



International Particle Physics Outreach Group

CERN HST 2018 teachers





International Particle Physics Outreach Group

Umbrella for PP outreach globally

- Network of scientists, science educators and communication specialists working across the globe in informal science education and outreach for particle physics
- Members come from the 22 member states of CERN + Brazil, Australia, Ireland, Slovenia, South Africa, the USA, and from DESY, CERN, five of the major experiments at the Large Hadron Collider (LHC), and the Belle II experiment at KEK's SuperKEKB accelerator in Japan.

PURPOSE:

- Raise standards of public outreach and science education efforts.
- Contribute to global efforts in:
 - Strengthening cultural awareness.
 - Understanding and support of particle physics and related sciences.
 - Inspiring the next generation of researchers.



International Particle Physics Outreach Group

- **Key partner in supporting CERN with its global mission**, in particular in CERN's efforts **to promote particle physics and to serve society on a global level** (bringing CERN educational and outreach activities to member states and outside of member states)
- Global forum to share **best practices on explaining hot topics of particle physics to lay audience**
- Reaching out to **high-school students and their teachers** to convey that beauty of nature and universe is understandable from elementary particles interactions

CREATING RESOURCES AND ACTIVITIES FOR HS TEACHERS

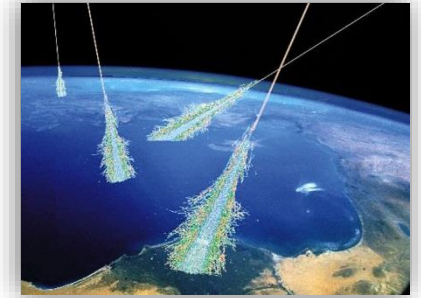
WE ARE HERE FOR YOU!!!!

HELP US TO HELP YOU!



Activities, programs, competitions for students and teachers

- INTERNATIONAL MASTERCLASSES
- WORLDWIDE DATA DAY
- COSMIC RAYS GLOBAL
- PARTICLES 4 YOU
- BEAMLINE FOR SCHOOLS
- CASCADE
- CREATING AMBASSADORS FOR SCIENCE IN SOCIETY
- DATABASE of EDUCATION and OUTREACH RESOURCES

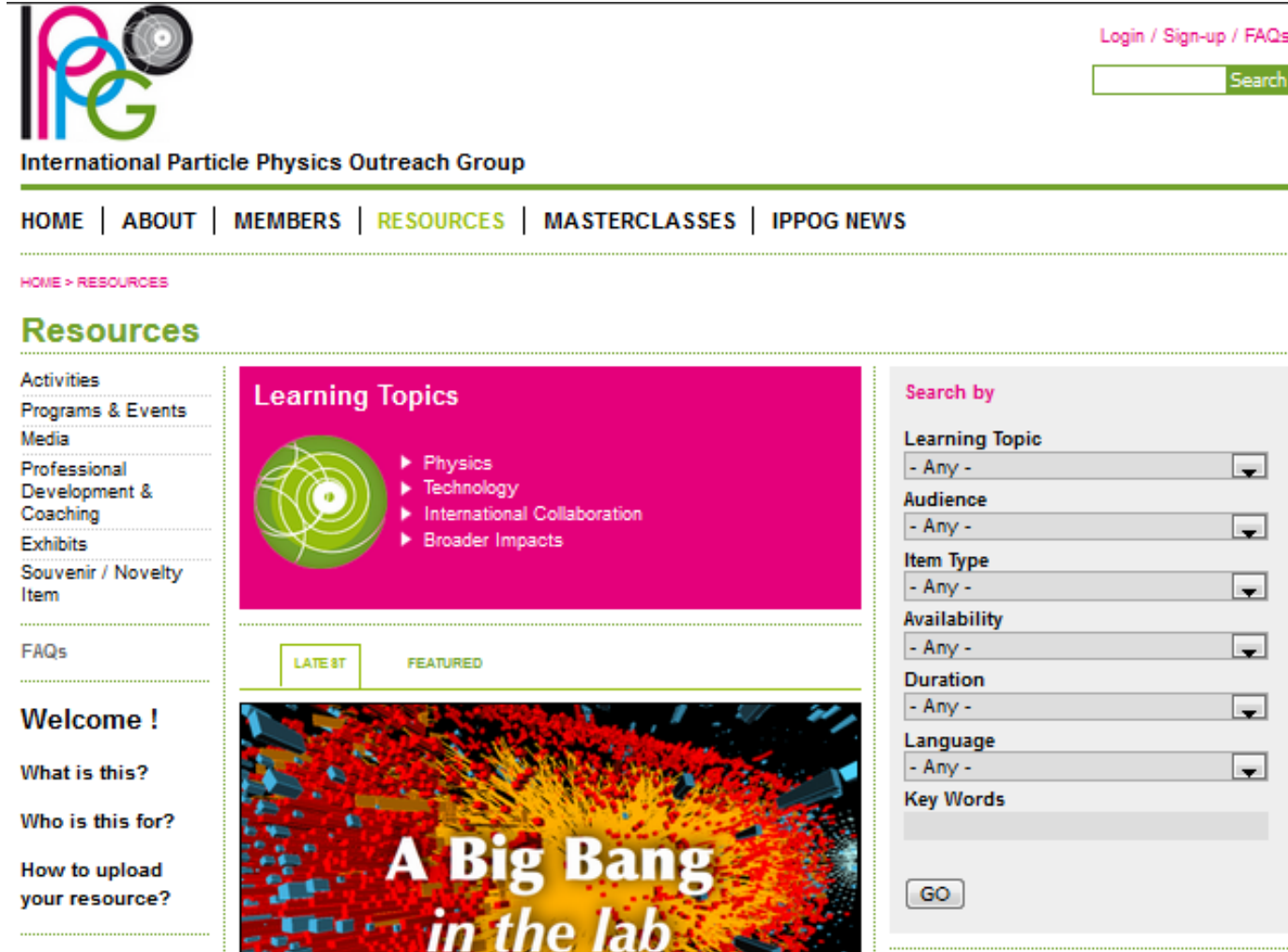


Learning Topics



- ▶ Physics
- ▶ Technology
- ▶ International Collaboration
- ▶ Broader Impacts

Database of educational and outreach resources on particle physics

International Particle Physics Outreach Group

HOME | ABOUT | MEMBERS | **RESOURCES** | MASTERCLASSES | IPPOG NEWS

HOME > RESOURCES

Resources

Activities
Programs & Events
Media
Professional Development & Coaching
Exhibits
Souvenir / Novelty Item

FAQs

Welcome !

What is this?

Who is this for?

How to upload your resource?

Learning Topics

- ▶ Physics
- ▶ Technology
- ▶ International Collaboration
- ▶ Broader Impacts

A Big Bang in the lab

Search by

Learning Topic
- Any -

Audience
- Any -

Item Type
- Any -

Availability
- Any -

Duration
- Any -

Language
- Any -

Key Words

GO

<http://ippog.org>

<http://ippog.org/resources>

New website and database are being developed !!!

Today especially for teachers and communicators

TASK:

Curation of existing resources

Proposed Working Group Tasks

Examine and Evaluate the Database Interface

- Is this something useful for you?
- How could it be made more useful for you?
- Do you agree with the proposed categories?
- When and how often would you use it?

Examine and Evaluate the Content

- Is there useful content?
- What do you want more of?
- How can the existing content be improved?

Curate the Content

- Rate content according to a scale (for example):
 - 0 = archive it
 - 5 = keep it no matter what
- Tag:
 - categories (topic, subtopic, item, audiences)
 - level of difficulty (standalone / needs guidance)
 - language

LANGUAGES NEEDED:
French, German, Italian

SKILLS WELCOME:
Web design / Graphics
Social Media
Marketing

HST 2017 Working Group G7



wiseGEEK

Database



Webpage

TEAM	
HST	IPPOG
Soleiman	Barbora
Katrin	Steve
Robert	
Rob	



Communication

<https://indico.cern.ch/event/572852/timetable/>

NICE SUCCESS STORY



“The workgroup activity with IPPOG has been a highlight of HST”



New IPPOG chairs

12th IPPOG meeting at CERN, the elections of chairs took place. From 4 candidates, IPPOG representatives elected a team of 2 co-chairs: and Steve Goldfarb for the terms of office from 1 January 2017 to 31 December 2017 and many thanks to Marge for her contribution to IPPOG in the role of co-chair.

as an IPPOG co-chair. It was a fun era and helping organize everyone. I look forward to "PPOG colleagues."

Setting up IPPOG into its Collaborative status was a major achievement is now behind us. Marge's wise and viewpoints US and Barbora's long hours on forums, and with support from V Council, in IPPOG, where we now to exploit our active status, with the help of Steve and Barbora, has great potential for IPPOG to grow further in scope and in reaching out globally all aspects of particle physics research and

Teachers working for IPPOG

IPPOG resource database and website revisited by high school teachers

During the 3 weeks [CERN HST 2017 programme](#) 43 high school physics teachers from many different countries spent several afternoons in working groups on different themes. IPPOG also proposed a working group this year and 4 teachers from Estonia, Iran, UK and US have been working on curation of [IPPOG resources database](#). The fruitful collaboration of mutual benefits and appreciation turned out to be extremely efficient exercise and contribution for IPPOG. There are more than 340 resources in IPPOG database. Firstly, teachers validated the new proposed curated categorisation for the upcoming new IPPOG website and resources database and then they curated big part of the resources (within their language limitations) and tagged them with new categories. Furthermore, they have proposed a user-friendly structure for the new IPPOG website and also a valuable communication strategy with the physics teachers around the world. They have identified the physics teachers associations in many countries actively seeking the collaboration with other teachers in HST program. The 'cherry on the cake' is the creation of "IPPOG friends" list / e-group, which includes today HST 2017 teachers and is expected to grow organically as IPPOG friends are spreading the word further...

Thank you for your valuable input which brought IPPOG further again!



"Thank you for such a memorable experience, it was truly great to work together and give something back to IPPOG and CERN. The workgroup activity has been a highlight of the HST."

- Robert Nickson, HST teacher, UK

Global cosmic rays studies

ACCOMPLISHMENTS

- Proposed curated categories validated
- Proposed DB search structure validated
- Large part of DB curated! – limits in language!
- Website structure proposed
- New communication channels identified!

IPPOG FRIENDS

43 HST 2017 teachers

GOOD START



Teachers will tell you more...

HST 2017 - IPPOG DB Curation

Fail Muuda Kuva Sisesta Vorming Andmed Tööriistad Pistikprogrammid Abi Kõik muudatused on Drive'i salvestatud

particles, quarks, bosons interactions

	A	B	C	D	E	F	G	H
	Item	Topic	Subtopic	Item Types	Audiences	Rating	Keywords	Comments
65	CERN lesson plan, Background material, units					5		as above
66	Cloud chamber diy manual	Technologies and Experi	Detectors	classroom materials	educators, upper second	5	detectors, cosmic rays, particles	
67	Solving the enigma of the universe	Matter, particles and unive	particles and interactions, or	presentation	broad public, educators, i	4	particles, cosmology, quarks, energy	
68	A question of survival							repeat link, different title, se
69	International cosmic day 2015							poster for this event, out of
70	Alice, a voyage inside the core of n	Technologies and experim	Detectors	video	broad public	3	detectors, alice, quark gluon plasma	
71	ALICE videos for open days 2013	Technologies and experim	Detectors	video	broad public	3		badly named file, sounds di
72	A new particle is discovered, a Hig	Matter, particles and unive	Higgs Boson	video	broad public, educators	4	higgs, boson	change name to The Discov
73	The Higgs Boson	Matter, particles and unive	Higgs Boson	poster	educators	5	higgs, boson	
74	A salad bowl accelerator	Technologies and experim	Accelerators	project	educators	5	accelerator model	
75	Build a cloud chamber							web version of line 66
76	The basics of the Higgs boson	Matter, particles and unive	particles and interactions	lesson plan	educators			needs log in
77	A la rencontre des aceleratures des particules							cannot comment, in french
78	Beamline for schools competition							2013, out of date, remove
79	Le mysteries des rayon cosmique							in french, cannot comment
80	CMS HEP tutorial	Particle physics and sociel	why fundamental research	simulation	educators, upper second	5	data analysis, boson, discovery	
81	Quark poker							in french, cannot comment
82	Particle masses, what if they had been different							Dual language, english link

Sheet1

Avastamine



<https://cds.cern.ch/record/2275522>

<https://mediastream.cern.ch/MediaArchive/Video/Public/Conferences/2017/572852c67/572852c67-2000-kbps-1280x720-30-fps-audio-96-kbps-44-kHz-stereo.mp4>

INSTRUCTIONS

- Study IPPOG website: <http://ippog.org> and IPPOG database: <http://ippog.org/resources>
- Materials to be found here: <https://drive.google.com/drive/folders/0B3h931xL91ixUEXUXzlOSEEzalk>
- Curated resources - Work of teachers from HST 2017 on IPPOG DB...
https://docs.google.com/spreadsheets/d/1sPLv85xzL1uvjxeKuEI8YrbeC_9YSHS2ckRCA7Sh0HY/edit?usp=sharing
- Presentation about the HST+IPPOG WG 2017:
https://indico.cern.ch/event/674777/contributions/2761690/attachments/1551000/2436637/HST_Teachers_IPPOG_DB_website_BBG.pdf
- Link to video of presentation:
<https://mediastream.cern.ch/MediaArchive/Video/Public/Conferences/2017/572852c67/572852c67-2000-kbps-1280x720-30-fps-audio-96-kbps-44-kHz-stereo.mp4>
- <https://cds.cern.ch/record/2275522>

MORE DETAILS ON IPPOG ACTIVITIES

IPPOG International Masterclasses

<http://physicsmasterclasses.org/>

- High school students (15-19) get to be “Researchers for one day” at their local university or research institute
- They analyze real LHC data, for example they “rediscover” Higgs boson

How does it look like?

- Lectures to introduce particle physics, experiments and detectors
- Sometimes includes a guided tour of local labs (if available/time allows)
- Lunch with lecturers, staff, PhD students
- Hands-on session where students work in pairs to make measurements on data
- Discussion and combination of results, together with other institutes from around the world, via video conference



- Very rewarding experience, both for students and teachers
- Evaluations show that events have a relatively strong influence on the students' long-term interest development in particle physics
- Independent of gender and level of education



15000 pupils in 46 countries analyse real LHC data through “International Masterclasses”



International Day of Women and Girls in Science

www.un.org/en/events/women-and-girls-in-science-day/

Focus on gender equality

Dec 2015: UN General assembly adopted a resolution → establish an International Day to recognize the critical role women and girls play in science and technology communities

International Day of Women and Girls in Science : Feb 11th, since 2016

- To support and promote the access of women and girls to science education and research activities
- MCs for girls around Feb 11th with female lecturers and moderators
- Reaching to hundreds of girls every year...

http://physicsmasterclasses.org/index.php?cat=women_in_science





<https://quarknet.org/content/lhc-world-wide-data-day-2017>

24 hours in which students around the world can analyse LHC data and share results via ongoing 24h videoconference with physicists working around the world

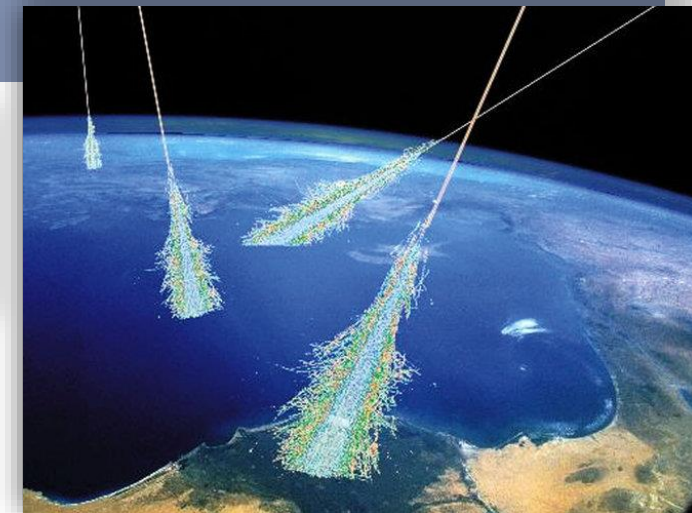


Cosmic rays global educational platform

New project being designed based on all existing educational projects on cosmic rays

<https://icd.desy.de/e49245/>

- establish a 'universal' portal through which successful cosmic ray studies programmes can reach out to teachers and students around the world
- common webpage on cosmic rays would contain all the resources available today, including background information, data, analysis tools, an educational framework for students' investigations, a place to post results
- teachers and students worldwide will learn how to build, borrow or purchase a detector for use in the classroom



<https://icd.desy.de/>

QuarkNet

Helping Develop America's Technological Workforce

Home Data Portfolio

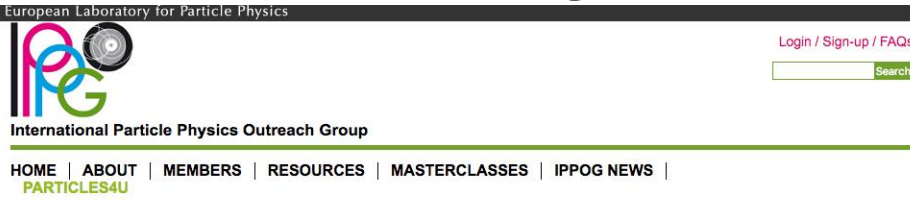
International Muon Week

<https://quarknet.i2u2.org/group/international-muon-week>

IPPOG Competition Particles 4 You

Competition for primary and high school

“Creating tools showcasing particle physics presence in every-day lives”



HOME > THE IPPOG PARTICLES4U COMPETITION

The IPPOG Particles4U Competition

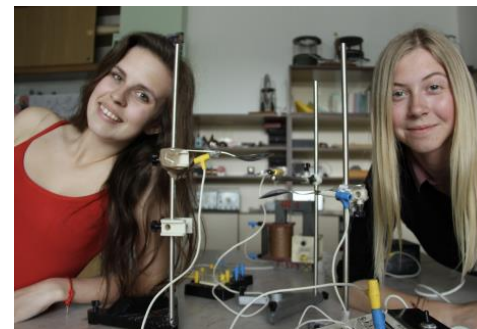
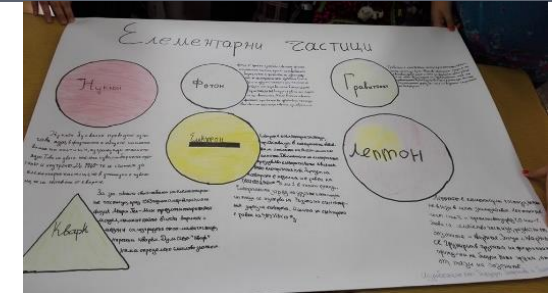


Particles4U

Particles4U is a competition for young students and teachers, sponsored by the European Physical Society (EPS), and organised by the International Particle Physics Outreach Group (IPPOG). We at IPPOG are scientists, communicators, and educators engaged in particle physics outreach around the world. But, sometimes, we need the help of experts, and that is where you come in...

Translated to 16 languages!
Almost 100 participants from 16 countries!

Winning teams received cosmic detector, certificates handed out during the Visit and lecture of real PP scientist in their school





Beamline for Schools

Worldwide competition for high school students (16-18) to propose and run the experiment

Winning teams are invited for 10 days at CERN and work on the experiment with CERN experts!

200-300 teams from schools around the world engaged in B4S!



Cascade Competition

CASCADE
competition



CASCADE of KNOWLEDGE... from High School students to wide public

<https://www.birmingham.ac.uk/schools/physics/outreach/Secondary-Schools/cascade.aspx>

Teams of 3 high school students film 15 minutes presentation of their physics project

Winning teams present in front of upto 500 people including their parents, friends, school etc...



Classroom to Boardroom

Creating 21st century problem solvers who innovate as technologists, think as entrepreneurs, and act as social change agents - making Global Goals everybody's business

**Business challenge for 28 16-years old students
from International School by CERN / IPPOG**

**“Creating Ambassadors of Science
in Society”**

18-21st of June 2018