

International Particle Physics Outreach Group (IPPOG) Report



- **Brief history: started as a network called the European Particle Physics Outreach Group (EPPOG) in 1997.**
 - Sweden represented in the network (Erik Johansson from SU was the original representative) through Fysikersamfundet.
 - Tightly connected to CERN in the beginning, changed name to IPPOG a couple of years ago to reach out worldwide.
- **Transformed from a network into a formal collaboration two years ago, with membership fees.**
 - Members can be countries, laboratories or experiments.
 - Fees are low (1 kEuro/year), **medium (3k)** or large (5k), depending on the GDP and the size of the community.
 - This allows to go from ideas to action, to have the means to produce material and pay for critical organisational support.
- **Meet twice a year for 2.5 day long, intense, meetings.**

	Signing Organisation	Country/Lab/Experiment	Date signed
1	NIKHEF	Netherlands	22 Sep 2016
2	DESY for KET	Germany	23 Sep 2016
3	Physics Department of University of Oslo	Norway	21 Oct 2016
4	LIP	Portugal	1 Nov 2016
5	The Section for Elementary Particle and Astroparticle Physics of the Swedish Physical Society through the Swedish LHC Consortium	Sweden	1 Nov 2016
6	CHIPP	Switzerland	4 Nov 2016
7	Ministry of Education, Science, Research and Sport	Slovak Republic	15 Nov 2016
8	Institute of Atomic Physics	Romania	17 Nov 2016
9	Helsinki Institute of Physics	Finland	29 Nov 2016
10	FWO + F.R.S.-FNRS	Belgium	30 Nov 2016
11	CERN	CERN	19 Dec 2016
12	INFN	Italy	21 Dec 2016
13	CNRS/IN2P3	France	23 Dec 2016
14	The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences	Poland	29 Dec 2016
15	CoEPP	Australia	14 Feb 2017
16	The University of Notre Dame on behalf of QuarkNet	USA	14 Mar 2017

Scope of Activity

International Masterclasses

Since 2005,
~ 14 k students,
225 institutes
in 52 countries

Int. Day of Women and Girls in Science

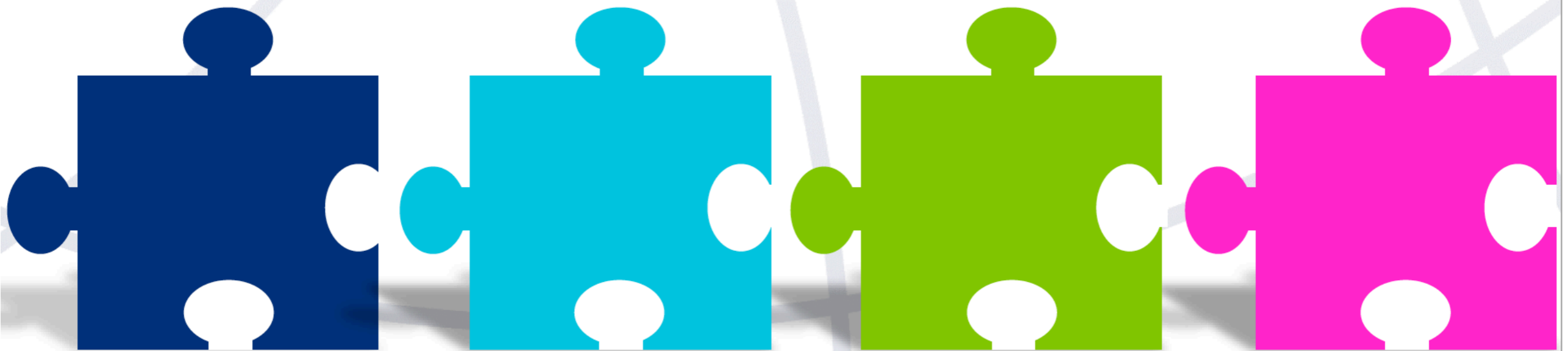
Since 2016,
300 students,
10 institutes
in 6 countries

World Wide Data Day

Since 2016,
400 students,
29 institutes
in 10 countries

Neutrino Masterclasses

New in 2019



PWF Afghanistan

Outreach program during PWF HEP Workshop at Kabul University

University and science organisations have very little resources!

We (PWF) will go again in the Spring and intend to make and take resources



- **Composition of the collaboration (full list in the backups):**

Status

- **Members:** 19 (+2) Countries, 2 (+3) Experiments, 1 Lab
- **Candidates:** Bulgaria, Hungary, Ireland, Israel, South Africa, Spain, United Kingdom
- **Expression of Interest:** Georgia

- **In the meeting, we have four different working groups:**

Bringing Masterclasses to New Countries

- Conveners: **Uta Bilow, Ken Cecire**

Explaining Particle Physics Hot Topics to a Lay Audience

- Convener: **Deszo Horvath**

Exhibits

- Conveners: **Emma Sanders**

European Strategy Update

- Convener: **Hans Peter Beck**
- Open Discussion on Friday morning
- Wrap-Up on Saturday morning

- **A large part of the current activities are concerned with giving input to the European Strategy from the outreach perspective.**

- We also have two discussion sessions:
 - Is beauty leading physics astray?
 - Convener: **Ivan Melo**
 - Outreach applications of particle physics for society
 - Medical Convener: **Manuela Cirilli**
 - Non-Medical Convener: **Barbora Gulejova**
- We also heard report on various other topics:
 - Researcher night at CERN, and “connect the dots” (see backup).
 - We had visitors from CAEN who demonstrated various equipments they have developed for education. Very nice instruments, but at a rather high price.
 - Plans for Masterclasses for SESAME (important for local engagement, ease of identification, and to build capacity for future). MAX IV?
 - Success stories and exhibitions from a few of the countries.
- We saw a report from the new ALICE visitors centre (it looks very nice) and had a video conference with moderator in CR.

- As said before, the Swedish membership fee is 3 kCHF.
- So far, it has been paid through the LHCK money.
- With the new grant for LHCK, no money was granted for outreach (and contribution to summer students was cut).
- Bengt tells me we have to find a new source of the money.
 - Ideally should be money from VR, through Fysikersamfundet.
 - In addition to travel money, we should strongly ask for this.

Source	Description	Income (k€)
Contributing Members	Annual Fee	60
CERN	Masterclass Coordination	45
CERN	Scientific Secretary	In-Kind
Carry-Over Spending	Set aside for major investments	25
Total		130

Category	Subcategory	Cost (k€)
Infrastructure	Web Design	10
	Web and Communication Content Development	50
Coordination	Masterclass Coordination	45
Activity Support	Masterclass Support	2
	Global Cosmics Support	2
	Exhibits Support	2
	Public Outreach at Conferences	2
Communication	Other Projects	1
	Print Material	1
	Translation	1
General Support	Travel & Fees	5
	IPPOG Meeting Expenses	3
	Office Expenses	1
Contingency		5
Total		130

- EPPCN (European Particle Physics Communication Network) was established by CERN in 2005 following the European Strategy.
 - Strengthen communication and dissemination of information to member states.
 - Coverage for the start of LHC, and the discovery of Higgs boson.
- Gets press releases ahead of time. Most of the discussions are on *how* to communicate, rather than discussions on the physics content.
 - The press releases then needs to get disseminated to the journalists.
 - In the statutes, says it should be professional communicators, but for some small countries doubles with the IPPOG delegates.
 - Very important that some delegates happen to be physicists (even when they are not supposed to be!).
- Task is to take information/press releases, translate to native language and *put a national spin on it*. These Swedish groups contributed to ...
- From Sweden, used to be a delegate from the communications office of VR, Camilla Jakobsson. Now the Swedish place is vacant.
 - I think CERN provides 5 kCHF/yr to the delegate for travel.

Backup

LHC: connect the dots !



What is this ?

At the Large Hadron Collider (LHC), protons collide in the centre of gigantic detectors. Then hundreds of new particles, the tiniest bits of matter (what we are made of, as well as everything around us: air, water, rocks etc.), are produced and fly in all directions away from the collision point.

These particles interact with the detector leaving little dots where they passed. By connecting these dots, we can see the tracks (path) of the particles. These tracks are analysed by the physicists to understand what happened in the collision.

Help the physicists!

On the slice of detector on the right, trace the tracks left by the particles to help physicists identify them! Maybe you will see evidence of a Higgs boson! Follow instructions on the right of the page.

Did you know that...

In reality the LHC detectors record about 1 billion collisions like this each second! You would need a lot of paper and pencils to draw them all. Instead, physicists use many computers (more than half a million processor cores) to store and draw all the tracks. These computers are in 170 data centres around the world!

Do you want to know more ?

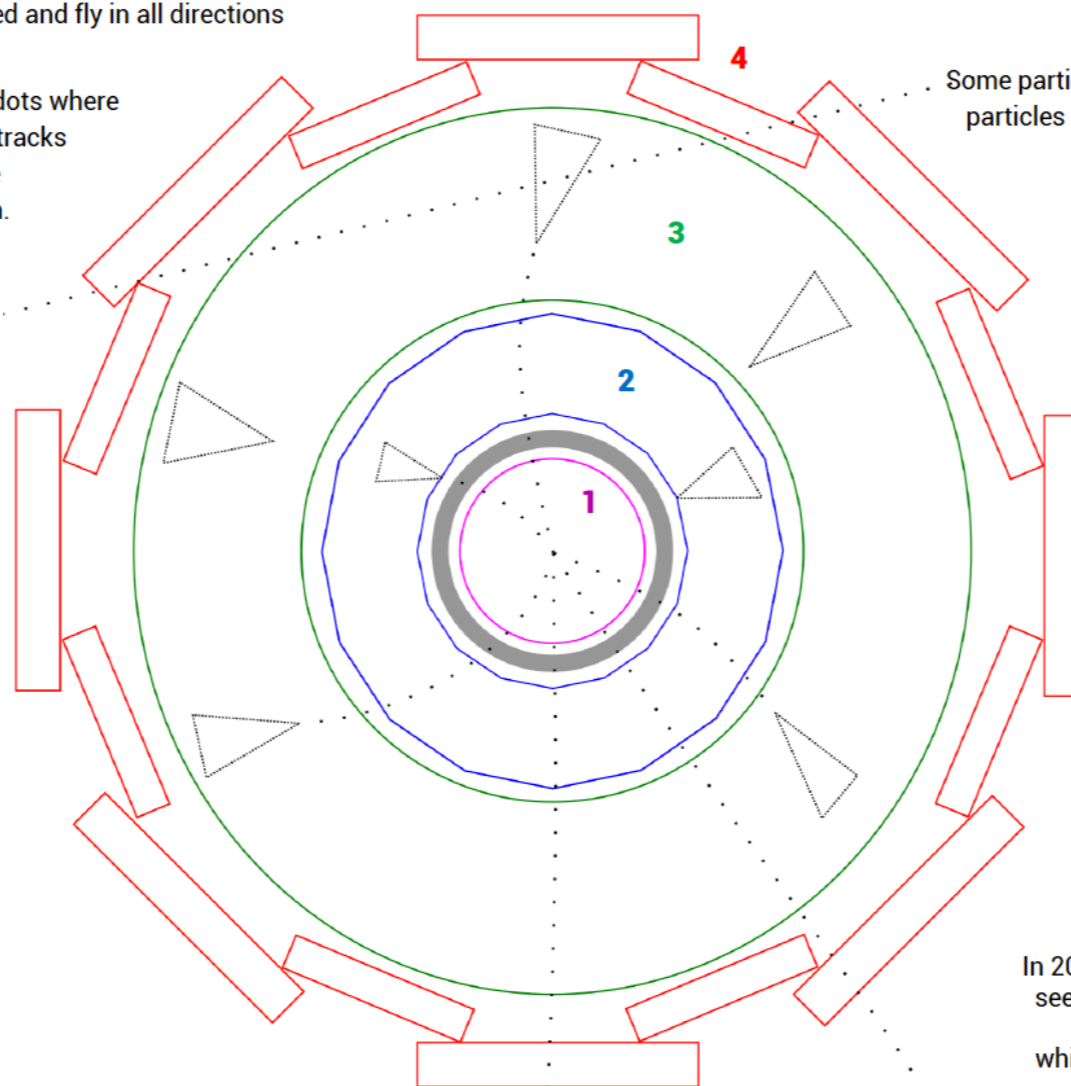
Scan the QR code below to discover more about this collision and find others collisions to analyse.

Come to CERN, in Geneva, Switzerland and visit our permanent exhibitions or get a guided tour of the Laboratory. More info on visit.cern.



Scan this QR code to find out more about this collision

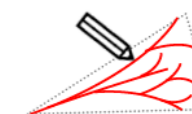
More collisions on cern.ch/connectdots



Take a pencil and connect the dots. That will reveal the tracks left by the particles.



Some particles are stopped by the detector generating dozens of new particles in what we call a *particle shower*. They are represented by triangles. Draw showers in the triangles.



Level 2 – Intermediate

Label each track with the name of one of the particles written in the first column of the table. There is a column for each detector part, numbered from the inside out. Identify particles by the traces they left.

Particle	1	2	3	4
Photon		Shower		
Electron	Track	Shower		
Neutron			Shower	
Proton	Track	Track	Shower	
Muon	Track	Track	Track	Track

Level 3 – Advanced

A. Have you found a Higgs boson in this collision ?

In 2012, the LHC detectors found a particle scientists had been seeking for decades: the Higgs boson. When a Higgs boson is produced at the collision point, it turns into other particles, which are then seen in the detector. You can find a Higgs boson by seeing any of these three combinations of particles:

4 muons	2 electrons + 2 muons	2 photons
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If you have not found a Higgs, try another collision...

B. Strange track...

One track does not pass by the point of collision in the centre. What is it ? Scan the QR code on the left to find out!

Collision # 15425874568

Analysed by :

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17	ATLAS Spokesperson	ATLAS	1 Nov 2017
18	BELLE II Spokesperson	BELLE II	19 Feb 2018
19	Jôsef Stefan Institute, Ljubljana, Slovenia	Slovenia	19 Apr 2018
20	Institute of Physics of the Czech Academy of Sciences	Czech Republic	21 Apr 2018
21	Rede Nacional de Física de Altas Energias (RENAFAE)	Brazil	26 Apr 2018
22	Ministry for Education, Research, and Religious Affairs	Greece	19 Jun 2018
23	HEPHY, ÖAW, ÖPG	Austria	Ready to Sign
24	Danish CERN Instrumentation Centre, NICE	Denmark	Ready to Sign
25	LHCb Spokesperson	LHCb	Ready to Sign
26	ALICE Spokesperson	ALICE	Ready to Sign
27	CMS Spokesperson	CMS	In Process