

17th IPPOG MEETING - GSI-FAIR

May 23, 2019

IPPOG Open Session – part 01

Additionally to those in the [participants list](#), online there were: Alberto Ruiz and Zdenek Dolekal.

- Welcome from Paolo Giubellino, Scientific Managing Director of GSI and FAIR, highlighting the importance of IPPOG activities to the scientific community.
- Welcome from Karlheinz Langanke, FAIR-GSI Scientific Programme director, highlighting the past GSI's collaboration to particle physics and presenting the international cooperation and construction of the FAIR project and the potential impact of discoveries expected from FAIR. While expecting completion by 2025, he presented a staged approach to FAIR science and progressive commissioning of accelerators and detectors.
- Welcome from Peter Braun-Munzinger, EMMI, Matter Under Extreme conditions and connections to other fields. Peter presented EMMI's activities, interdisciplinary workshops and programs in which they have recently participated. He also presented some of the most recent papers published.
 - Follow up: Participate and/or promote the Call for Proposals for workshops, programs and Task Forces on the research areas of EMMI.
- Steven Goldfarb, co-chair of IPPOG welcomed the new representative of Denmark, Ian Bearden, and reported on the new signatures that contribute to making IPPOG a collaboration of 30 members today. Countries and labs with pending membership status includes: Bulgaria, Israel, South African and Spain. Georgia and Montenegro have expressed interested in joining the collaboration. Additionally among the new Core Team initiatives there were: "[Girls do Physics](#)", new [IPPOG categories](#) at CERN document server CDS, new IPPOG website progress, collaboration with CAEN and plans for the annual report.
- Ken Cecire and Uta Bilow, the international masterclasses coordinators, gave a report on the new countries that have participated in the International Masterclasses, helping to compile a total of 54 participants worldwide. The success of the program is related to a comprehensive preparation that includes manuals, orientation and pre-event videoconferences. Additional to the regular master classes, 600 students participated in the International Women's Day and another 100 on the World Wide Data Day.
 - Follow up: Masterclass mini-training next IPPOG meeting at CERN
- The new GSI Masterclass presented by Yiota Foka was tested locally and accepted by the international group. Furthermore there are several institutes already interested.
- Carolin Schwerdt reported the discussions taking place during the Global Cosmic Ray Steering Group meeting. The participants reported activities related to: Quarknet, EEE from Centro Fermi, Cosmic@Web from DESY, COSMOS à l'École, OCRA from INFN, APPEC, HAWC and CREDO. The discussions

focused on defining “what is important to establish a long-term collaboration of people doing cosmic outreach”.

IPPOG Open Session – part 02

Guests presentations

- Carola Pomplum, from the GSI-FAIR Public Relations Department, gave an overview of the department activities that deals with journalists, decision makers and the society including the local residents. Their activities include media relations, events management, exhibitions development, guided tours, lectures and production of print material and online platforms. Challenges include International communication to shareholder countries, the involvement of high political levels (ministries and members of parliament) and management of crisis, such as dealing with communication of, for example, potential delays and increase of cost.
- Manjit Dosanjh, presented on behalf of the ENLIGHT network, launched as an open collaborative network in 2012. ENLIGHT was established with the goal to create a common multidisciplinary platform, to identify challenges, to share knowledge and best practices, to harmonise data and to provide training and education. Since 2015, ENLIGHT is a non-profit network/foundation and has established a Scientific Advisory Committee. The focus of the network today is to play a key role in the education of the young generation in this rapidly growing field of particle therapy, helping to fully exploit the advantage of hadron therapy.

Inspiring Success Stories

- Ralf Averbeck, GSI, reported on the ALICE Masterclasses at GSI. These masterclasses focus on the Heavy-ion experiment at the LHC with an investigation of quark-gluon plasma properties. Signal extraction is ready and will be tested in a pilot run on June 7, 2019.
- Lorenzo Galante, an invited physics high school teacher, provided creative new ideas for teaching Particle Physics at the secondary school level. His program aims to make students familiar with the concepts of collisions, the momentum conservation law as a discovery tool in particle physics, missing momentum as a signature for a missing particle and the invariant mass as a useful tool to discover those particles that would escape detection otherwise.
- Rosario Nania, Centro Fermi, gave an update on the POLAR mission and the DarkSide experiment at LNGS. After the successful experience of Polar quEst 2018 to measure cosmic rays flux near the North Pole, the same detector POLA-01 travelled to Italy to make a measurement of the variation of the cosmic ray flux with latitude: this trip was associated with different public events in the schools participating in EEE. A paper on these measurements is under preparation. At the end of May, three detectors of the same type of POLA-01 will be installed permanently in the scientific station of Ny Alesund (Svalbard), with the idea to measure the flux of cosmic rays over long periods in time and correlating it to weather and solar events. Other activities that involve Centro Fermi include the creation of videos, public events and conducting masterclasses.
- Spencer Pasero, USA representative in IPPOG, reported on the STEM Career Expo. This is a Fermilab event in which STEM professionals come to Fermilab to

share with students what they do, how they got to where they are and what are the challenges in their fields. The format of the event consists of booths and panel discussions. Its success is based on asking professionals to focus on their careers instead of the company they are currently working at.

- Nicolas Arnaud, France representative in IPPOG, talked about two different projects: The Antimatter Night and the Journey of a Cosmic Ray Detector. The first is a free local event composed of outreach talks, an exhibition, art performances, Q&A sessions, etc. The second is about measuring the latitude effect on cosmic muons through the Cosmix educational detector on the “Marion Dufresne,” a Boat navigating the French Southern and Antarctic Seas.
- Atanas Batinkov from Bulgaria, gave the highlights on the Bulgarian Outreach efforts in the past year as well as the plans for the future. Among other events the Bulgarian community participated on: International Masterclasses, Hands on Particle Physics at CMS, Particles4U competition, Virtual visit to CERN, Sofia Science Festival fair, a British council annual event, Music of Physics event, ART@CMS. Looking forward, they are planning to participate in similar activities this year including virtual visits in September to be linked to the annual event of “Researchers Night”. Additionally, two articles that they have produced on promoting science activities have been selected for a prize. Atanas also presented the path forward for Bulgaria to sign the MoU which will require a joint decision between two national institutes: the Bulgarian Academy of Science and the Institute for Nuclear Research and Nuclear Energy and Sofia University “St. Kliment Ohridski”.
- Marzena Lapka from CMS presented the concept of an online tutorial to teach kids to code. The scope of the work is to develop and design a self-paced online programming tutorial that would allow players to acquire physics and programming skills. The concept has been tested and the developers are currently looking for funding.

May 24, 2019

IPPOG Session 2: Contributions from FAIR-GSI

- Thomas Stoehlker, Deputy Research director of FAIR APPA (Atomic and Plasma Physics and Applied Science) presented the scope and goals of the collaboration. APPA focus on strong field and antimatter research as well as on warm dense matter. Also materials with radiation hardness and space travel. Compared to GSI, FAIR will provide a specific intensity and energy deposition increased by a factor of 100. Reporting that there are many challenges and opportunities ahead.
- Christian Graeff, Biophysics at GSI - First Biophysics Collaboration Meeting.
- Gerhard Kraft gave an overview on the Ion Therapy activities at GSI. He started by presenting the current status of cancer treatments and the technical challenges to apply a cross beam technique in bigger affected areas. The new technology using Heavy Ion Beam scanning has the benefits of higher precision with a higher dose and less damage to the surrounding area. The technique also allows for real-time control while treatment is ongoing. Quality and beam control

developed at GSI were key for the success of the application that is currently used at the Heidelberg Ion Beam Therapy Centre which has already treated more than 5k patients.

IPPOG Session 3: Panel discussion: Outreach on the benefits to society from fundamental research

Moderators: Hans Peter Beck (Universitaet Bern (CH) and Steven Goldfarb (University of Melbourne (AU)

Panelists: Christian Graeff, Pedro Abreu (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part), Rolf Landua (CERN), and Tobias Engert (GSI)

The discussion started with the question “what is outreach”? Rolf started by saying that “the word outreach means to reach out for human beings that are outside the circle in which you are inside, adding that sometimes we end up talking among ourselves”. Pedro added that we need not only to reach out but also bring in and engage. First those outside the community that would be interested in continuing the work we do and second also the community itself that is not always aware of the work we do. Tobias Engert added that we need to create a strategy to have outreach as part of the core of the organization with confirmation from the top down.

The conversation then steered to the support given to those doing outreach. Steve added that recognition is needed from senior faculty and senior management of the value outreach experience adds to researchers; it needs to be considered in hiring practices if we truly want outreach to be recognised on a higher level. Rolf argued that the reason there are news about CERN in the media is due to people’s curiosity, but he wonders about the value of communicating every step of the development of the research that doesn’t directly affect society. Christian said the research done by CERN shouldn’t be diminished. Adding that the work developed from GSI is little known within the doctors and even more with the patients and communicating its progress is very important.

Rolf again came back to the root of the discussion saying that “We need to distinguish between Education and Outreach. Those who visit CERN don’t get “educated”, they might get inspired or emotionally connected but education happens in a different environment, such as the classroom. Tobias then shifted to a discussion on target audiences, by stating the importance to be able to create a dialogue with decision makers by using success stories such as Hadron and Heavy Ion Therapy for example. Rolf agreed that politicians are a very particular case in which KT reports is very important but that shouldn’t be confused with the general public. The panelists agreed that journalists and politicians have special needs but that most of the general public need the same level and kind of information.

Tobias Engert fully agreed on statement of BBG, that separation of audiences to young generation and politicians is not needed, while students are future politicians and we need them to become scientifically aware decision makers. Finally the question of how to

measure the time and money we invest versus the impact of the actions come to light as a good follow up for the panel.

- Follow up: Potential discussion on how to measure cost benefit from Educational and Outreach initiatives.

IPPOG Session 4: Collaboration Matters and Guest Talks

- The minister of Science from Montenegro, Dr. Sanja Damjanovic, expressed the interest of her country to join IPPOG. Montenegro has about 620k inhabitants and a community of 1766 researchers, mostly concentrated into the medical field. The Montenegrin Smart Specialization Strategy S3.me (2019-2024) is focusing on Sustainable Tourism, Energy and Agriculture. In terms of Outreach initiatives, Montenegro has participated in the CERN teachers program, in “Art@CMS @ Science Festival Montenegro, and participates since 2017 in the international masterclass programme.”. Additionally Montenegro has active groups participating in CMS, is hosting the South East European International Institute for Sustainable Technologies (SEEIIST, <http://seeiist.eu>), is a member of EMBL, and EMBO. Montenegro has intentions to join CERN and ESA as associate member or via association through clustering with other small countries. In April Montenegro submitted a Letter of Interest to become a member of the IPPOG to the IPPOG Chair. The Montenegrin Minister was present at this meeting to underline their intention.
- Jose Ruben Alfaro Molina from the Universidad Nacional Autonoma of Mexico presented the High Altitude Water Cherenkov (HAWC) collaboration. The collaboration works on the Energy Cosmic Gamma ray detector and is composed of 14 Mexican Institutions and 18 US Institutions. The HAWC collaboration has organized several outreach initiatives and is interested in improving its activities. Jose finished by stating that HAWC is interested in joining IPPOG.
- Hans Peter Beck gave an update from the IPPOG paper for the European Particle Physics Strategy Report. The message was that, independently of the next steps the scientific community wants to take, large-scale facilities will be sought that will require a substantial investment. Only with public and political support and with new physicists, engineers, and technicians entering the field, a future large-scale programme can be realized. Education, Communication, and Outreach need therefore be considered upfront in the strategic planning instead of having these as an afterthought to inform about discoveries that have been made. In a nine page [document written by IPPOG](#), today's and future challenges in education and outreach are discussed. This document was submitted as an abstract to the European Strategy Group and sent out to the president of the CERN Council and to CERN's directors. At the EPPSU open symposium in Granada, only one plenary talk on education, communication and outreach was scheduled, to be given by Perrine Royole- Degieux, co-Chair of EPPCN. Hans

Peter contacted the EPPCN co-Chairs, Arnaud Marsollier and Perrine, suggest to make a joint presentation. EPPCN proposed to share their slides, which were promised to cover all aspects and would take into account all abstracts submitted on this subject. However, the presentation proposed didn't reflect the strategy proposed by IPPOG such that Perrine gave a talk focusing on communication. Hans Peter addressed the public in Granada with the message that "physicists cannot outsource to communicators, should play a strong role on Education and Outreach, and shall use the expertise of communicators for informing the public at large". Next, Hans Peter and Steve will stay in close contact with the European Strategy WG5 that concerns communication. IPPOG's input to EPPSU was specifically mentioned in the viewpoint of May 2019 CERN Courier on "[Strategy Update: Communicating the next collider](#)"

- Pedro Abreu reported on the IPPOG Conferences Committee activities, starting by describing the duties of the committee and pointing the fact that its membership should be rotated. The current committee is composed of Pedro, Farid, Despina and Marge (who is no longer part of the collaboration). There are 6 talks planned for 2019 and two talks for 2020. The committee needs volunteers to take part and if budget is an issue perhaps we can tap into the IPPOG funding.
 - **Follow up - Finding new participants to join the committee. IPPOG is open to receive proposals of IPPOG members to attend conferences to present on behalf of IPPOG.**
- Barbora Bruant Gulejova provided an update on the IPPOG Website, Content building and Communication developments. Lengthy and complex process of search for the IPPOG new website designer (external company) involved [technical specifications document](#) drafting (27 pages) and CERN procurement procedures leading to call for tender, which resulted in a price of order of magnitude higher than the IPPOG budget available. Finally Barbora contacted few other companies recommended in CERN circles and BLIND Creative Studio, a Greek company, could be identified. BLIND will stay within the IPPOG allotted budget and has already produced a [first design proposal of chosen subwebsites](#) (iterated with website steering committee). Barbora asked IPPOGers to give feedback [here](#). IPPOG is not going to migrate the current resource database (RDB) to the new database in a fully automated way. Instead a curation of the current content will be needed, with hand migration to the new database decided item by item. Contribution of IPPOGers in this resources selection process will be crucial. Moreover, building of new content for database also in view of creation of more "IPPOG made" resources, Barbora launched a new era of "results-oriented" IPPOG working groups, in particular WG on 'Explaining PP to Lay Audiences' working on 'IPPOG Wisdom collection', and WG on 'Outreach of Applications for Society' creating stories about these for the new IPPOG RDB category "PP and society" also by collaborating with industrial partners, like CAEN.

Further, CERN's CDS system has now a new branch in its structure for IPPOG to be used. New category "International Collaborations" has been created at CDS, where IPPOG is the first one. All IPPOG forum members are eligible and encouraged to submit photos, videos and documents [here](#) by choosing "Find where to submit", others/international collaboration / IPPOG.

The campaign and competition "Girls, do Physics!" (GDP) was initiated by Barbora and conducted with help from the team of volunteers between

awareness days 11/2-8/3 2019 aiming to inspire and motivate primary and secondary school girls to study physics. Young female physicists with different careers (including those outside of academia), to which school girls can relate, were featured. The goal of the campaign was to show that IPPOG is engaged in important challenges of PP and science community and society (like STEM crisis, sustainable development, diversity...), but also to reach to young audience. Therefore [IPPOG Instagram](#) was created firstly filled with “IPPOG in images” content and when launching GDP campaign, girls were asked to share a picture showing their enthusiasm and involvement in physics via [Instagram](#) using the hashtag #girlsdophysics and #girlsdoparticlephysics. 6 winners have been awarded (individuals and teams). Campaign has triggered very positive feedback and big impact on social media and attracted world-wide attention from outside usual IPPOG circles.

New IPPOG survey for high schools has been put together by Barbora, ECOLINT students and Teddy, aiming to create proper IPPOG data about opinion / relation to physics and physics teaching at high schools. Feedback is welcome [here](#).

IPPOG friends group created from CERN HST participants 2017 and 2018: 3 teachers have been empowered by Barbora to help with coordinating the efforts within the group. Meaningful working plan has been established aiming to increase IPPOG’s visibility among teachers worldwide.

New advisory group on Communications has been established (Marzena, Catia, Nicolas).

- Follow up - Define a WG to curate the resource database
- Follow-up - Send feedback on new IPPOG website design proposals [here](#)
- Follow up - Submit photos, videos and documents you have related to IPPOG into the CERN CDS IPPOG categories [here](#) by choosing “Find where to submit”, others/international collaboration / IPPOG.
- Follow-up - Give feedback to survey for high schools [here](#).

25 May 2019

PPOG Session 5: Working Group reports and final remarks

- Report of the Exhibits WG by Steven Goldfarb and Catia Peduto. The group discussed the new format of the WG that now will be called Exhibits and Exhibitions to best address all the needs of the collaboration. The goal is to extract ideas for the database, classify the content and brainstorm new items. Between meetings the team will keep working on the ideas.
 - Follow up - Participants of the WG should collect ideas of exhibitions and examples of exhibits to be shared during the next meeting.
- Report of the Explaining PP to lay audience WG by Barbora, Thomas and Dirk. As IPPOG is great source of ideas, how to explain complex PP subjects to

lay audiences in form of stories, anecdotes, analogies etc., Barbora has proposed in 2016 to create “[IPPOG Wisdom Collection](#)” as a useful tool for the whole PP/scientific community. She has prepared the detailed proposal of the structure and topics of this collection, including all materials which has been collected so far as extractions from IPPOG reports and newsletters in past few years. WG went through in details and agreed on the updated proposal, while many members signed and committed to write contribution on specific subject. Whole IPPOG is welcome to contribute (sign up [here](#)). The main 4 categories (more or less mapped with new RDB categories) have been agreed: “mostly known physics”; “mostly unknown physics”; “technologies and experiments”; “PP and society”. The latter category includes stories about PP applications for society and arguments recommended by IPPOG for justification of fundamental research and reaction to media provocations.

- **Follow up - The group invites all IPPOGers to submit material they have already written and also participate in writing new items for the IPPOG Wisdom Collection - please, choose your topic and sign up [here](#). .**
- Report of the Outreach of Applications for Society WG by Barbora (co-convenor with Yiota) - Following the panel discussion on the same topic at the previous IPPOG meeting, which concluded that there are a lot of material from KT but stories are missing, this new WG was established. Barbora and Yiota have collected a lot of materials about many subjects, which are clearly structured [here](#). The aim of the WG is to write up stories about the collected materials and propose more. input from the whole IPPOG collaboration is welcome.
 - **Follow up - If IPPOGers are invited to participate in writing stories and enrich the database. Please, see the topics, propose new and sign up [here](#) to contribute.**
- Report of the Expanding MC to new countries WG presented by Ken and Uta. The group identified strategies, target people and associations that can help with Masterclasses expansions. The group is now working on new supporting material. They are also developing Masterclasses in Spanish in order to reach Central and South American countries.
 - **Follow up - Add to the list of people and associations for MC expansion and development of new supporting materials.**