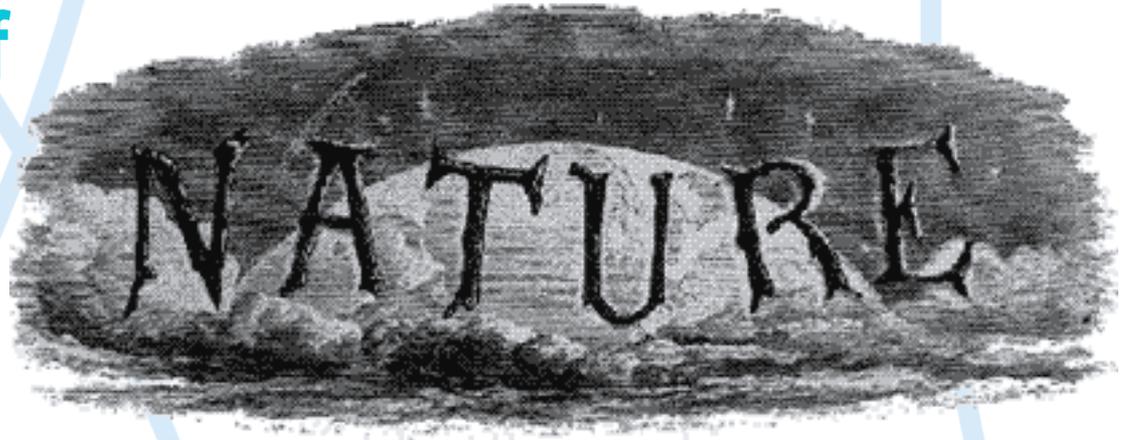




Report to ECFA, November 24th 2016

Hans Peter Beck: IPPOG Co-chair, Bern University
Marjorie Bardeen: IPPOG Co-chair, Fermilab

1st issue of



Nov 4, 1869

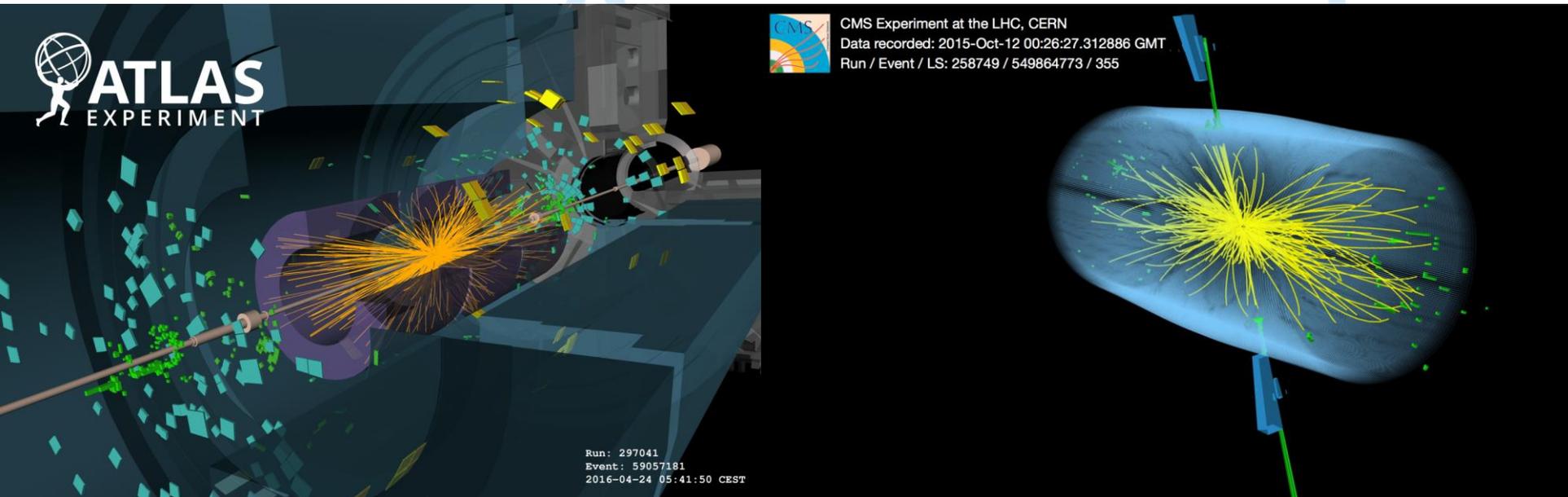
A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE

<http://www.nature.com/nature/about/first>

'The objective which it is proposed to attain by this periodical may be broadly stated as follows. It is intended, **First, to place before the general public the grand results of scientific work and scientific discovery; and to urge the claims of science to move to a more general recognition in education and in daily life.**

'**Secondly, to aid scientific men themselves, by giving early information of all advances made in any branch of natural knowledge throughout the world, and by affording them an opportunity of discussing the various scientific questions which arise from time to time.**'

13 TeV pp Collisions



Truly an amazing achievement
the biggest complex machinery ever built
possible with a world-spanning collaborative effort,
advancing knowledge in the most fundamental questions
about our Universe!

Critical Outreach

Explaining and reaching out particle physics is a critical necessity for all involved in particle physics research to engage in.

➤ **Planting seeds**

- building up the next generation of curious minds
some may even chose **particle physics**

➤ **Satisfying the curios minds**

Curious minds want to get fed

➤ **and particle physics is offering a lot of food**

- **Fundamental physics** and the **whereabouts of the Universe**
- **Human endeavor** and **human culture**
- **Bridging cultures** and nations in world-wide collaborations and show-casing how we can work together
- **Advances and pushes technology** and creating spin-offs (www, medical, and much, much more)

Critical Outreach

Whom to reach out

➤ Young students

- Planting seeds in **young curious minds** is most effective
 - these will continue being **curious minds in society**, some may become **scientists** or even **particle physicists**, some will become **decision makers**
 - all will be **tax payers** and **voters**

➤ Broad public

- To allow for transparency as is natural in all open, democratic societies
- Be aware that not all are interested

➤ Decision makers

- Politicians and funding agencies

The right level of language is crucial to whomever you talk and needs reflecting the message and complexity you want to convey

Don't care and don't want to know

Not everybody wants to know and not everybody cares in advancing knowledge

some ignore science
some are even against science

Should we care ?

Yes !

Science literacy of a society is as important as literacy itself

We live in a modern world

A basic understanding of the tools and methods developed by a scientific approach that shape so much our daily life is indeed relevant

If we fail, we risk an unbridgeable gap in society



©Brian McFadden (2001-2009)

Reaching out further

How to reach out to the non-interested?

This is a **challenge** that cannot be addressed with exposing scientific tools and methods even stronger

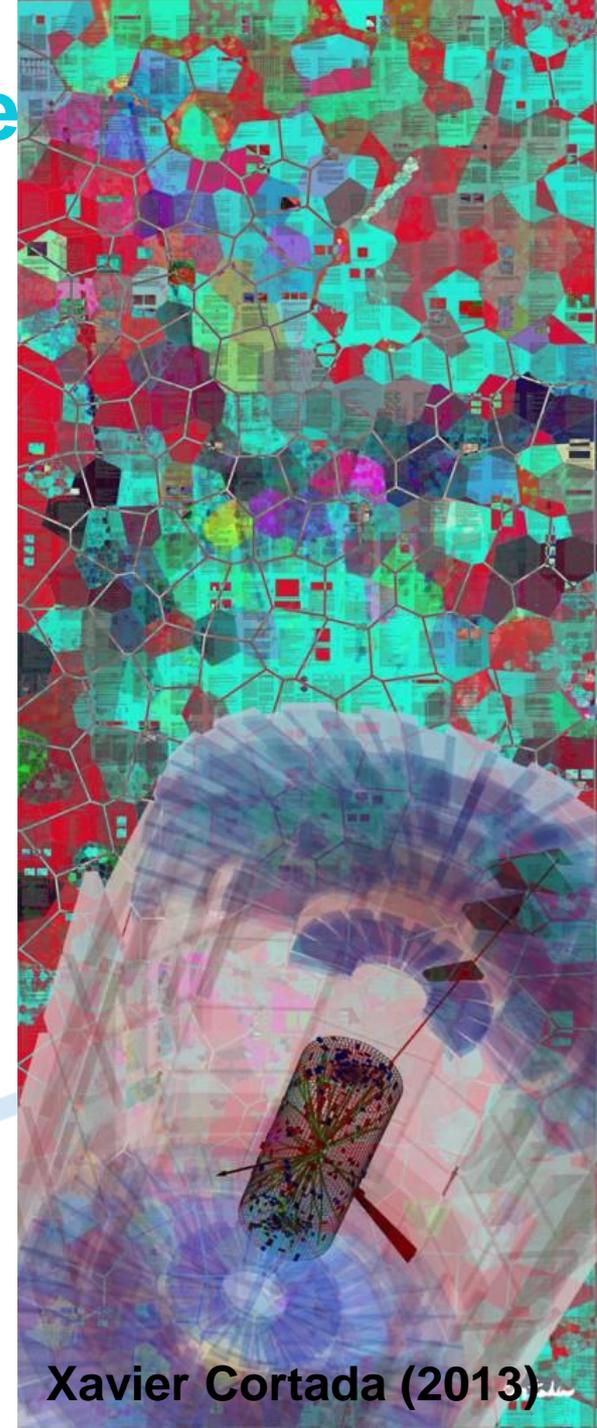
However, **different routes** can **share our enthusiasm** with a wider **audience**

Art involving science topics are a possible way to widen the audience

to share excitement

to trigger reflections inside peoples minds on the universe, on science, etc. that otherwise would never happen

There is no need for everybody to become an expert – but **enabling curiosity and apprehension** matters



Things that need correcting

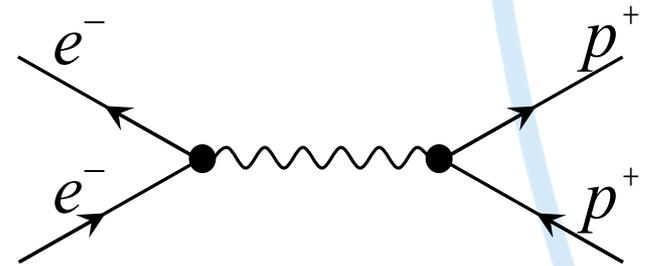
prejudices and perceptions
of the broad public
that could come up

'irrelevant science of things'

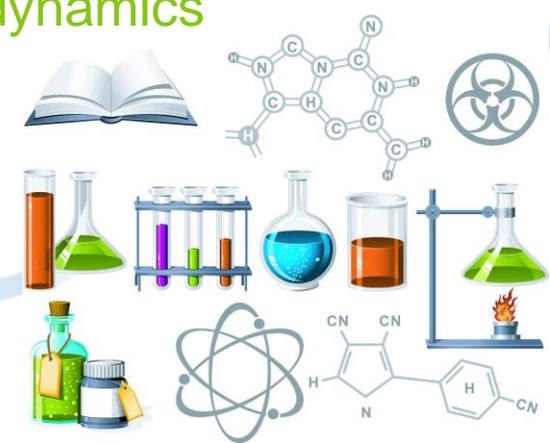
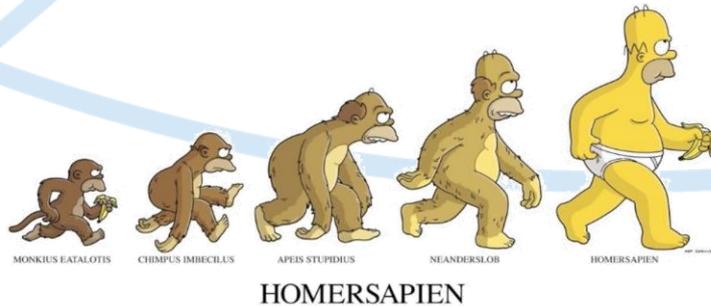
Prejudice: Physics is often perceived as the 'science of things' and therefore detached (i.e. irrelevant) from life, the universe and everything.

Don't be shy to state that (particle-) physics is the fundamental base for all understanding of life, the universe and everything

i.e. Chemistry is based on physics
 quantum mechanics, (quantum-)electrodynamics
 Biochemistry is based on chemistry
 Life is based on biochemistry



No Hydrogen without particle physics!



'it's calculated – why measure?'

Prejudice: Everything can be calculated and there is no need for experiments accelerators and other infrastructure are just toys for boys and girls

Use the chess analogy to counter state

Physics elaborates on finding the rules on how the Universe works

These rules are like the rules of the game chess

Knowing the rules opens up to understand chess and play the game

However, an individual chess game is way open on how it can evolve.



Further, the rules we found have been validated only within a limited energy scale (high energy frontier, low energy precision measurements), that we cannot rely on these rules beyond the limits these are validated.

New physics, i.e. extending the rules we know, is possible and is a big driving force in fundamental research.

'it's calculated – now its dull!'

Prejudice: Whatever is explained by science becomes dull and loses its mysteries, fascination and wonders.

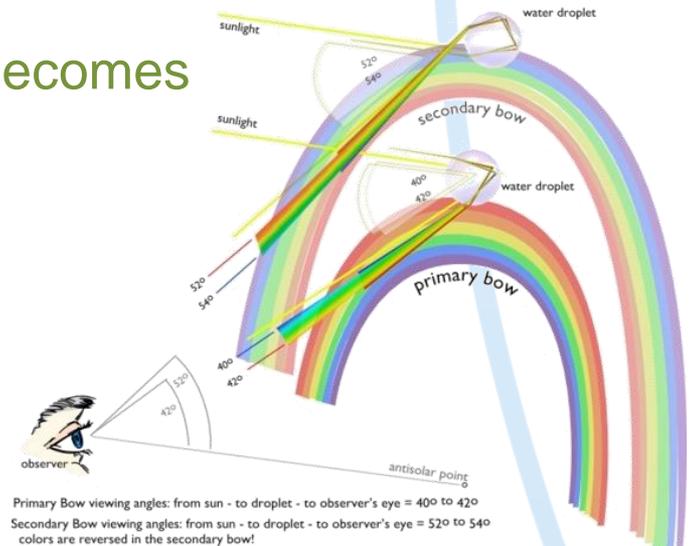
The contrary is true !

Use the archeological site analogy

If you don't know about the site you are visiting, all you see is a pile of old stones and perhaps some funny (maybe appealing) ornaments and scripture.

The more you know about the ancient culture, their habits and their lives, the more interesting the archeological site becomes.

Physics opens up understanding nature, and allows enjoy nature more and more.



‘it’s calculated – now its dull!’

Prejudice: Whatever is explained by science becomes dull and loses its mysteries, fascination and wonders.

The contrary is true !

Use the **archeological site analogy**

If you don’t know about the site you are visiting, all you see is a pile of old stones and perhaps some funny (maybe appealing) ornaments and scripture.

The more you know about the ancient culture, their habits and their lives, the more interesting the archeological site becomes.

Physics opens up understanding nature, and allows enjoy nature more and more.



The Gannarve megalithic ship grave on the island Gotland in Sweden.

'particle physics detached from life'

Prejudice: New findings by particle physics experiments are so detached from real life and from real problems that these are of no concern anyhow and therefore of no use.

It's true that knowing the Higgs existing and its mass doesn't change every days life.

Knowing that there is a Higgs mechanism responsible for mass of elementary particles, and that mass is fundamentally needed for allowing structure to build up in the Universe, put's this knowledge on a different scale. We simply wouldn't exist without the Higgs mechanism in place!

All after all, it's all about the Universe in the end being Intelligible and in a combined effort, we can learn how it works.

'science findings don't last'

Prejudice: Established knowledge is only valid for a short moment in time and thrown over board immediately when new findings come in. As this happens iteratively, there will never be anything useful worth trusting. Science (and scientists) can't be trusted.

Although bad examples do exist e.g. in clinical studies based on too small or biased samples, this is not true in general.

The work and findings of e.g. Newton and many, many more, is still valid today;

although general relativity supersedes Newtonian mechanics, we now know exactly how well Newtonian mechanics works and where the limits are.

Empirical established knowledge will stay forever as part of human culture.

The existence of the Higgs boson will stay, but it's role in nature is still open for future refinements.

IPPOG

International Particle Physics Outreach Group

an example for concerted and systematic effort for outreach

Enabling Outreach Globally

as a Collaboration in a collaborative effort

– an International Network

Current members come from the 22 member states of CERN, Australia, Ireland, Slovenia, South Africa, the USA, and from DESY, CERN and five of the major experiments at the Large Hadron Collider (LHC).

International network of (mainly) **physicists** who commit a fraction of their time in **education** and **outreach**.

These are your **local contacts** in your **country, laboratory,** and **experiment** when you need, **advice, help, support,** in your education and outreach activities.



IPPOG Fall meeting
2015 – CERN
Incl. half-day session
with EPPCN

IPPOG meets twice a year in Spring and Autumn to discuss and exchange **thoughts** and **success stories**, get **inspirational ideas**, and getting **organized world-wide**.



IPPOG Spring meeting 2016 – Krakow, IFJ PAN

IPPOG'S PURPOSE

Strengthening the sustainability, reproduction and growth of outreach activities in particle physics

through the provision of reliable and regular discussion forums and information exchange for science institutions and laboratories as well as for individual scientists engaged in science outreach and informal science education world-wide

Raising standards

for outreach and informal science education initiatives by proposing and implementing strategies designed to share lessons learned and best practices for outreach in particle physics and related fields

Providing explanatory materials

for helping disseminate results from particle physics and related subjects.

IPPOG an umbrella for making outreach global

CERN Courier June 2014

Education



High-school students from all geographical regions master real event-display programmes, software tools and analysis methods. Having been introduced to the problem, they identify electrons, muons, photons and jets by exploiting their characteristic signals in various detector elements, perform event selection and categorization, and achieve the final analysis goals. (Image credits, left to right: Caroline Hamilton/CoEPP/University of Melbourne, Jayne Ion/ION creative, Franziska Viebach/TU Dresden.)

International Masterclasses in the LHC era

Each year in spring, the International Particle Physics Outreach Group organizes the International Masterclasses, which give students the opportunity to analyse data from the LHC.

The International Masterclasses (IMCs) began in 2005 as an ini-

ATLAS "discovery" data are available for students to Higgs boson, CMS approved 13 Higgs candidates in th of interest, which are mixed with a more abundant san Z events, for "treasure hunt" activities; ALICE data a to study the relative production of strange particles, w a tell-tale signal of quark-gluon plasma production; L students how to measure the lifetime of the D meson; containing b and c quarks are studied extensively to slu mystery of antimatter in the universe.

Students quickly master real event-display progra

IPPOG

Reaching out with particle physics

How do we communicate about the LHC as a discovery machine, following the Higgs boson of 2012? How do we take the particle-physics masterclasses to new countries, age groups and settings? What makes a good educational game? How do we join in the existing national cosmic-ray-detector programmes, to take them further? These were some of the questions addressed at the 9th meeting of the International Particle Physics Outreach Group (IPPOG), which took place in Paris on 16–18 April.

common project or for an activity going on in only one country. Between the meetings, work continues and ideas are tested: do they work, for example, with real students and teachers? Other topics on the agenda of the recent meeting included discussions on how to boost the educational use of CERN open-access data, and how to bring science education and outreach to particle-physics conferences in a more effective way. There was also news on web resources, exhibits and programmes for teachers and students in the

the communication between researchers, teachers and participants goes on across a longer timescale, may become particularly important. At the other end of the spectrum are the "masterclasses in a box", which are based on printed images and foreseen for settings where no computers are available.

There were also presentations on activities such as the most recent edition of the International Cosmic Day and the International Muon Week. These are crucial when the goal is to have more modern and

International Masterclasses, the flagship activity of IPPOG trained over 13'000 students and 1'000 teachers in Spring every year !

Over 200 institutions in over 46 countries participating.

CERN Courier June 2015

Faces & Places



IPPOG's participants in Paris. (Image credit: Dominique Longieras/LAL-Orsay.)

**CERN Courier
June 2014 edition
&
June 2015 edition**

IPPOG NEWSLETTER

SEPTEMBER 2015

A word from the coordinator

LABORATOIRE DE L'ACCELERATEUR LINEAIRE



IPPOG meeting, 14-15 April 2015, Paris

After a very interactive and productive spring meeting in Paris, IPPOG is now ready to take several new actions and continue its sources! The future of IPPOG is very promising and a lot of updates. We hope you enjoy this first number of IPPOG newsletter and its next meeting in autumn at CERN.

Hans Peter, Margie

Universe of Particles - Explore, Discover
International network of scientists, science educators and science and education and outreach for particle physics.
Vision for the future:
Understanding and enthusiastic support of particle physics and research.

IPPOG's current members come from CERN's 21 member states, plus Ireland, Romania, and institutions in Europe and USA and 5 other experiments of LHC. Since 2013 the number of

"The discovery of Higgs boson is not the end of the story... it is just the beginning of a new era... The scalar era!"

- IPPOG on LHC as a discovery machine

"Higgs-what now?"

IPPOG feels the need for LHC Run 2 strategy especially in the context of fundamental research in particle physics and scientific audience acceptance.

"How to prepare/approach the discovery of the Standard Model?"

IPPOG NEWSLETTER

FEBRUARY 2016

A word from the coordinator



IPPOG meeting, 6-7 November at CERN, IPPOG & EPPCN family

Last | produ be pr succe contrit
The li an off with s consit Under Legal soon 2016 Joyful formal tific i welco

Our membership is growing worldwide and IPPOG is becoming truly international and several others intend to become members this year. In terms of conference education and outreach contributions on behalf of

The last IPPOG meeting in November 2015 at CERN (<https://indico.cern.ch>) was fruitful. Tradition from 2014 continued, and EPPCN colleagues joined it was opened by the new CERN DG, Fabiola Gianotti, who stressed the EPPCN. The former Head of the Education and Outreach Group of Landua, also highlighted the importance of IPPOG and the willingness future. The program of the meeting was very rich and diverse and we about the highlights in this second edition of the IPPOG Newsletter.

Wishing you a great and successful 2016. We look forward to see you 19-21 May in Cracow.

Hans Peter, Margie and Barbara

IPPOG growing truly international



expressed interest for membership and potential candidacy for membership is in the pipeline!

Page 1

IPPOG NEWSLETTER

NOVEMBER 2016

Number 3

A word from the coordination team

Dear IPPOGers,



IPPOG meeting, 19-21 May 2016, Krakow

This third edition of our newsletter, which is much inspired by the Spring **IPPOG meeting in Krakow** comes out just before our next meeting at CERN (10-12 November 2016) - at a time when IPPOG has never been so close to becoming an official collaboration which allows us to professionalise the personal investments we all make in IPPOG. In this way we can steadily increase the impact we are able to have. Even though setting up the IPPOG Collaboration turned out to be much more complex and a much longer process than originally imagined, now the final MoU document is circulating and signatures are indeed coming in.

IPPOG is an international body open for new member countries, laboratories and experiments to join. With Australia, Ireland, South Africa, United States of America and more recently Slovenia, we are clearly stepping into the global realm of collaboration. With the burden of the MoU writing and collaboration building (almost) behind us, IPPOG can now concentrate on growing its activities. We will be discussing adding a training program and 'cosmic rays going global' to IPPOG's core activities. Broadening the scope of masterclasses, the flagship activity of IPPOG, geographically and in physics content will be key for continued success. The efforts to improve the IPPOG web-presence will soon materialise.

We wish you fun reading this newsletter, great meeting at CERN and wonderful end of 2016!

Hans Peter, Margie and Barbara



DOWNLOAD the electronic form of this newsletter with clickable hyperlinks at:
http://ippog.web.cern.ch/sites/ippog.web.cern.ch/files/IPPOG_newsletter_November_2016.pdf



IPPOG pilots World Wide Data Day

Imagine a 24 hour span of masterclass-like videoconferences for students and teachers in the schools. To cover that, we'd need world-wide collaboration. And the students would need simple measurements that their teachers can readily explain. Well, we are getting there with the pilot of World Wide Data Day (www.wide-dataday.org) on 2 December this year. Students will measure theta and phi of muon tracks in dimuon events from online ATLAS and CMS displays and try to understand their distributions. Physicists at TRUMF, CERN, Fermilab and even in Australia will be on hand to help them see the big picture when they connect on Vidyo.

Contact Ken Cecire (kcecire@nd.edu) to discuss how you, a colleague or a good physics teacher you know might be involved.



Page 1



IN THIS ISSUE

★ IPPOG worldwide

- IPPOG's growing membership
- Worldwide spotlights
- Popular E&O sessions at conferences
- IPPOG - key partner of CERN
- IPPOG article on ethical issues in PP
- Exhibitions worldwide
- RECFA supports IPPOG Collaboration

IPPOG internal affairs

- IPPOG Collaboration MoU signatures being collected
- 12th IPPOG meeting at CERN

IPPOG activities

- IPPOG pilots World Wide Data Day
- IPPOG discusses theory in science and everyday language
- Masterclasses 2017

12th IPPOG Meeting Nov 10-12, 2016

<https://indico.cern.ch/event/573645>



Explaining PP hot topics to lay audience

Organising E&O sessions for LHCP and ICHEP

Table top experiments

Masterclasses in New Countries

Beamline for schools 2016 and call for 2017

Broadening the physics scope of Masterclasses

Inspiring success stories

Special events and exhibitions

Masterclasses 2016

IPPOG website

MoU discussion

Country highlights

An inside view from IPPOG

Impact and usage of worldwide open data

Ethics in particle physics

Physics for everyone - The Higgs particle

Election of new chairs

IPPOG's Flagship: International Masterclasses

High school students (15 – 19) are
„scientists for one day“

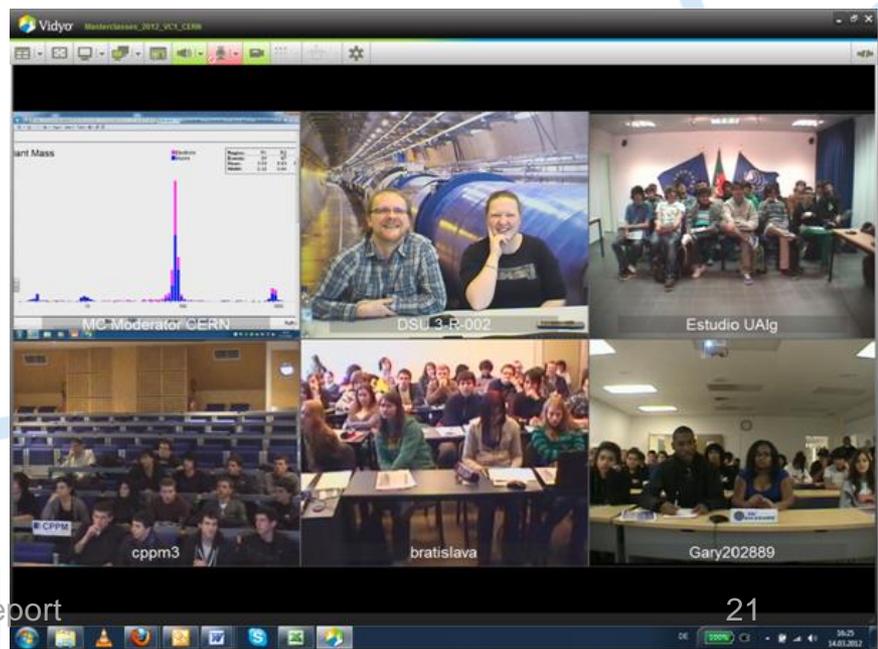
Get invited to a research institute or
university

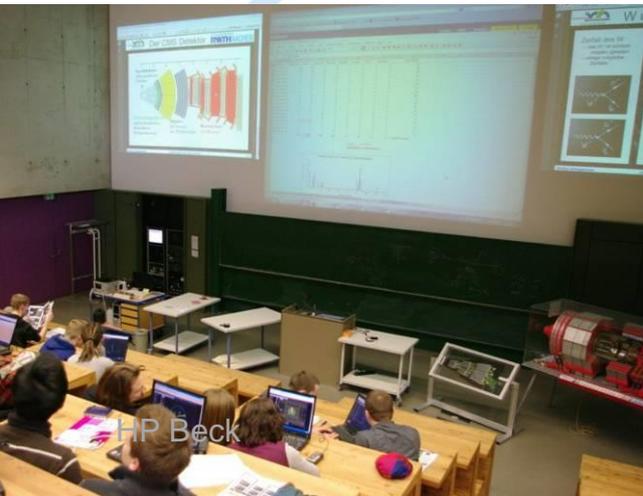
Introductory talks (standard model,
detectors, accelerators)

2 h measurement with LHC data

New also with Icecube data

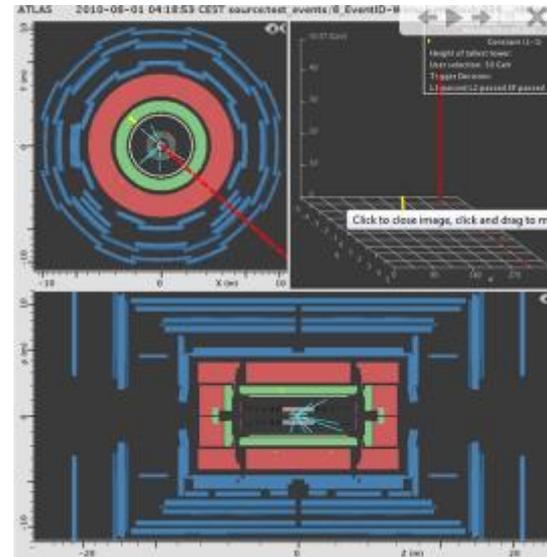
International video conference
(2 – 5 inst. + CERN/Fermilab)





High-school students analyze LHC data

- **ATLAS**
 - W path (Higgs → WW)
 - Z path (discover Extra Z' Bosons)
- **CMS**
 - WZH measurements
- **ALICE**
 - Looking for Strange Particles
 - R_AA
- **LHCb**
 - $D^0 \rightarrow K\pi$ measurement
- in the future: **TOTEM**, ...



Measurements are kept up to date and continuously improve

Exploit known Standard Model Processes, e.g.

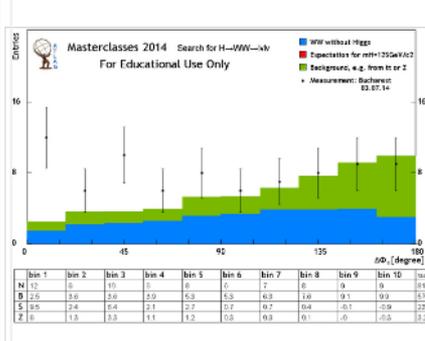
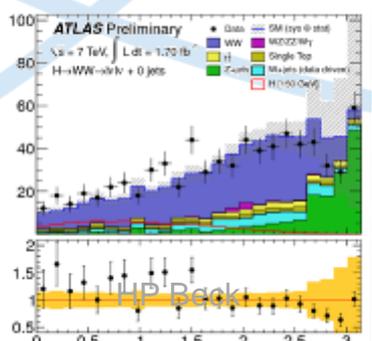
W^+/W^- ratio corresponding to (uud) quarks in proton

Understand mass peaks of J/Psi and Z

On the way to discover new particles

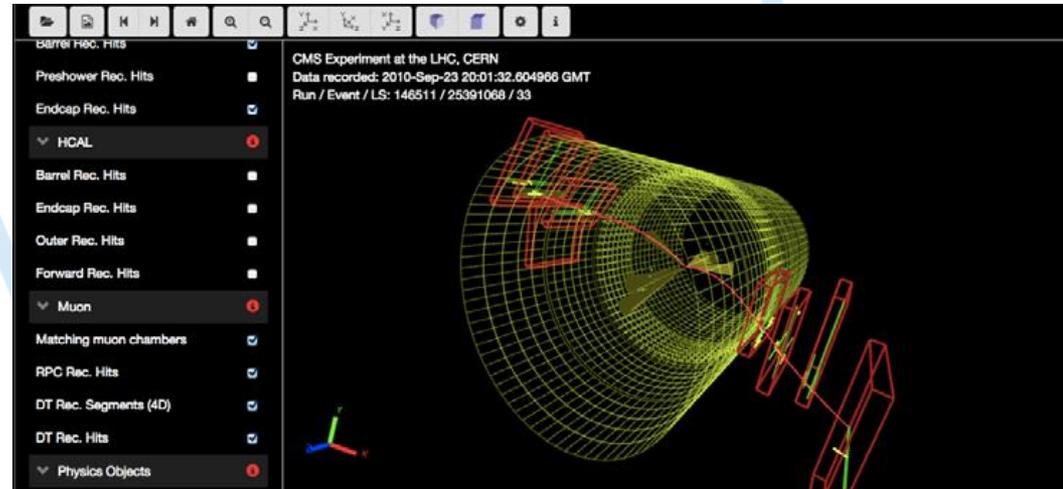
Higgs → WW

Extra Z Bosons



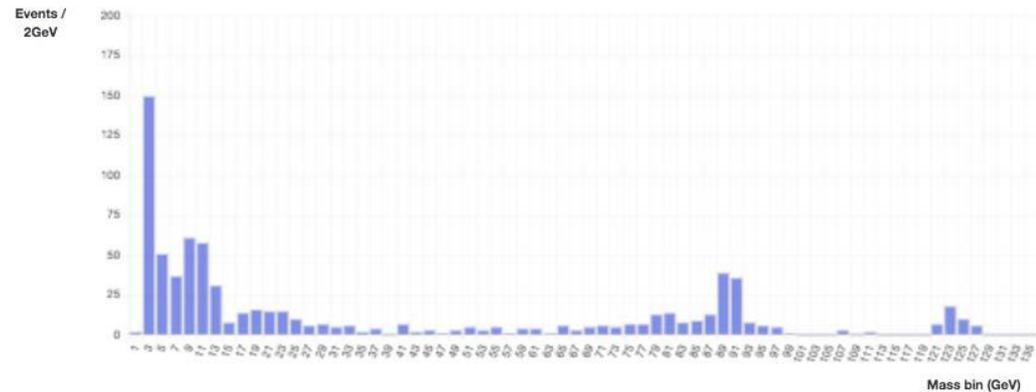
For example: The CMS WZH measurement

- Students visually characterize, W , Z , and H candidates in event display and extracting kinematics from objects ‘they see’ and fill spread sheets.
- Create mass plots of SM particles that decay in 2 leptons plus H
- Measure W^+/W^- ratio in e and μ leptonic channels
- 3000 events can be analyzed – with misfits, surprises, interpretation
- Website in 12 languages for 2016



Back Mass Histogram Results All -

Tables: FtCollinsCSU MexicoCity1 PurdueCalumet Williamsburg



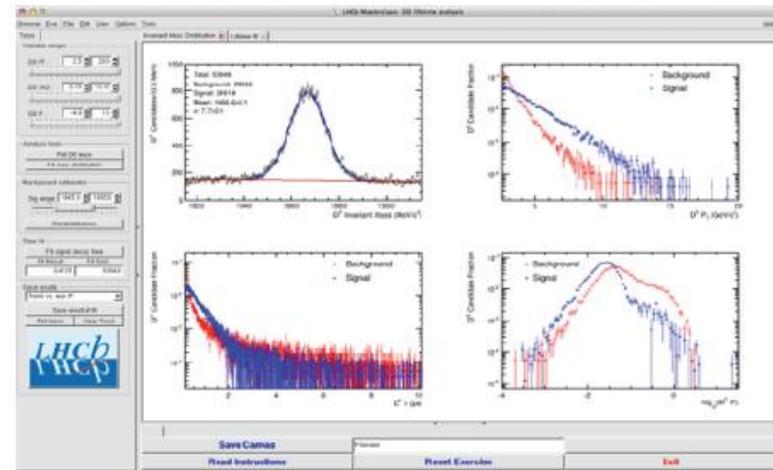
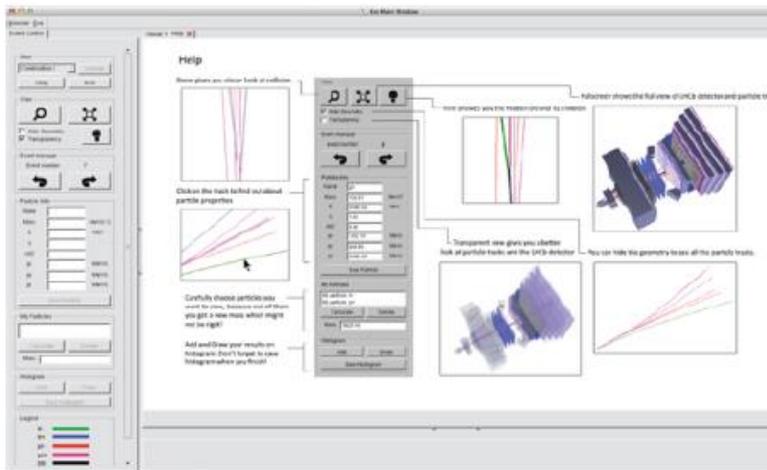
For example: The LHCb $D^0 \rightarrow K\pi$ measurement



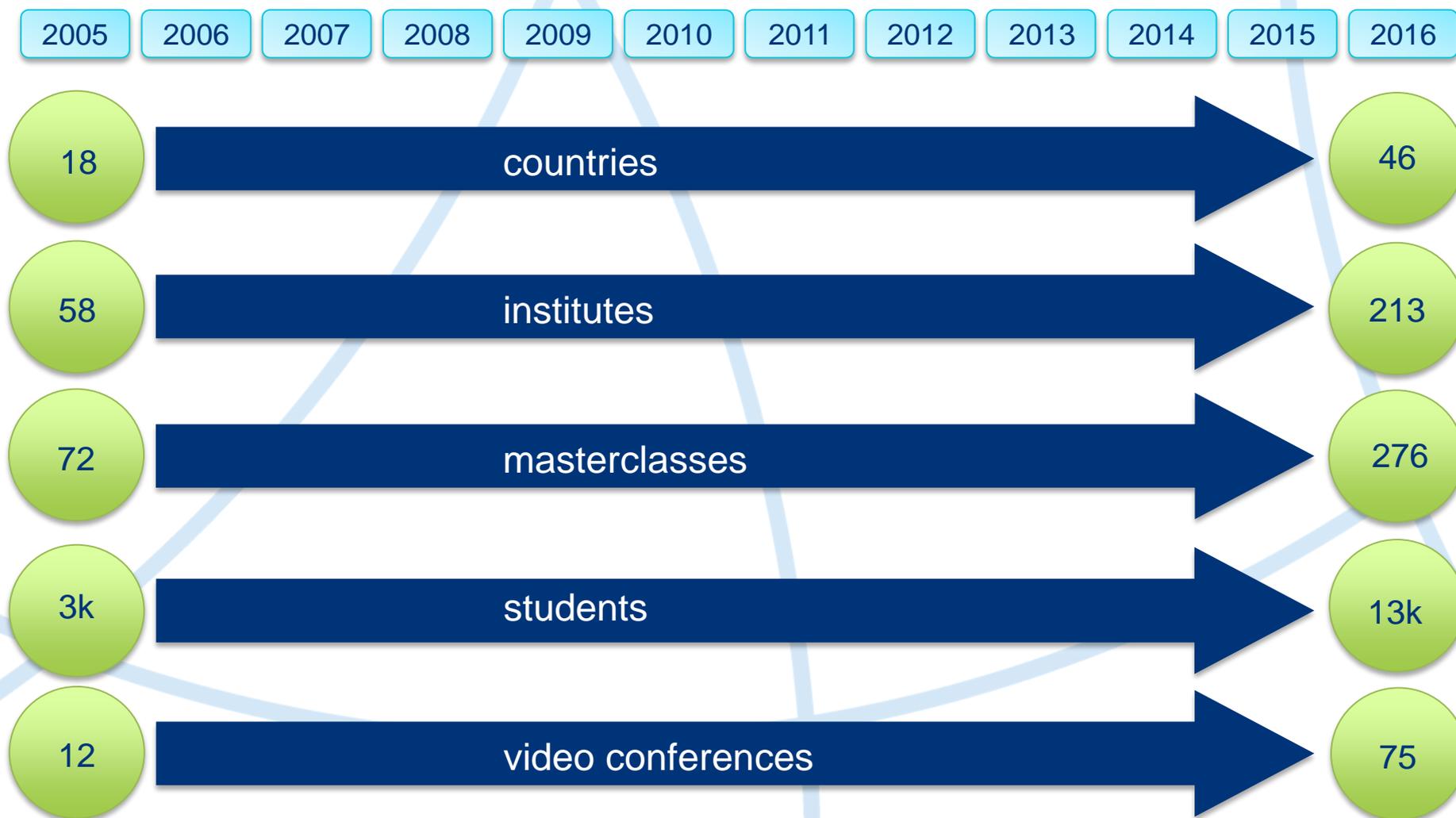
- LHCb experience has > 20 institutes involved, EU and US for 2015/2016.

- The experience is twofold:
 - The students search for the $D^0 \rightarrow K\pi$ decay using an event display.
 - The students also perform a lifetime measurement at the 1% level.

Seicento ragazzi con Masterclass



Evolution of Masterclass participation



International Masterclasses



11 February – 23 March 2016

46 countries – 213 institutes – 13'000 high-school students – 1'100 teachers

Expanding to Astroparticle physics – discussions and pilot tests

IceCube Masterclass

<http://icecube.wisc.edu/masterclass/home>

International Muon Week

Quarknet

<http://Internationalmuonweek.org>

International Cosmic Day

<http://icd.desy.de>

IPPOG is embracing all particle physics activities.

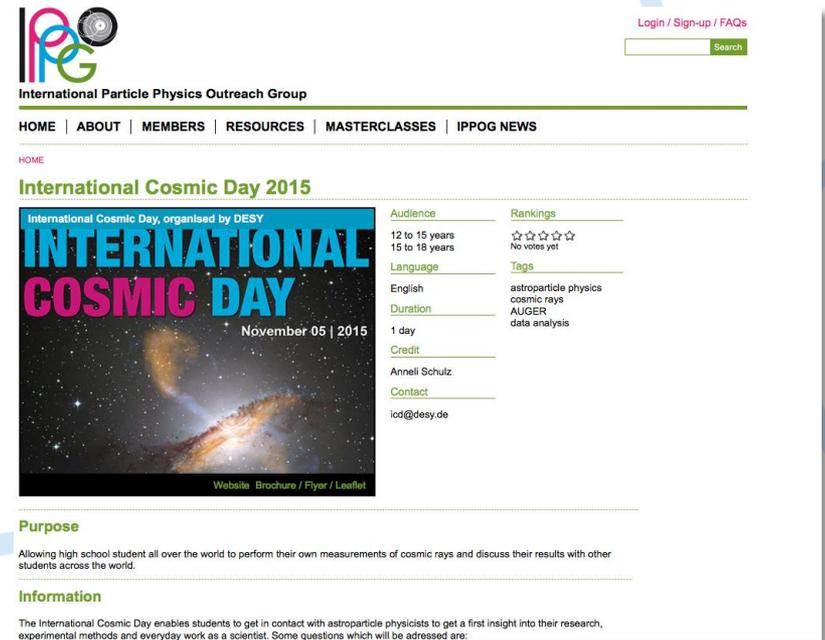
Although, historically, there is a strong bias
towards LHC physics.

This bias is lingering with a broader base.

Auger Masterclass

<http://auger.colostate.edu/ED/>

- Pilot tests in German Netzwerk
Teilchenwelt



The screenshot shows the IPPOG website with a navigation menu and a featured event for International Cosmic Day 2015. The event details include audience (12-15 and 15-18 years), duration (1 day), and contact information (Anneli Schulz, icd@desy.de). A purpose statement at the bottom explains the event's goal of allowing high school students to perform measurements of cosmic rays.

International Particle Physics Outreach Group

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

International Cosmic Day 2015

International Cosmic Day, organised by DESY



INTERNATIONAL COSMIC DAY
November 05 | 2015

Website / Brochure / Flyer / Leaflet

Audience	Rankings
12 to 15 years 15 to 18 years	☆☆☆☆☆ No votes yet
Language	Tags
English	astroparticle physics cosmic rays AUGER data analysis
Duration	
1 day	
Credit	
Anneli Schulz	
Contact	
icd@desy.de	

Purpose

Allowing high school student all over the world to perform their own measurements of cosmic rays and discuss their results with other students across the world.

Information

The International Cosmic Day enables students to get in contact with astroparticle physicists to get a first insight into their research, experimental methods and everyday work as a scientist. Some questions which will be addressed are:

IPPOG at Conferences

Education & Outreach becoming an integral part in international HEP conferences, where IPPOG is an active player and driver

❑ **EPS HEP 2015 – Vienna**

- ❑ Parallel sessions on education and outreach
 - sessions chairs are IPPOG members
- ❑ Panel discussion "*IPPOG: Experts in bringing new discoveries to the public*" (Michael Kobel – IPPOG Germany)

❑ **Lepton Photon 2015 – Ljubljana**

- ❑ plenary talk "*education & outreach*" (Kate Shaw – IPPOG ATLAS)

❑ **LHCP 2016 – Lund**

- ❑ Parallel sessions on education and outreach ← this session here !

❑ **ICHEP 2016 – Chicago**

- ❑ Parallel sessions on education and outreach (IPPOG engaged and invited)

❑ **Physics, Technology, Ethics – Žilina**

- ❑ Invited contribution on *Some Ethical Questions related to Particle Physics* (Ivan Melo – IPPOG Slovakia; Thomas Naumann – IPPOG DESY; HPB)

❑ **WCPE 2016 – Sao Paulo**

- ❑ *CERN Masterclass courses and the impact on school physics* (Uta Bilow – IPPOG Masterclasses)

❑ ...

Fourth Annual Large Hadron Collider Physics Conference

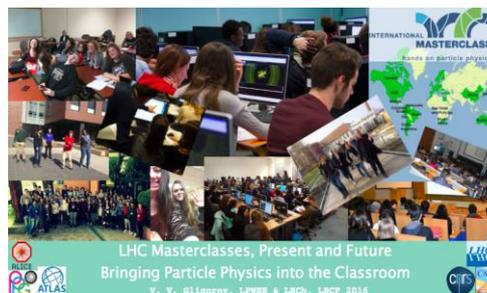
Lund, Sweden, 13th - 18th June 2016

Outreach parallel session (6 invited talks + interactive panel session!)



CERN: Outreach in the International Context

Sascha Schmeling on behalf of CERN



LHC Masterclasses. Bringing Particle Physics into the Classroom

Vladimir Gligorov on behalf of ALICE, ATLAS, CMS, & LHCb



Professionalizing IPPOG

Newsletter twice a year in-between IPPOG meetings.

Memorandum of Understanding between IPPOG members in an much advanced state.

Well defined IPPOG structure and tasks.

IPPOG Working groups, with action items.

All these advances would be unthinkable without the help from a dedicated scientific secretary to IPPOG!

IPPOG: Worldwide Outreach

Hans Peter Beck on behalf of IPPOG

THE GOALS

- > Be open – demystify scientific research
- > Inform public – increase awareness (scientific literacy)
- > Inform public – appreciation of our work
- > Inspire youth – prepare next generation of scientists
- > Ensure (continuation of) support and funding
- > Tell taxpayers how their taxes are used
- > Inform media (strong amplification factor)

LHC Communication & Engagement with New Audiences

Despina Hatzifoadou on behalf of ALICE, ATLAS, CMS, & LHCb



ATLAS & CMS Data Release and Tools

Felix Socher on behalf on ATLAS & CMS

What is STEAM

STEAM is an educational and innovation framework bringing science, technology and engineering together with the arts/other disciplines and types of learners with the goal of being more engaging, creative and naturally successful for all members of any educational system.



Education and Communication with Art at ATLAS and CMS

Pierluigi Paolucci on behalf of ATLAS & CMS

Programme for Science Education Research

4.2 Science education should focus on competences with an emphasis on learning through science and shifting from STEM to STEAM by linking science with other subjects and disciplines.

Outreach parallel sessions

- 3 sessions, 260 minutes in total
- 45 abstract submissions!!
- 18 talks (some merged) + 14 posters
- Very popular sessions! Full house!
- Fruitful panel session



"In Particular", a podcast about physics (12' + 3')	Tova Ray Holmes	
Superior B		11:30 - 11:45
Hard to Move Science: Using travelling exhibitions to reach national audiences (12' + 3')	Mr. Terry O'Connor et al.	
Superior B		
"In Particular", a podcast about physics (12' + 3')	Tova Ray Holmes	
Superior B		11:30 - 11:45
Forging New, Non-traditional Partnerships Among Physicists, Teachers and Students (12' + 3')	Ms. Marjorie Bardeen et al.	
Outreach Activities in the Belle II Collaboration (12' + 3')	Prof. Toru Iijima et al.	
Superior B		11:45 - 12:00
Art and Science convergence at Kavli IPMU (1: The International Physics Masterclasses and Particle Physics Workshops as professional development tools for high school teachers in São Paulo, Brazil (12' + 3')	Mr. Rodrigo Araujo et al.	
Superior B		
Neutrinos and Dark Matter in the Classroom (1: Driving from Chicago to Buenos Aires: instrumentation schools during a road trip across the Americas. (12' + 3')	Federico Izraelevitch	
Superior B		12:15 - 12:30
Phantom of the Universe: A State-of-the-Art Panel Discussion	Ms. Marjorie Bardeen et al.	
Superior B		
Xraise: Empowering Minds with Science! (12' + 3')		
Superior B		
Huron		16:45 - 18:00

IPPOG is becoming a Collaboration

- ❑ Today, **particle physics** has become a **global activity**, with experimental collaborations featuring thousands of researchers from all over the world.
- ❑ Commensurate with this reality, **IPPOG as well needs to evolve to cover more countries, laboratories and experiments** in the areas of particle physics, astrophysics and associated technologies.
- ❑ In particular, IPPOG should be given a formal, albeit simple, organizational structure so as to guarantee the sustainability of its work. This means as well that **IPPOG should be able to rely on some basic regular funding as well as in-kind contributions.**
- ❑ Based on the existing IPPOG model, we have over the past few months carefully examined various elements for such a formal structure, and we have extensively consulted with stakeholders.
- ❑ **A Memorandum of Understanding ('MOU'), which is similar to existing instruments used for international scientific collaborations in particle physics, reflects these efforts.**

IPPOG MoU



INTERNATIONAL PARTICLE PHYSICS OUTREACH
GROUP

MEMORANDUM OF UNDERSTANDING

Establishing

The International Particle Physics Outreach Group (IPPOG) Collaboration

PREAMBLE

IPPOG is a network of scientists, researchers, science educators, explainers and communication specialists active across the globe in outreach for particle physics;

IPPOG's mission is to maximise the impact of education and outreach efforts related to particle physics;

The European Strategy for Particle Physics, as adopted and updated regularly by the CERN Council, acknowledges the important role played by IPPOG in the promotion of particle physics;

The IPPOG stakeholders recognise the need to create a formal legal structure permitting IPPOG to increase the scope and quality of its work;

This Memorandum of Understanding (the "MoU") creates the IPPOG Collaboration and sets out its governance and the rights and obligations of participants.

ARTICLE 1 PURPOSE OF THIS MOU

- 1.1 This MoU creates the IPPOG Collaboration and sets out its governance and the rights and obligations of participants.
- 1.2 This MoU is not legally binding, but its signatories recognise that the long-term success of the IPPOG Collaboration depends on their adherence to the provisions of this MoU.

- Collaboration will be considered starting when **10 Member** have signed.
- Today **signed**, or clear commitment to sign:

B, CH, D, I, F, FIN, N, NL, P, RO, S, SK

- The IPPOG Collaboration will be achieved in a few weeks from now!



- Other members have two years to resolve their internal discussions on how to sign the MoU.
- IPPOG intends to grow internationally.

IPPOG in Nov 2016

