



IPPOG today and tomorrow (Barbora's memory)

B. Bruant Gulejova

13th IPPOG Meeting
Lisbon 20-22 April 2017

Pending TO DOs since Paris IPPOG meeting in Nov.2015

Masterclasses in new countries

9th meeting Paris:

Masterclasses in Russia: Dubna (Ivan Belotelov) expressed interest to join MC

- start with Dubna
- hold masterclass there or possibly in Moscow (all 4 LHC exp.)
- expand within Russia to universities, schools
- spread by use of connections with institutes in nearby countries, e.g. **Armenia**

TO DO: work with Ivan on establishing first masterclasses (Ken, Uta)

MC in other new countries: interest from **India, Pakistan, Nepal**(Abha) -if good feedback, this could be included next year

- discussion with **Venezuela** (Kate)
- new countries becoming associates at some level with CERN
- **Mongolia, Sri Lanka, Albania, Bangladesh** (encouraged by international relations of CERN)

TO DO: Make contacts with physicists in **prospective new countries** (Abha, Kate, Uta, Ken, CT)

TO DO: Work with countries represented in **CERN high school teachers (HST) programs** – teachers bring masterclass “home” (Konrad to follow up with national HST contacts)

after 1,5 years repeated....

11th meeting Krakow:

TO DO: Make contacts with physicists in prospective of new countries!

TO DO: Work with teachers at HST

Reaching curricula with Masterclasses

9th meeting Paris:

International Schools and outreach to schools - Good route to spread masterclasses via **International Baccalaureate Organization (IBO)**- „Most International Schools use the International Baccalaureate Curriculum, which includes particle physics”

TO DO: organise meeting of IPPOG with IBO (HQ in Geneva) during next IPPOG meeting at CERN to include MC in PP part of curriculum of International Schools (Ken, Hans-Peter, Barbora)

11th meeting Krakow:

TO DO: To meet with International Baccalaureate Organization HQ in Geneva at the next IPPOG meeting, to implement a worldwide data on 27th October 2016 and to continue development of virtual MC, website, videos.

Efforts done, so far didn't work out that well, but new contacts in IBO established recently (Barbora) - promising

Masterclasses materials

9th meeting Paris:

Virtual MC and trainings

TO DO: Virtual training for those who do not have access to all information (MC SG)

Masterclass-in-a-Box: from Ken (see <https://quarknet.i2u2.org/page/masterclass-box>)

-folder with all what is needed to know

-for those who don't have internet / computers

TO DO: Develop and make available Masterclass-in-a-Box (Ken)

after 1,5 years repeated

11th meeting Krakow:

TO DO: Develop and make available MC-in-a-box (see <https://quarknet.i2u2.org/page/masterclass-box>)

More on Masterclasses

12th meeting CERN

LHCb MC

TO DO/ to be improved: Refresh exercise and vidyo in control room

Educational materials from MC - Data-based PP projects and courses similar to MC on Z path (Farid)

Recommendation/TO DO: Extend this to develop educational materials

Broadening of scope of MC

TO DO/ Recommendation: [Guidelines](#) – should be discussed further at MC Steering Group, in future put on IPPOG webpages with some instructions of who to contact if one was interested to develop a Masterclass

TO DO: Request to IMC Steering Group to consider extension of the IMC with new Masterclasses

Virtual visits and MC

TO DO/Proposal: As a good bye message of Virtual visit could be said that students can also join Masterclasses! (Marzena)

Masterclasses communication

10th meeting CERN:

TO DO: ATLAS promotes MC during **ATLAS weeks**, but other collaboration don't. Uta will prepare the **slides to be distributed within all collaborations** and will be made available in **IPPOG DB**.

TO DO (IMC team with IPPOG): Set up a team that contributes, or get central person on board; we need to identify people, who will take care of the social media in both IPPOG and MC on regular basis, to make this sustainable...

TO DO (ALL): If you are on twitter, please follow us. Also, please spread the word at home to teachers, students, and your institution to follow the IMC account as well.

12th meeting CERN

TO DO: Many **Twitter account** do not follow and should follow us: Help us to get these on board!

@_nikhef; @ALICEexperiment; @CERN; @CERN_FR; @CMSexperiment; @Desy; @desynews; @EPFL; @EPFL_en; @KEK_en; @KEK_JP; @LHCbExperiment; @QMUL [Queen Mary University London]; @STFC; @teilchenwelt; @uw_icecube; @uslh; @AAPTHQ; @helmholtz_de; @helmholtz_en; @LHCnews; @particlenews [interactions.org]; @symmetrymag @argonne; @berkeleyLab; @Brook-havenLab; @CEA_Recherche; @CEA_Saclay; @doescience; @Livermore_Lab; @J_PARC; @MIT_Physics

TO DO: [New posters](#) for IMC available at MC library – put to IPPOG DB (Ken)

TO DO/PROPOSAL: New competition proposed: "Higgs challenge" (by Sasha)

- competition would be done **like Beamline for schools**, they would have to come up with their idea what they want to do....
- or do both **project description AND analysis based on open data**
- be selected from their results while already **having done some work to submit** (not only proposal)...
- unlike Beamline for School where they must come to CERN, here they maybe don't have to come as they have **an access to open data and get time with researchers but at the national level at the universities**
- countries have different levels of curriculum, knowledge of PP, so it would be good to have **not only 2 winners, but also national prizes and recognition**
- should we involve BL4S team and CERN Open Data Portal team to learn from their experience(s)?

TO DO/ PROPOSAL: Competition for teachers

- Competition for teachers who should **develop the teaching tool, interface based on data**, maybe we can provide them with template...+ need for prizes per country
- IPPOG supports the idea of Open Data Portal team to pursue these activities and to prepare the proposals for challenge competitions.

Impact and use of open data

12th meeting CERN

TO DO/Recommendation: We can take advantage of the experiences in IPPOG, CERN and ATLAS/CMS, etc... to create common frameworks and protocols that make easy the collaboration with smaller-yet-huge experiments out there. Documentation and design of friendly + powerful User Interfaces (UI) should be our top priority in order to get more people to really use and enjoy the data and tools.

TO DO/Recommendation for practical actions:

Practical Actions as recommendations & ideas ongoing and under test

- Online catalogue of all possible/existing open datasets (and/or resources) at CERN and CERN related experiments (can be archived using a map) with the instructions to get an inspiration on what to do with data
- Online Catalogue (mapping) of the HEP and general large theory and experimental collaborations on physics worldwide

IPPOG WEBSITE

IPPOG DB

9th meeting Paris

TO DO: Create the reading/curating standing committee for IPPOG DB!

12th meeting CERN

TO DO: Curation of the existing resources!!!! Only to choose which of the resources in the current DB will be transferred to the new IPPOG website and assign them tags (topic, type, audience, language, keyword). Curation group needed, volunteers IPPOGers...?

IPPOG DB: Tabletop experiments

12th meeting CERN

TO DO/Consensus: Need to organise all these experiments at one place - centralized repository of experiment recipes. All efforts should be centralised and stored in a systematic way. **TO DO:** Put it all to the IPPOG database in the category “Do it yourself”, plan: new S’CoolLAB PhD student will have a look what exists and what teachers want (Julia)

Graphic design

TO DO: Inspiration from other websites: today’s trends are appealing pictures and colours! We need especially professional graphical materials to feed the website....Who from IPPOG could help?

More on website

9th meeting Paris

Panel Educational games

TO DO: Put interesting games of high quality on the IPPOG webpage

Exhibitions

TO DO: Store and share ideas in IPPOG website. Calendar for upcoming exhibitions.

10th meeting CERN

TO DO: Plan for the IPPOG website Exhibitions / Event calendar + in Database: Exhibition objects

National webpages

9th meeting Paris

TO DO: Links to IPPOG from webpages of experiments (ATLAS, CMS), other labs (CERN, DESY, FERMILAB,...) and all the IPPOG members' webpages (countries websites), and list on IPPOG site - IPPOG website should have the link to the list of the national webpages. There will be a separate item on the IPPOG page like 'countries websites'. Define country educational webpage choosing criteria for putting it on IPPOG site

Social media

10th IPPOG meeting CERN

TO DO (IMC team with IPPOG): Set up a team that contributes, or get central person on board; we need to identify people, who will take care of the social media in both IPPOG and MC on regular basis, to make this sustainable...

Publication and Speakers Committee

9th meeting Paris

TO DO: Create a **repository of IPPOG contributions at conferences and publications** on IPPOG website (Barbora + WG)

-Keep record of conferences, abstracts, talks and publications on IPPOG website, including the past conferences and publications (EPS, ICHEP, LP, ESOF, and IPPOG papers in journals)

-Store the abstracts in an IPPOG internal repository (useful as templates for new conferences)

-Create dedicated extra item on IPPOG page for list of the (i) conferences, names of speakers, abstracts, slides, proceedings and (ii) publications (collect good and suitable journals,...)

TO DO: **Collect the list of the above mentioned information since 2012 at least!** (Farid, Pedro)

10th meeting Paris:

RECOMMENDATION / TO DO: **Introduce IPPOG notes** – for example Conference write-ups (especially before they become available in conference proceedings), other internal IPPOG notes, for example describing some work done within IPPOG like the outcome of some working group on discoveries, masterclasses materials. These would be clearly visible and referenceable notes to give a credit to the work of people who have done something good on behalf of IPPOG, namely students (e.g. from CASCADE, or “Physics slam”), could be also MC moderators or IPPOG associates,... IPPOG would decide case by case whether it is really on behalf of IPPOG, CMS, ATLAS, Icecube, etc...

TO DO: WG should take care of organising the rehearsals of the talks

Publication and Speakers Committee

12th meeting CERN

TO DO: Update the list of the upcoming conferences, put their webpages list on the IPPOG website

TO DO: Prepare the list of the Publication opportunities – identify where IPPOGers have a possibility to publish their papers

IPPOG at conferences

EPS HEP 2015 outreach session

10th meeting CERN

TO DO: Make the video from Physics slam available (Natasha send to Dave)

IDEA: Produce together outreach materials from students giving 3-minutes talks about their posters

ICHEP LHCP E&O sessions

12th meeting CERN

Kate got a list of names at the end, many people doing and interested in outreach who wanted to know how to join a network or email list!

TO DO: How can we (IPPOG) facilitate the wider outreach community? We can use this list and create a category IPPOG friends...(to be discussed)

EPPCN and IPPOG connection

9th meeting Paris

Little focus in **CERN backgrounders** on 2 topics:

- what + how are we going to measure: missing energy, ...
- how to communicate an observation without immediate + clear interpretation?
- Dark Matter + Dark Energy: examples of observations without clear + immediate interpretation

TO DO: EPPCN CERN communication + IPPOG discussions about this to work together to present it in future would be welcome! Open communication is important! Discuss communication strategies, use the **collaboration with EPPCN** to find a coherent way how to communicate!

Overseeing the CERN backgrounders (4th generation and Higgs as a tool and what we have learned from the Higgs discovery so far) and discussing with CERN press and communication is a good idea and a way to get started (Hans-Peter will follow on this with LOG).

EPPCN and IPPOG connection

12th meeting CERN

TO DO/Suggestions: Concrete way of communication between IPPOG and EPPCN would be like that of Interactions with EPPCN, though sharing Press releases...

-Question: **Are IPPOGers or others interested allowed to go to EPPCN meetings?** Reply:
Not sure, we need to discuss...

Suggestion from IPPOG: IPPOG would like to profit from EPPCN, so that they communicate also IPPOG to the headlines.

10th meeting CERN

TO DO (EPPCN/IPPOG ALL): Please, send your comments on what would you like to be handled by IPPOG/EPPCN later in the future.

Explaining physics to lay audience

10th meeting CERN

NEW PHYSICS TOPICS: after Higgs discovery we are entering a new SCALAR ERA

Discovery of Higgs doesn't mean the end of PP, but marks the beginning of a new scalar era (as Higgs is the only elementary scalar particle as we know today). More scalar fields need exploring (the hypothetical inflaton may be such a candidate for another fundamental scalar).

Physics associated with the Higgs potential is rich and interesting, but also very complex and not fully understood. There are several topics representing the basics in this field (Mathematical description of Higgs potential (La Grangian), Mexican Hat, Symmetry breaking...), which could be tackled and efforts could be done to explain them to high-school students or broader public.

Find the new article from Ivan Melo dealing with these topics in the IPPOG database – [link](#).

ATTENTION: Before explaining what we want to discover, first explain well what has been already scientifically proven...Higgs mechanism of electroweak symmetry breaking through the phase transition; what does it mean symmetry in weak force (particles in one bag vs 2 bags – leptons and quarks, as we cannot easily explain how lepton changes to quark...).

TO DO: Send mailing list to get some more ideas (H-P)

TO DO: In past there was a 'WG on Explaining Higgs' very interesting, but no materials produced as an outcome. Producing the written material should become a habit - even IPPOG publication!

TO DO: However indirect impact/outcome: there were some widely well received documents prepared by Steve and Dave indirectly out of these discussions- collect these documents for IPPOG DB (Steve, Dave)

Communication with public (from Ethics in Physics panel)

12th IPPOG meeting

Most of our measurements are communicated by physicists to physicists. Although the papers are public, it is not reasonable to think they are read and understood by the public.

TO DO: Should we feel obliged to "translate" all of these papers in a summary format that could be read by the non-PhD public? If not all, how many? Yes! Now there are just ATLAS summaries and CERN backgrounders...some work to be done here...

TO DO: Yes! ATLAS public summaries, very easy to understand. Steve next meeting?

Media/ doomsday and other catastrophes... how to react? (Ethics in Physics)

12th meeting CERN

Answer: There are responses on this already made on CERN/ATLAS (about energies, which are energies of collisions, difference between energy and energy density), there are information, hints, factsheets... BUT if one looks for something about these events, one finds ONLY BAD HEADLINES! Backgrounders of CERN, at website of CERN's Press office, but it's really well hidden!

TO DO: IMPORTANT: If the website is to be found on google, it needs to be REGISTERED in google first, it takes time, but it must be done. Therefore one cannot find any of our explanation resources (e.g. CERN Backgrounders and ATLAS summaries) when randomly searching on internet....

Justification strategy for PP machines / data

9th meeting Paris

TO DO: IPPOG needs a LHC Run 2 COMMUNICATION STRATEGY! (Hans-Peter)-answer in two directions:

- precision in Standard Model + Higgs
- discoveries beyond the Standard Model

12th meeting CERN

Justification strategy / data

- How to sell a new European Strategy? How to justify cost of HL-LHC, LC, FCC,...How to explain that there is a lot of work to be done to discover, higher precision needed...
- Return on investment in HEP: time scales slow, but also 100 years for atom, ...(war + Moon landing are worse or less efficient to create spin-offs)

TO DO: We need quantification...collect quantitative info on amount + time scale

12th meeting CERN

TO DO: Try to find replies to the questions of panelists:

-Is beauty a valid criterion for scientific truth?

-How well do we understand the concept of "truth?" Is it what we have measured or is it something

we are trying to uncover?

-How do we justify our portion of a pie that also includes education, infrastructure, defence, etc.

-How have HEP results in the past affected everyday life?

-What is the timespan from research to daily life impact?

-When could we expect the results of current research to have an impact?

-How do HEP theories influence general culture and the view of the world?

-Are particle physicists obliged to respond to the concerns of the public even when those concerns are not scientifically sound? If so, how much effort is reasonable?

TO DO: Maybe we should clarify the different meaning of truth in the human and scientific realms.

TO DO: We may enlarge the paper – everybody invited to join or to add ideas.

IPPOG collection of PP explanations / stories for laymen (Barbora)

12th IPPOG meeting

-IPPOG is a great source of ideas how to explain the complex subjects of PP to the laypeople, students, etc.

-In form of little stories, images, anecdotes, trick how to explain, ideas how to visualise things, analogies....

-All this great materials are worth being: collected, shared, published, and offered as a tool!

-This would be a nice IPPOG activity which would bring a real product.

TO DO: Collect + publish explanations, coordinated activity (Barbora, Dirk and Farid)

Cosmic rays

10th meeting CERN

TO DO: Put together already now little website, where what exists could be put together (Rasmus can try to use it – as HST)

TO DO: Define goals/needs from the point of view of the teacher (Rasmus); Marge will loan him a de-tector from QuarkNet

12th meeting CERN

TO DO: Follow-up (Charles)

TO DO: Set-up a group supporting this projects (Charles, Marge, Barbora, Hans Peter, Steve, Nicolas, Despina, Pete + partners outside IPPOG)

TO DO: Common data format and funding request must be still discussed

Beamline for Schools

10th meeting CERN

TO DO:

- Participate in the selection committees in April and May 2016
- Identify potential donators and national prizes / follow up

12th meeting CERN

TO DO / Challenges (where IPPOG can help):

- not enough teachers – they must spend a lot of time with teams
- publicity is main challenge every year
- regional contacts in some countries missing (Australia, Bulgaria, Denmark, Ireland and Romania, as well as some non-IPPOG nations such as India, China, Japan, Russia)

Other IPPOG issues

MOU

12th meeting CERN

TO DO: The representatives/delegates from countries who didn't obtain the commitment of signature of IPPOG MOU or didn't identify the signatory yet should continue the discussions.

Growing membership

12th meeting CERN

TO DO: Toru engaged to bring good news from Belle II

Reaching to new audiences

12th meeting CERN

Inspiration for IPPOG from CMS CREATE: This type of activity could be done wherever also by high school or even younger students. The aspect of **multidisciplinary teams is very inclusive** - reaching also to students who don't feel comfortable with physics or engineering, but study management, arts, architecture, etc. Reaching to new audiences!

Proposal for the Call for new EPS activity projects 2017 (Barbora):

Competition "Creating tools showcasing PP presence in every-day lives"

IPPOG Working Groups

IPPOG ORGANISATIONAL STRUCTURE

ASSOCIATES

MEMBERS
(Countries, Labs, Experiments)



Collaboration Board
(Member representatives
Candidate members reps)

Coordination team
(Chairs + Scientific Secretary)

Activities

Working Groups (longterm)

Adhoc panels
and Working Groups

Publishing and Speakers Committee

Pedro + Farid

WG on Explaining PP

Dirk + Thomas

WG on MC in new countries

Ken + Uta + Kate