

IPPOG Global Cosmic Rays Portal

Making Cosmic Rays Studies available to schools worldwide

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Outline

- ❑ Why outreach in particle physics and related sciences matters
- ❑ IPPOG - strategic pillar for worldwide outreach
 - EPPSU context
- ❑ IPPOG New websites
- ❑ Global Cosmic Rays Portal
 - What? Who for? Why? How?
- ❑ IPPOG Resource Database & astroparticle physics community

Challenges of HEP / science community

Main challenges of scientific community

- Challenged financial support of large experimental endeavours
- Falling interest of young people to study physics and STEM
- Mistrust in science

Reasons

- Misperception of physics / science in society – complicated, abstract, disconnected from real life
- Lack of awareness and understanding

Why is physics & basic research misperceived?

Scarce exposure of society to modern physics

- ✓ School curricula – mostly no modern physics
- ✓ Media – misinformation and disinformation

Cell phones and computers were sewn into reality thanks to fundamental science.

Despite this:

Most students finish high school believing that there are only:

- 3 elementary(?) particles (electron, proton, neutron)
- 2 types of forces (gravitational and electromagnetic)

Why exposure of society to HEP matters?

Exposure to modern physics, like HEP and its technological applications **increases the interest of students in physics** and their perception of its role in society and sustainable development.

Study in Germany and UK:

General interest in physics at schools has increased strongly thanks to inclusion of extra-curriculum activities in HEP (exhibitions, Physics Masterclasses, teaching)!

European Particle Physics Strategy Update

CERN-ESU-014



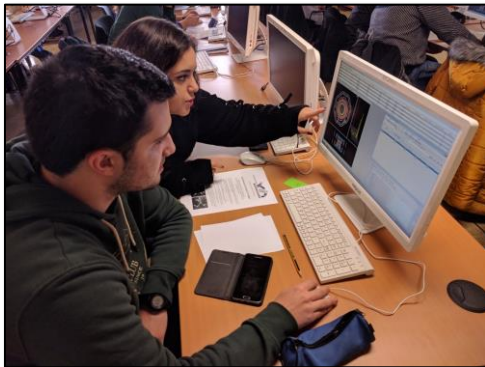
Exploring the fundamental properties of nature inspires and excites. It is part of the duty of researchers to share the excitement of scientific achievements with all stakeholders and the public. The concepts of the Standard Model, a well-established theory for elementary particles, are an integral part 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.**

7 

Environmental and
societal impact

Importance to update physics curricula is now officially recognised by full HEP community

International Particle Physics Outreach Group



- ✓ Outreach
- ✓ Informal education
- ✓ Extra-curricula activities

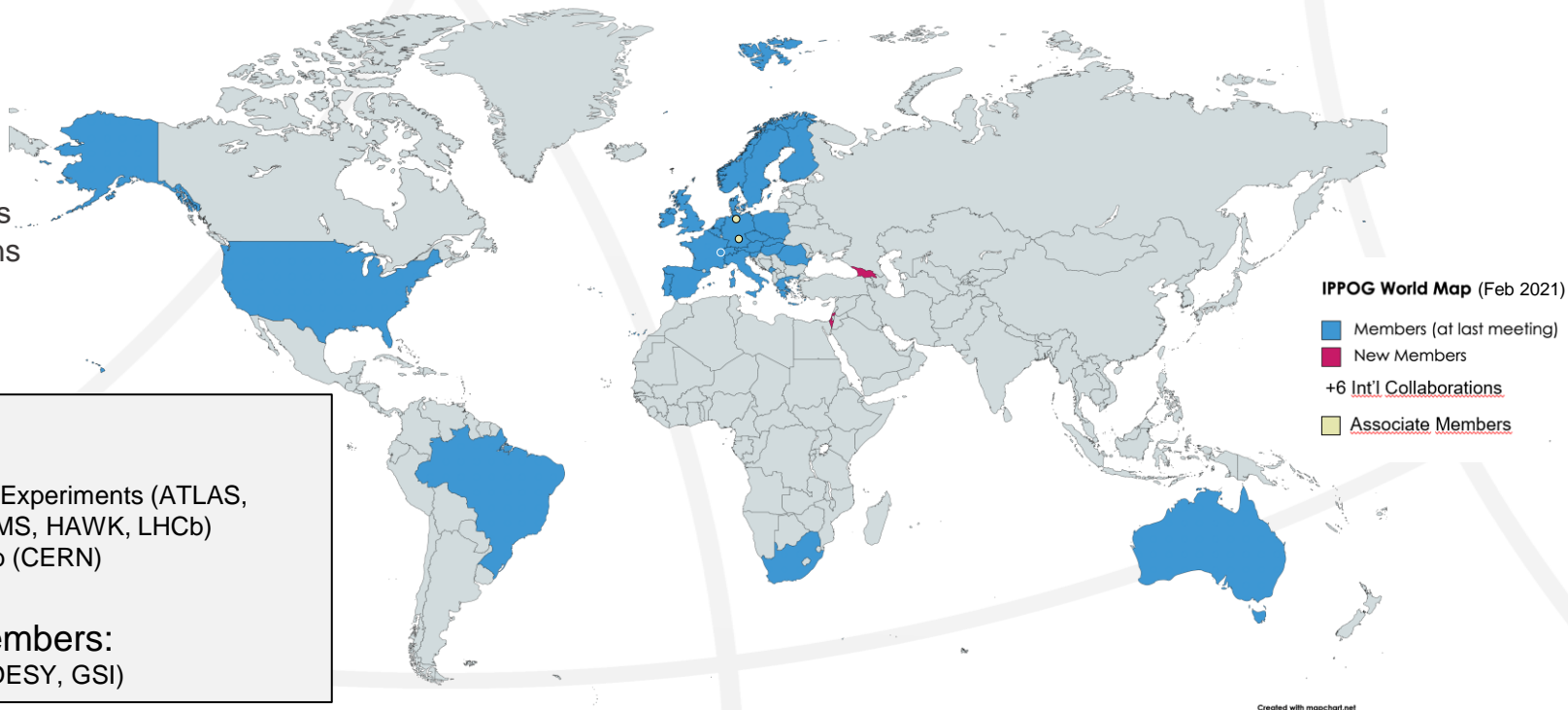
The way to bridge the gap between contemporary science and school education and increase appreciation of science by society

The International Particle Physics Outreach Group (IPPOG) has been making concerted and systematic efforts to present and popularise particle physics and related sciences across all audiences and age groups since almost 25 years.

Today, HEP and **scientific community has in IPPOG a strategic pillar** in fostering long-term, sustainable support for fundamental scientific research around the world.

IPPOG: Global Network

- Asia
- Africa
- Australia
- Europe
- The Americas
- International Labs and Collaborations



37 Members:

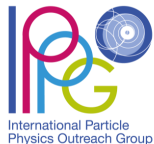
- 30 Countries
- 6 Collaborations / Experiments (ATLAS, ALICE, Belle II, CMS, HAWK, LHCb)
- 1 International Lab (CERN)

2 Associate Members:

- 2 National Labs (DESY, GSI)

Created with mapchart.net





IPPOG Collaboration

International Scientific Collaboration

- Active Researchers with Experience in Education & Outreach
- Experts in Communication & Education

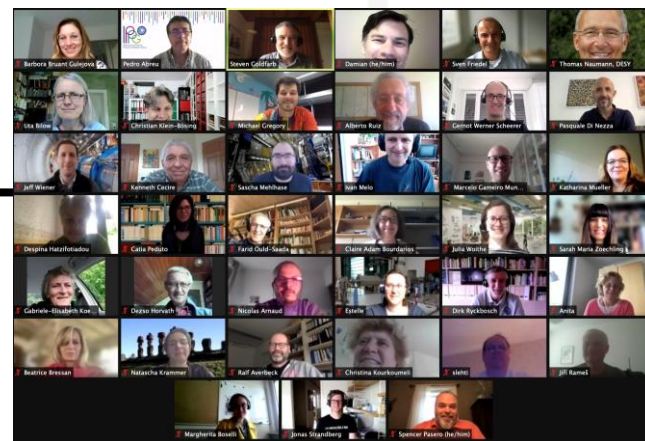
Mission

- **Establish Understanding** of scientific process
- **Instil Appreciation** of fundamental research and importance of evidence-based reasoning
- **Build Trust** with communities
- **Inspire Next Generation** of scientists

Organise Global Activities

Support Local Activities

- Sharing of expertise, best practices, resources to support events, kick-start activities



IPPOG meeting, May 2021



Activities with global reach

International Masterclasses in Particle Physics

- Flagship activity for high schools students (15–18 y.)
- Real Data from ATLAS, CMS, ALICE, LHC-b, Belle-II, MINERvA, Hadron therapy



Worldwide data Day

Global Cosmics

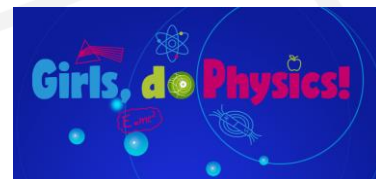
- Network of Cosmic Rays Projects for Schools
- International Cosmic Day and International Muon Week



Resource Database

- Primary source of particle physics outreach material in the world

... and many other projects, competitions, campaigns and activities...



Broad physics scope...

Physics topics

- Particle Physics and **related sciences**
- Beyond LHC physics
- Neutrinos
- Astro-particle physics
- Heavy ions
- Gravitational waves

IPPOG and astroparticle physics

Big added value for outreach!

- Everybody can see stars
- Easy to accept that particles are showered on us from the cosmos
- Cosmic studies are more “tangible” for the public...
- Connection to real life and curriculum

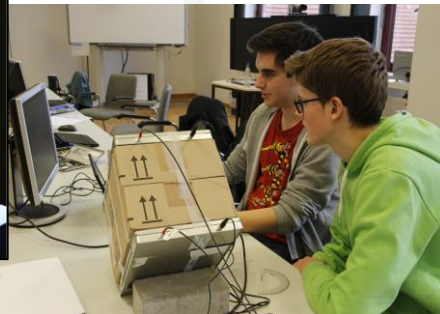
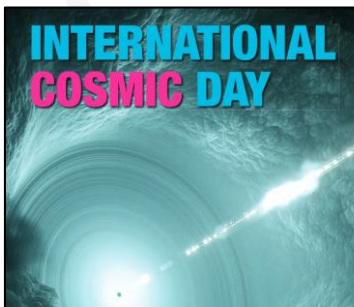


IPPOG and astro-particle physics

IPPOG has been promoting since many years...

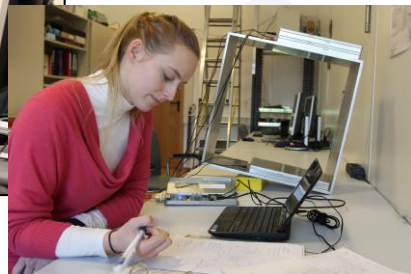
International Cosmic Day

- organized by DESY every year



International Muon Week

- organized by Quarknet every year



IPPOG – Community builder Global Cosmic Rays Studies

2010: **ASPERA meeting on cosmic ray detectors at CERN**

High school cosmic ray projects representatives expressed interest to:

- Develop common website with real data available
- Enable teachers and students worldwide with or without detector
 - to design and conduct cosmic studies
 - using data from existing projects

2015: **IPPOG meeting: Panel with 5 original cosmic rays projects**

- COSMIX, Extreme Energy Events, HISPARC, QuarkNet, Teilchenwelt Netzwerk
- Interest expressed from both IPPOG and projects to continue dialogue
- Partnership with APPEC discussed

2016: **Panel discussions on Global Cosmic Rays collaboration at IPPOG meetings**

- Continued common efforts and strategic discussion how to kick-off the project

IPPOG – Community builder Global Cosmic Rays Studies

2017: **Workshop on High School Cosmic Ray Experiments** in Rome, Centro Fermi

- 2 days meeting organized by IPPOG
- 25 experiments / cosmic rays programs shared information and experiences
- Identification of projects willing to provide experiments, results & data for educational purposes:
- Finland, France, Germany, Italy, Poland, Russia, Spain, Sweden, Taiwan, UK, US

2017 **IPPOG Global Cosmics Steering Group** created

- Convener: Carolin Schwerdt (DESY)
- All projects temporarily listed at the ICD website: <https://icd.desy.de/e49245/>

2018: **IPPOG New online portfolio development started....**

- Decision taken to build the Global Cosmic Studies Educational Platform as part of the new IPPOG website and developments...

IPPOG New Websites

IPPOG website major upgrade and build-up (2018-2021):

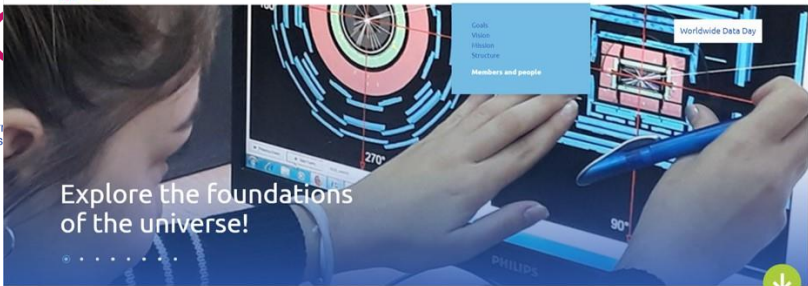
- *improve the user experience across the IPPOG digital portfolio*
- *strengthen IPPOG online presence by creating a new website including new Resource Database and new Global Cosmic Rays Portal*
- *greatly broaden the audience type and use of the webpages & available resources*

“IPPOG wants the new website to become more open to students, teachers and the general public”

Global Cosmic Rays Educational Portal

- **Universal platform** including **all available CR projects** (with open data)
- Information on **Astroparticle Physics**
- List of **all projects**, each with **entry webpage** with description and links, **World map**
- **Events:** possibility to request information, to join etc...
- **Resources:** - background information on detectors etc...
 - data, analysis tools
 - educational framework for students investigations
 - info on how to build, buy or borrow detector for classroom use

IPPOG wants to enable all teachers and students around the world to participate in cosmic rays studies all year long.



Explore the foundations
of the universe!

What's new

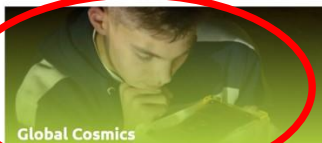


[VIEW ALL NEWS](#) [VIEW ALL EVENTS](#)

Activities



International Masterclasses



Global Cosmics

Projects and competitions

International

- Particles 4U
- Girls, do physicist!

National

- Creating Ambassadors for Science
- Music festival in Slovakia

[View all](#)

IPPOG Resource Database

From wonders to excitement

Example of text (might be changed in the future)
We contribute to global efforts in strengthening cultural awareness, understanding and support of particle physics and related sciences and in developing the next generation of researchers. More specifically, IPPOG's purpose is to raise standards of public outreach and science education efforts.



Matter, Particles and Universe



Exploring the Unknown



Technologies and Experiments



Particle Physics and Society

[Search for more](#)

About IPPOG



Example of text (will be changed in the future)
IPPOG is a network of scientists, science educators and communication specialists working across the globe in informal science education and outreach for particle physics. Particle physics is the science of matter, energy, space and time. Read more.

- Goals
- Vision
- Mission
- Structure
- Members and People

**New IPPOG website under development
Currently BETA-TEST!**

Scroll down





International Particle Physics Outreach Group

ACTIVITY

Global cosmic rays portal

Projects for High School Student

There are several projects around the world that address young teachers, to give them the opportunity to explore cosmic rays projects are presented below. For further information, please



- Astroparticle Physics
- Projects
- Events
- Requests
- How to obtain a detector for your classroom?
- Map
- About

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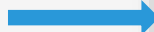
UK

USA

USA

Projects

Finland



France



Germany



Italy



Poland



Japan



Russia

Showers of Knowledge

Spain



Sweden



Taiwan



UK



UNIVERSITY OF BIRMINGHAM



QuarkNet Cymru

USA



Portal

Finland



Callio Lab is a new environment for underground research and other activities.

France



Germany



Italy



Events

Resources

Requests



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Calendar
For IPPOGers
Gallery

ICRC 2021, 19 July 2021, online

Cosmos à l'École



Intro
Website



INTRO

In France, a collaboration started several years ago between the "Institut National de Physique Nucléaire et de Physique des Particules" (IN2P3) of the CNRS and "Sciences à l'École", a project from the French Education Ministry which is promoting science in high schools and higher education. Large cosmic ray detectors called "Cosmodétecteurs" are built in the Marseille INCP3 laboratory (CPN4) and given to high school teachers selected by "Sciences à l'École". These teachers are trained prior to receiving the detector – a one week-long seminar at CERN, part of the High School Teacher program, plus a technical course in Marseillette learn how to use the apparatus. These teachers then exchange information through a dedicated internet forum and present the educational activities they develop with their Cosmodétecteur. There are currently 30 such detectors in France and 15 more will be released in 2017.

Experiment 1

Experiment 2



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PROPER URL (as part of GC portal):

<https://ippog.org/global-cosmics/cosmos-lecole>

NEXT STEPS:

- Beta-testing of IPPOG website till 31/8/2021 (test-ippog-d8-clean.web.cern.ch)

FEEDBACK WELCOME!

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- Collecting final input from all projects (Global Cosmics Steering Group)
- Publishing end 2021

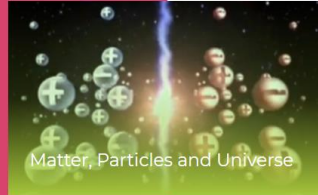
IPPOG Resource Database

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[Search for more](#)



New IPPOG Resource Database is / will be...

- form to facilitate the exchange of HEP E&O resources across the globe
- content including engaging materials (e.g. videos, posters, talks, hands-on activities, tools, etc.)
- content recommended by experts in the field
- to share wonders and excitement of HEP with students and general public
- readily understandable and regularly updated to reflect the current HEP landscape
- primary source of HEP outreach material in the world

Ideal place for educational and outreach materials also for Astro-particle physics community!

THANK YOU

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