^{\mu\nu} + \bar{\psi}i\not{D}\psi + \psi_Y\psi + h.c. + |\mathcal{D}_\mu\phi|^2 - \mathcal{V}(\phi)$$

# Int'l balloon festival 2020

## 25<sup>th</sup> January Saturday Opening Day

- ✓ **Historic Balloon flight** up to 4000m altitude with real Cosmic Ray measurement – University Fribourg
- ✓ Lecture and Workshop program from 11h30 till 19h
- ✓ key note presentation during the opening

## 26<sup>th</sup> January Sunday

- ✓ Lecture and Workshop program from 11h30 till 19h

## 29<sup>th</sup> January Wednesday – Children Day

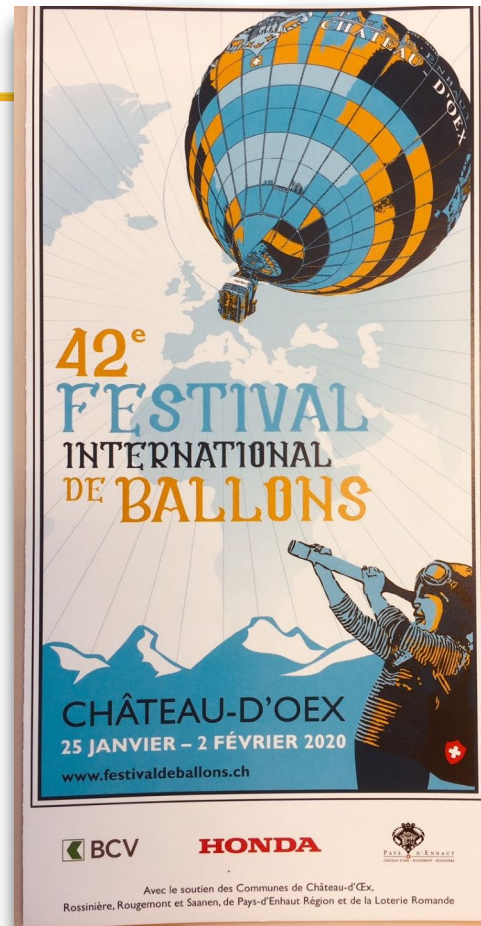
- ✓ Lecture and Workshop program from 11h30 till 19h

## 1<sup>th</sup> February Saturday

- ✓ Lecture and Workshop program from 11h30 till 19h

## 2<sup>nd</sup> February Sunday Closing Day

- ✓ Lecture and Workshop program from 11h30 till 19h



# Media coverage

CERN COURIER.COM  
NEWS ANALYSIS

OUTREACH

## Ascent commemorates cosmic-ray pioneers

On 25 January, a muon detector, a particle physicist and a prizewinning pilot ascended 4000m above the Swiss countryside in a hot-air balloon to commemorate the discovery of cosmic rays. The event was the highlight of the opening ceremony of the 42nd Chateau-d'Oex International Balloon Festival, attended by an estimated 30,000 people, and attracted significant media coverage.

In the early 1930s, following Becquerel's discovery of radioactivity, studying radiation was all the rage. Portable electrometers were used to measure the ionisation of air in a variety of terrestrial environments, from fields and lakes to caves and mountains. With the idea that ionisation should decrease with altitude, pioneers advertised in balloon flights as early as 1909 to count the number of ions per cm<sup>3</sup> of air as a function of altitude. First results indeed indicated a decrease up to 1300 m, but a subsequent ascent to 4500m by Albert Gockel, professor of physics at Fribourg, concluded that ionisation does not decrease and possibly increases with altitude. Gockel, however, who later would coin the term "cosmic radiation", was unable to obtain the hydrogen needed to go to higher altitudes. And so it fell to Austrian physicist Victor Hess to settle the case. Ascending to 5300 m in 1912, Hess clearly identified an increase, and went on to share the 1936 Nobel Prize in Physics for the discovery of cosmic rays. Gockel, who died in 1927, could not be awarded, and for that reason is almost forgotten by history.

ATLAS experimentalist Hans Peter Beck of the University of Bern, and a visiting professor at the University of Fribourg, along with two students

from the University of Fribourg, re-enacted Gockel's and Hess's pioneering flights using 21st-century technology: a muon telescope called the Cosmic Hunter, newly developed by instrumentation firm CAEN. The educational device, which counts coincidences in two scintillating-fibre tiles of 15 x 15 cm<sup>2</sup> separated by 15 cm, verified that the flux of cosmic rays increases as a function of altitude. Within two hours of landing, including a one-hour drive back to the starting point, Beck was able to present the data plots during a public talk attended by more than 250 people. A second flight up to 6000 m is planned, with oxygen supplies for passengers, when weather conditions permit.

"Relating balloons with particle physics was an easy task, given the role balloons played in the early days for the discovery of cosmic rays," says Beck. "It is a narrative that works and that touches people enormously, as the many reactions at the festival have shown."

The event – a collaboration with the universities of Bern and Fribourg, the Swiss Physical Society, and the Jungfrauoch research station – ran in parallel to a special exhibition about cosmic rays at the local balloon museum, organised by Beck and Michael Hoch from CMS, which was the inspiration for festival organisers to make physics a focus of the event, says Beck: "Without this, the festival would never have had the idea to bring 'adventure, science and freedom' as this year's theme. It's really exceptional."

RÉGIONS | 13

Des étudiants en physique de l'Unifr profitent du Festival de ballons pour prendre des mesures

## Sur la trace des rayons cosmiques

Les membres de l'équipe ont préparé l'expédition avant de monter dans les ballons.

Un premier vol est prévu pour le 25 janvier 2020.

« Nous obtenons des données sur les phénomènes cosmiques », déclare Hans Peter Beck.

Le festival de ballons de Chateau-d'Oex est une manifestation traditionnelle qui attire chaque année des milliers de visiteurs. Cette année, les organisateurs ont voulu mettre en avant la physique et les rayons cosmiques.

Un premier vol est prévu pour le 25 janvier 2020. Les participants seront des étudiants de l'Université de Fribourg et de l'Université de Berne, accompagnés par Hans Peter Beck et Michael Hoch.

Anzeiger von Saanen

Abonnieren Anmelden

## HILFE SUCHEN, HILFE ANBIETEN

HER KOMMEN SIE IHR ANGEBOT FÜR HILFE, AUFGEBOREN ODER HILFE FINDEN!  
DIE PLATTFORM FÜR PRIVATHILFE VOM «ANZEIGER VON SAANEN»

Die Wissenschaft hält Einzug ins Ballonfestival

01.28 Jan. 2020

Die 42. Ausgabe des Ballonfestivals hat es in sich: Neben der Aussicht auf wunderschöne bunte Heissluftballone am Himmel erfährt der Besucher viele interessante Fakten im Bereich der Wissenschaft.

FOTOS: SONJA WOLFF

Das 42. Internationale Balloonfestival in Chateau-d'Oex folgt ganz dem Motto «Abenteuer, Wissenschaft und Freiheit». Besonders die wissenschaftlichen Aktivitäten und Events durchziehen das Festival wie ein roter Faden.

SONJA WOLFF  
Eine thematische Ausrichtung des traditionellen Ballonfestivals ist neu und eine beeindruckende Idee. Doch wie passt das

## Cosmic Rays at the 42nd Hot-Air Balloon Festival in Chateau-d'Oex

Hans Peter Beck

The Hot Air Balloon Festival in Chateau-d'Oex is a well-known established event in the Swiss mountainous regions between Gstaad and Grindelwald. Around the globe meet there every winter for their special week since 1979. It is well-known for Bertrand Picard and Brian Jones' ascent in 1999 for their three-weeks lasting, non-stop tour around the globe, in a balloon, the Brevinger October 3. In its 42nd edition, the physics of cosmic rays entered the stage of the Hot Air Balloon Festival, and of January 2020. This is no coincidence and preparatory work was needed for it to happen.

The balloon museum in Chateau-d'Oex [1] is featuring historic balloon materials, equipment, measuring devices, as well as modern equipment and illustrates the difficulties that needed to be mastered for the Brevinger October endeavor to be a success. Keeping museums alive and attracting visitors means adding temporary exhibitions. General science topics, not even to speak physics, is rarely on the screen of museum curators. For the 2019 temporary exhibition, however, the theme was a mixture of art and science, as Figures 1, 2, and 7 show. In particular, it was the museum's curator Jacqueline Trienti, who was first attracted by the art works of Michael Hoch, physicist and member of the CMS collaboration at CERN. Hoch became internationally renowned for his specific art works, rendering particle physics into art.

Figure 1: Balloon museum Chateau-d'Oex

Figure 2: Pioneers of cosmic rays. A large-scale poster, inviting the visitor to the balloon museum to dive into a topic they consider less essential of life. The historic balloon rig of Albert Gockel, Victor Hess and Werner Kohlhöfer are put in context as the pioneers of a new field of research that is continued self today with actual experiments carried out in space on the International Space Station (ISS), in high altitude (Aerobusstratosol), on ground in Japan (Super-Kamiokande) and the South Pole (IceCube).

CERN Courier  
26 March 2020

La Liberté  
27 January 2020

Anzeiger von Saanen  
28 January 2020

SPS Communications  
June 2020

RTS.CH PROGRAMME TV SPORT INFO

PLAY RTS

Vidéo Radio

Accueil Direct Émissions Catégories

HANS-PETER BECK  
PRÉSIDENT DE LA SOCIÉTÉ SUISSE DE PHYSIQUE

00:44 / 02:12

Entretien avec Hans Peter Beck, président de la Société suisse de...

Swiss TV — RTS 30 January 2020, Couleurs Locales  
<https://rts.ch/play/tv/redirect/detail/11056089>

FESTIVAL INTERNATIONAL  
DE BALLONS  
Château-d'Oex



## Science & Art at the 42<sup>nd</sup> International Hot-Air Balloon Festival and the Balloon Museum in Château-d'Oex

Hans Peter Beck, Universities of Bern and Fribourg  
LHCP 2020, Paris zoom — 25–30 May 2020



PROCEEDINGS  
OF SCIENCE

## Science & Art at the 42<sup>nd</sup> International Hot-Air Balloon Festival and the Balloon Museum in Château-d'Oex

Hans Peter Beck<sup>a,\*</sup>

<sup>a</sup>Laboratory for High Energy Physics, University of Bern,  
Sidlerstr. 5, CH-3012 Bern, Switzerland

E-mail: [hans.peter.beck@cern.ch](mailto:hans.peter.beck@cern.ch)

At the 42<sup>nd</sup> international balloon festival in Château-d'Oex, 25 January to 2 February, 2020, one balloon flight was special. Manned by two students from Fribourg, the speaker, and a prize-winning pilot of the international Gordon-Bennett cup 2019, a balloon ascended to 4000 m asl, commemorating a pioneering flight measuring cosmic rays. Using 21<sup>st</sup> century technology the flux of Cosmic Rays increasing with altitude was verified. This article tells the story behind this event and what circumstances made it possible.

- ✓ A museum that initially had nothing to do with science, particle physics, accelerators, CERN, the Universe, etc. was thinking about its next temporary exhibition - initially only Michael's art was an attractor.
- ✓ A narrative with local relevance allowed to bring the visitor, who expected balloons, to get driven into particle physics and the modern understanding of the Universe in an easy to follow story — starting with balloon flights in 1909.
- ✓ Adding works of art related to the science shown adds another level of how to emotionally involve visitors in the subject.
- ✓ Visitors were taken in unexpectedly and were immediately fascinated. The museum attracted many more visitors than in other years.
- ✓ The museum is planning to prolong this temporary exhibition by one more year until March 2021!
- ✓ The Hot Air Balloon Festival organisers were captivated and decided to take physics on board
- ✓ Bringing in bachelor students in and have them doing fun and interesting work
- ✓ Huge impact at the festival

The Eighth Annual Conference on Large Hadron Collider Physics-LHCP2020  
25-30 May, 2020  
online

Speaker

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<https://pos.sissa.it/>



## European Particle Physics Communication Network

Country Report: Switzerland  
 Report provided by Swiss Institute of Particle Physics (CHIPP)  
 Angela Benelli



Angela Benelli is representing Switzerland in EPPCN

Participated in the EPPCN group for the  
 Communication of the European Strategy for Particle Physics

EPPCN ad-hoc meeting

Question & Answer about the EPPSU

Talking points – for communication with media

Annual report to the CERN Council

[Scientifica 2019](#) (30 August – 1 September) « **Science Fiction – Science Facts** » this was the motto for the Zurich science days of this year, organised by the University of Zurich and ETH. During these three days, more than 30'000 visitors took the opportunity to discuss directly with the researchers about science facts that sound like science fiction today, but which might be commonplace tomorrow. Laura Baudis presented an opening talk a show and a booth. Christof Aegeger showed that even in everyday physics phenomena, fact can often be stranger than fiction and seemingly magical things can happen completely according to the laws of physics.



The booth called « Dark Matter-Antimatter-Does it matter? » presented XENON, CMS and

LHCb experiments in the context of searches for dark matter and the current understanding of the matter-antimatter asymmetry.

**National Media Visit** (23-24 January 2020) A group of 9 journalists visited CERN accompanied by a CERN press Officer and several Professors from Swiss institutes.

Visits to LHC tunnel, CMS, LHCb, AD and the Computing Centre were organised. The two days visit ended with a Questions and Answers session where the CERN directorate was invited. [Articles](#) in the Swiss press and a [video](#) were produced as a result of the visit.



During the period of the **COVID-19 emergency** CHIPP has collected on its [website a page](#) the Physics contributes to the Swiss task force fighting the COVID19 emergency, more than 400 visualisations. Many physicists have offered their knowledge to contribute at the task force, everybody in his field of expertise is offering support and tools. On Twitter we pushed the news and we had more than 3800 visualisations during the first weeks of the lockdown.

As last year, also in 2019, CHIPP most successful campaign on social media is the series of articles that Benedikt Vogel wrote about **PhD, PostDoc students and Senior Physicists** from Swiss Universities presenting their work.

The articles are published once a month on [chipp.ch](#) website hosted at the SCNAT portal. On Twitter they had about 5% engagements each.

Angela Benelli

## International Particle Physics Outreach Group — <http://ippog.org>



### IPPOG Annual Report 2019

<https://cds.cern.ch/record/2728568>



#### SEVEN YEARS IN IPPOG

These are a few reflections from my past seven years as IPPOG chair, starting from the day I took office on 1 Jan 2013, as co-chair alongside Mergj Barbone from FNAL. At the time, IPPOG had recently completed its transition from EPPOG with the addition of several non-European members, serving to bolster its mission globally. In 2013, as is the case today in 2020, the European Strategy Group (ESG) was preparing a new strategic roadmap for particle physics. This time, in addition to statements concerning the future physics program and infrastructure developments, the strategic relevance of communication and public engagement was recognized and for the first time stated explicitly:

"...Sharing the excitement of scientific discoveries with the public is part of our duty as researchers. Many groups work enthusiastically in public engagement. They are assisted by a network of communication professionals (EPPCN) and an international outreach group (IPPOG). For example, they helped attract tremendous public attention and interest around the world at the start of the LHC and the discovery of the Higgs boson. Outreach and communication in particle physics should receive adequate funding and be recognized as a central component of the scientific activity. EPPCN and IPPOG should both report regularly to the Council." (CERN-Council-S108)

These words stemmed from productive discussion between leaders of the two organizations with the ESG working group. Notably, past IPPOG co-chairs, Dave Barney (CERN) and Michael Kobel (TU Dresden) provided key influence. At the time, however, IPPOG did not have a sustainable source of "adequate funding" and a solution needed to be found to comply with the recommendations. It was up to the newly elected co-chairs to propose that

the members pay a small recurring fee to put IPPOG on sustainable ground and to bolster its mission in a scalable manner. This was easily said but not easily realized. IPPOG would need to re-structure itself, and it made sense to follow the model of an international experimental scientific collaboration.

To succeed, key decisions would need to be taken, while keeping all IPPOG members informed and on board. Writing the constitution, budget needs and goals for IPPOG's future as a collaboration turned out to be more complex and time-consuming than imagined. In discussions with RECOFA and CERN, important structural support was obtained. CERN agreed to provide IPPOG with half a fellow and other logistic support. These resources were used to add Barbara Gulejova as our scientific secretary, significantly bolstering the IPPOG coordination team. Her help re-writing the draft constitution, editing newsletters, organizing IPPOG meetings, being there for all small and big needs, having more hands, eyes, and deepening the exchange of ideas proved to be invaluable.

CERN Legal Services took over our draft constitution, shortening the page count considerably, while sharpening the paragraphs and reformulating its content in a legalistic way, where a typical physicist would simply wave a white flag and surrender. At last, the IPPOG Memorandum of Understanding was born and was accepted by vote. This was not without discussion: Fears of breaking IPPOG by becoming (too) formal were countered with demands to establish a stronger self-funded structure, and it was not clear how all this would evolve.

Fears aside, IPPOG continued to evolve its core activities, with the ever-popular International Masterclasses growing

steadily in numbers of participating countries, institutes, and, most importantly, participating high-school students, reaching numbers of over 14,000 annually. While particle accelerators and large-scale experiments are out of reach for most high-school students, cosmic rays are not. The idea of seeking synergies among the many diverse educational programs based on cosmic muons culminated in the "Global Cosmos" initiative. It provides a means for experts and leaders of local and national programs to meet and exchange ideas under IPPOG's umbrella, finding their way towards a truly global initiative.

Realizing the importance of engaging the next generation of young scientists, stakeholders, and the public at large to convey the values that fundamental science research, such as particle physics, generates for society is an IPPOG mandate. With IPPOG bolstered as a collaboration, recognition also comes from outside. Organizers of more and more conferences in particle physics explicitly invite IPPOG representatives to share ideas and report on their activities.

During my seven years, new members joining IPPOG include Australia, Belle II, Brazil, HAVC, Ireland, Montenegro, Slovenia, and South Africa, with Georgia on its way. Allowing for national laboratories to become close to IPPOG, associate membership was defined, and with it, DESY, GSI and Centro Fermi will soon join. As IPPOG membership grows, it becomes stronger, more widely respected, and strengthens its global reach.

With member representatives meeting twice a year, fruitful discussions on various topics follow almost naturally. Some of these are as simple as the organisational aspects of developing and running IPPOG activities. Others are on critical topics, such as how particle physics, with its large-scale infrastructure and international collaborations, is perceived from outside. Further discussions, such as those examining how to best explain the Higgs mechanism, or delving into deep questions on ethics, the beauty of science, or the meaning of "theory" in science compared to its meaning to the public at large, will stay in my memory as highlights.

Looking back at these seven years, I am happy to see how IPPOG evolved into a true scientific collaboration that is successfully tackling its mission in concerted global outreach, that is conducting inspiring discussions on relevant topics, writing articles and conference proceedings, and that is continuing to raise its impact in an ever-growing community over a larger and larger geographical global scope.

Looking forward, I am happy to see the new co-chairs, Steve Goldfarb and Pedro Abreu, together with Barbara Gulejova and Claudia Marcelloni, forming the IPPOG coordination team, taking IPPOG further, broadening its scope and impact globally.

All the best to IPPOG and to all who are active in IPPOG!



Hans Peter Beck  
IPPOG co-chair  
2013-2019

*HP Beck*



After 7 years chairing IPPOG, and turning the group into a scientific collaboration, HPB has ended its mandate.

**Steven Goldfarb**, Melbourne  
**Pedro Abreu**, Lisbon  
are the new chairs.

**Katharina Müller** is the Swiss representative

# Masterclasses — not in 2020 due to COVID-19

**Except in Bern** — where a Masterclass took place on 3 March, just before lockdown

A typical Masterclass day  
Here at Uni ZH (co-organized with ETHZ)



Very similar also at Uni Bern and Uni Geneva

In Zurich – focus on CMS

In Bern + Geneva – focus on ATLAS

In Lausanne – opportunity to add a focus on LHCb

International Videconference at end of the day (Uni BE and GE)

## Vormittag:

9:00 – 9:05

## Hörsaal Y15 G19

Begrüssung

( Prof. Florencia Canelli )

9:05 – 9:40

Einführung in die Teilchenphysik

( Simon Corrodi )

9:40 – 10:15

Beschleuniger und Detektoren

( Myriam Schönenberger )

10:15 – 10:45

Kaffeepause im Foyer

10:45 – 12:30

Führung durch das Physik-Institut

12:30 – 14:00

Mittagspause

## Nachmittag:

14:00 – 14:30

## Hörsaal Y15 G19

Einführung in das "Scannen" von Ereignissen

( Maren Meinhard )

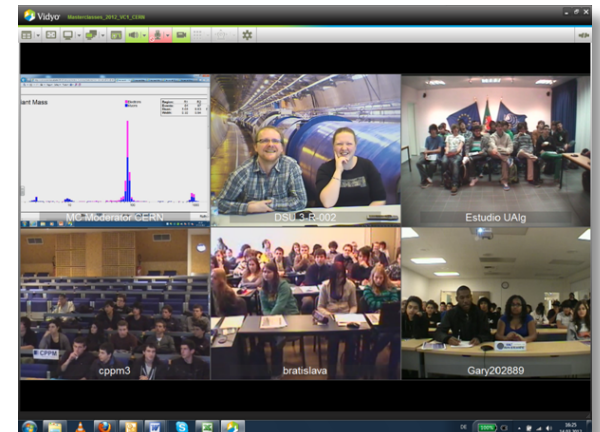
## Nachmittag:

14:45 – 15:45

## Computerräume

**Y01 F08, Y11 F49, Y11 G34 und Y11 G40**

Eventanalyse



No masterclass 2020 in Zurich (ETH&UZH) 65 applications but then we had to cancel the event

- **Science Lab UZH courses** for high schools topics: particle physics, cosmic rays, cosmology, neutrinos and energy about 20 courses, online and in person

- **Several outreach talks and interviews**

Laura Baudis: Elusives Network: A day in the life of a physicist

Laura Baudis: Springer Nature: Conversations with our Authors

- How Particle Physics Works:

Episode II – The New Analysis

<https://www.youtube.com/watch?v=krWPeFLLBFY>

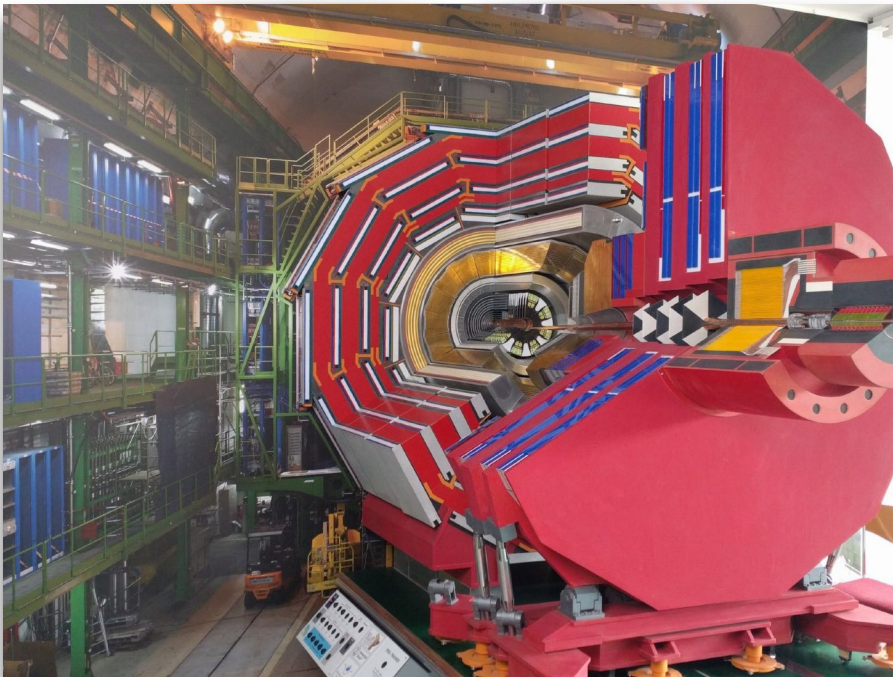
Flavour at Zurich: youtube channel

Katharina Müller

## Science Exploratorium @ UZH

The Science exploratorium at UZH, opening November 4, is a new window to the research activities within the faculty of science. It will have several interactive stations that put a spotlight on select research topics for example:

- superconductivity
- particle physics with a to-scale interactive replica of the CMS detector
- dark matter detector



Katharina Müller

## Scientifica 2019 – Zurich science days

Scientifica August 31 – September 2, 2019: Science fiction – Science facts with more than 30000 visitors

— Opening talk by Laura Baudis

— Booth by ETH and UZH with the focus on Dark Matter and Antimatter



Katharina Müller

Not many CERN visits this summer !!

But, in ZH we gave a common series of lectures at the Volkshochschule ZH in September about different aspects of Particle Physics, with the title "Rätsel der Materie". (see attach)

No masterclasses though, scheduled for March 20, 2020....

Christoph Grab

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VOLKSHOCHSCHULE  
ZÜRICH

18 TAGE<sup>100</sup>    KURSE ▾    CAMPU

Kurs: 20S-0110-01 RV i Beendet

Konzept: Robert Budaváry  
**Rätsel der Materie**

Die Frage, was die Welt im Innersten zusammenhält, treibt Physiker seit Jahrhunderten um. Aus was besteht die bekannte, woraus die Dunkle Materie? Wo ist die Antimaterie geblieben? Welche Rolle spielen Symmetrien und Asymmetrien? Wir nähern uns den Grenzen der Teilchenphysik und erfahren, welche Experimente geplant sind, um den Rätseln der Materie auf die Spur zu kommen.

- 03.09. **Die Suche nach neuen Teilchen** ▾  
Prof. Dr. Günther Dissertori
- 10.09. **Symmetrien in der Teilchenphysik** ▾  
Prof. Dr. Christophorus Grab
- 17.09. **Materie-Antimaterie-Asymmetrie des Universums** ▾  
Prof. Dr. Klaus Kirch
- 24.09. **Rätsel Dunkle Materie** ▾  
Prof. Dr. Laura Baudis

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Do, ab 03.09.2020, 4x, 19:30 – 20:45  
Uni Zürich-Zentrum, Rämistr. 71, Zürich  
CHF 105.00

## Summaries from institutes — PSI

PSI has a central unit for public relations which runs an extensive outreach program (typically focusing on applied topics).

- In “normal years” around 500 groups visit PSI.
- Presently guided visits are again possible but limited to the exhibition. Research facilities are not accessible for the public (due to the pandemic situation).
- If the guide is from the Laboratory for, this topic is emphasized
- In order to continue the outreach in spite of the Corona-restrictions, virtual visits have been offered (using zoom)

<https://www.psi.ch/de/media/forschung/forschung-online-erleben-mittendrin-statt-nur-dabei>

- Exhibition “PSI forum” has reopened (with the typical safety measures)
- On-site events (Lehrberufe al carte and public talks) were cancelled this year.
- The next “Open day” is planned for autumn 2021.

• iLab for schools (led by former particle physicist B. Henrich) runs again but without visits of research facilities (virtual tour to SLS is offered).

• Magazine “5232” in German and French (issue 3/2019 with focus on proton therapy)

<https://www.psi.ch/de/media/5232-das-magazin-des-psi>

• Press releases and news on the web-site. PSI specific PP topics are covered:

- <https://www.psi.ch/de/media/forschung/auf-der-suche-nach-einer-neuen-physik>

- <https://www.psi.ch/de/media/forschung/langlebige-pionisches-helium-exotische-materie-erstmal-experimentell-nachgewi>

- <https://www.psi.ch/de/media/forschung/dem-ratsel-der-materie-auf-der-spur>



Exhibit at forum:  
“rain of particles”  
(presently closed)

Malte Hildebrand & Tilman Rohe



## Activities of the Laboratory for Particle Physics (LTP) at PSI

LTP physicists are involved in outreach activities individually. Many have been suspended this year.

### •Youth

- Mentoring students, guiding young women to MINT subjects (Caminada)
- Short CMS-Clip International women's day (Caminada) <https://z-upload.facebook.com/CMSexperiment/videos/1299338800216339/>
- Supervising Martura-Arbeiten and internships
- Zukunftstag: typically not only the own kids are brought to PSI. This year's event is planned to take place (with restrictions)
- Assisting local schools as physics experts, e.g. by checking exam problems or participating in oral exams
- Visiting schools (Hildebrandt)

### •General Public

- Organizing and guiding CERN/CMS tours (Caminada, Horisberger, Ingram), not during pandemic
- Talks (Kirch). Some organizations have restarted their activities, e.g. Volkshochschule ZH:  
<https://www.vhszh.ch/kursangebot/detail/materie-antimaterie-asymmetrie-des-universums/20S-0110-04/>

### •University students

- Summer school in theoretical PP Zuoz every 2nd year (Signer, Spira). This year's event is postponed to 2021
- Contributing to schools organized by other organizations e.g. IEEE (Hajdas, Ritt, Schmidt-Wellenburg).
- Lecturing PSI-summer students (Soter)
- PP lab courses at a secondary beam line in cooperation with UniZH (Caminada), ETHZ and Uni Heidelberg
- Supervising all kinds of university students: semester works, master thesis, summer students

•NB: Virtual workshops and conferences can have a much reduced registration fee and the attendees save the travel costs. This makes them accessible to scientists/students from financially weak institutions. This could also be considered as outreach.

Malte Hildebrandt & Tilman Rohde

## Summaries from institutes — EPFL

### Activities of the **Laboratory for Particle Physics (LTP)** at PSI

- LHCb Masterclass at EPFL (27/02/2020): 25 students from the Lausanne region



- Presentation of the LPHE laboratory at the EPFL Open days, 14–15/09/2019



- Participation of LPHE members to the CERN Open Days, 14–15/09/2019
- Interviews by Lesya Shchutska on CHIPP/SCNAT web site, by Tara Nanut at the BBC and Maria Vieites Diaz in Spain media.
- F. Redi is the Head of the International Masterclass project for the LHCb experiment, and convenor for the LHCb outreach group

+ Information days and presentations to high school students + CERN visits + ...

Fred Blanc

# Conclusions

**COVID-19** had and has a **big impact** on our education and outreach activities. In 2021 the situation will be easier, and hopefully back to normal latest by 2022...

**Outreach activities** within science are intended to inform the **political platform**, the **informed public**, or the **potential young physicist**.

- Giving talks** to interested groups, open universities, schools, companies, societies, etc.
- Participating in Coordinated outreach** done at/by universities (cantonal and federal) and laboratories (CERN and PSI)
  - Open day events, Bachelor/Freshers information Days

**Involving teachers** and bringing them to CERN is notoriously difficult – we keep trying!

But many motivated teachers active with their school classes to visit CERN

**Outreach talks at schools** are important and indeed many CHIPP members do go to schools to give talks.

## Implementing the EPPSU will require broad support

Science Policy Reports

Hans Peter Beck · Panagiotis Charitos *Editors*

**The Economics of Big Science**

Essays by Leading Scientists and Policymakers

The essays in this open access volume identify the key ingredients for success in capitalizing on public investments in scientific projects and the development of large-scale research infrastructures.

Investment in science – whether in education and training or through public funding for developing new research tools and technologies – is a crucial priority. Authors from big research laboratories/organizations, funding agencies and academia discuss how investing in science can produce societal benefits as well as identifying future challenges for scientists and policy makers. The volume cites different ways to assess the socio-economic impact of Research Infrastructures and their role as hubs of global collaboration, creativity and innovation. It highlights the different benefits stemming from fundamental research at the local, national and global level, while also inviting us to rethink the notion of “benefit” in the 21st century.

Public investment is required to maintain the pace of technological and scientific advancements over the next decades. Far from advocating a radical transformation and massive expansion in funding, the authors suggest ways for maintaining a strong foundation of science and research to ensure that we continue to benefit from the outputs. The volume draws inspiration from the first “Economics of Big Science” workshop, held in Brussels in 2019 with the aim of creating a new space for dialogue and interaction between representatives of Big Science organizations, policy makers and academia. It aspires to provide useful reading for policy makers, scientists and students of science, who are increasingly called upon to explain the value of fundamental research and adopt the language and logic of economics when engaging in policy discussions.

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Beck · Charitos *Eds.*



The Economics of Big Science



**The Economics of Big Science**

Hans Peter Beck  
Panagiotis Charitos *Editors*

Essays by Leading Scientists  
and Policymakers

*Foreword by Rolf-Dieter Heuer*

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## The future of education and outreach



All my best wishes for **Katharina Müller** (Uni ZH), in her new role as CHIPP education and outreach coordinator !!