



# IPPOG International Masterclasses 2023

## The Video Conference

**IMC Moderators training**

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6<sup>th</sup> February 2023

# Moderators

## Video Conference

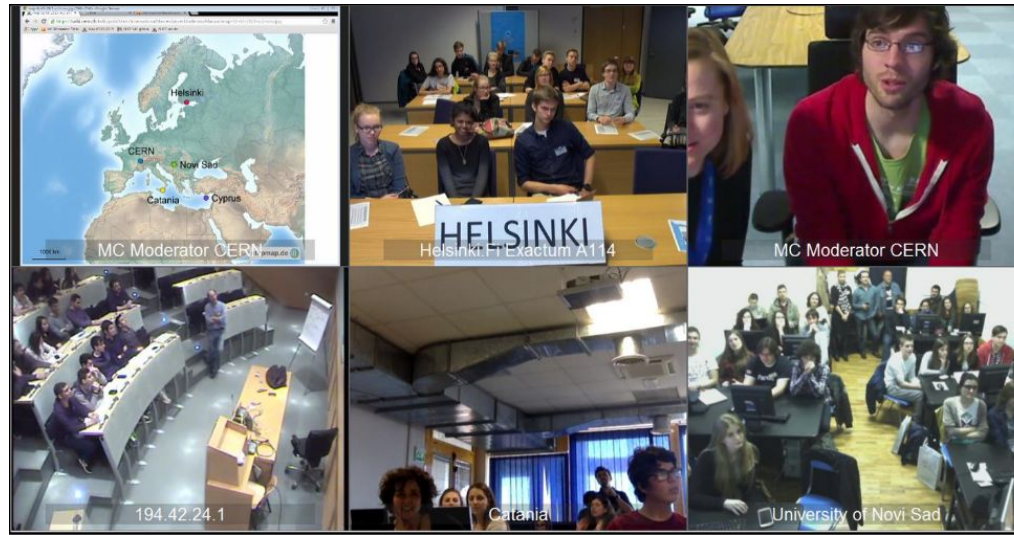
- You are going to be the face of CERN to hundreds of students around the world!
- In pairs you will hold a video conference via Zoom to a group of institutes who have all done the same masterclass exercise during their day.
- The video conference (VC) allows the students to come together to combine and discuss their results under your guidance in a light hearted and fun way.



# Aims

## Video Conference

- Convey the internationality of the event.
- Demonstrate how physicists work together internationally.
- Encourage students to exchange experiences between masterclasses.
- Demonstrate improvement in accuracy by combination of different data sets.
- Be a FUN end to a long day!



3-5 institutes  
participating in  
each session

# General information

## Video Conference

- [Moderators Manual](#) – has all the information you need for the VC!
- [TWiki](#) has quick links and information
  - Bookmarked on the 'favourites' bar of the browser in the VC room

### Preparation for the video conference

Prepare/upload all the material you will have to share, including:

- [intro slide](#)
- masterclass [map](#)
- [table/website](#) for combination of results
- [link](#) to quiz on Kahoot!

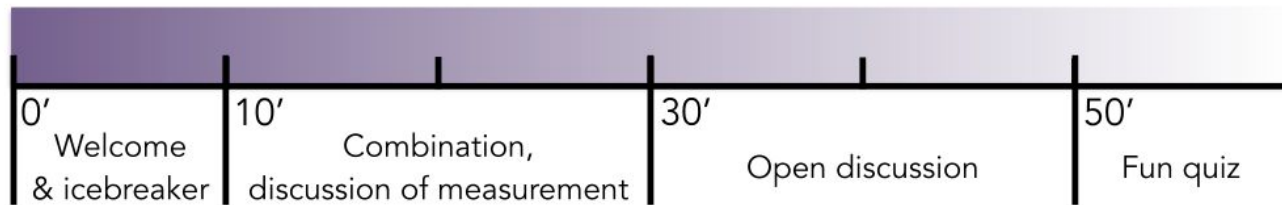
- Use Zoom to setup the video conference.
  - Moderators will have alternative host permissions, if they have a CERN Zoom account.
  - Step by step instructions are in the Twiki.
  - Make sure you know how to use the shared desktop.
  - Mute any noisy participants if necessary!

# Timeline

## Video Conference

Check the one-pager for moderators here:

[https://twiki.cern.ch/twiki/pub/Main/InternationalMasterclassesModeratorManual/One\\_pager\\_for\\_moderators-2023.pdf](https://twiki.cern.ch/twiki/pub/Main/InternationalMasterclassesModeratorManual/One_pager_for_moderators-2023.pdf)



- One hour video conference (16h – 17h sharp) with 3–5 institutes.
- **If both moderators are at CERN:** Arrive at the correct room at 15:30 to get everything setup and prepared.
- **Otherwise (1 at CERN + 1 remotely or 2 remotely) :** connect to the correct Zoom meeting room 30 minutes in advance (i.e. by 15:30) to meet your co-moderator and get everything setup and prepared.
- **One location for the VC:** 4/S-020
- Details available on the TWiki and in the Manual
- Agree with your co-moderator which chat function you want to use in case you need to communicate with each other during the video conference.
  - Option in Zoom to message the co-host.
  - Skype, Mattermost or other platform also fine if you prefer.



# Welcome & Icebreaker Video Conference



## The welcome has to be on schedule, clear and interactive!

- Students should immediately feel that this is a two-way conversation and they should actively take part in the VC.
- Introduce yourself, say a little about your research and explain where you are.
  - *"Hello! My name's Katharine and I work on the ATLAS detector. My research focuses on searching for new particles that can decay to two Higgs bosons."*
  - *"Right now we are sitting at CERN. CERN is the largest centre for particle physics research in the world and the place to be for a particle physicist"*
- Go through the VC timeline and explain what will be happening in the next hour.
  - Share the provided intro slide.

# Welcome & Icebreaker Video Conference

- Share a map showing all the connected sites.
  - Use to explain to the institutes in which order they will be addressed (e.g. north to south).
- Ask one short, friendly question to each institute (sometimes suggested by the local organisers).
  - "Barcelona, how did you find the exercises today?"
  - "Vienna, have you seen the VERA accelerator?"
  - More ideas for questions available from the TWiki



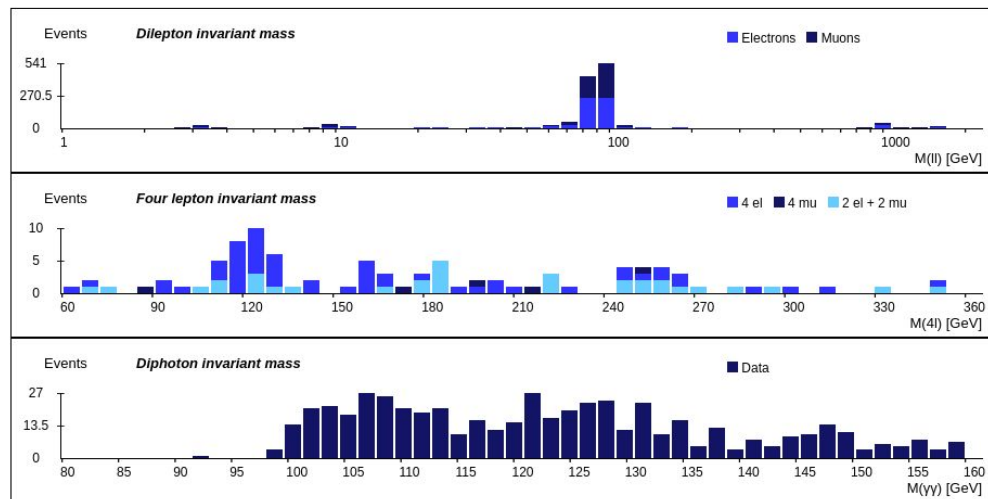
# Discussion of measurements & Combination

## Video Conference

- Share the combination results on Zoom.
- Summarise and comment on the combination.
  - Note that all groups in the VC have done the same measurement, but using different datasets.
  - Don't comment on results from individual institutes.
- Compare to the theory/experimental results.
- Stress why using different data from different sources is beneficial (stats and reduces bias).

### OPloT – MasterClass – Combination for all institutes on 2022-03-12

Start Student Moderator Tutor Administrator





# Discussion of measurements & Combination

## Video Conference

- Ask each group questions about their measurement.
- Questions have been pre-agreed by the authors of each measurement.
  - **Follow the individual training for the measurement you are doing!**
- Examples include:
  - Where are the peaks in the mass histogram? What do they represent?
  - How would you interpret the blue and green areas? What do they mean?
- See the TWiki for list of questions for each measurement.



# Discussion of measurements & Combination

## Video Conference

### Example from ATLAS Z-path:

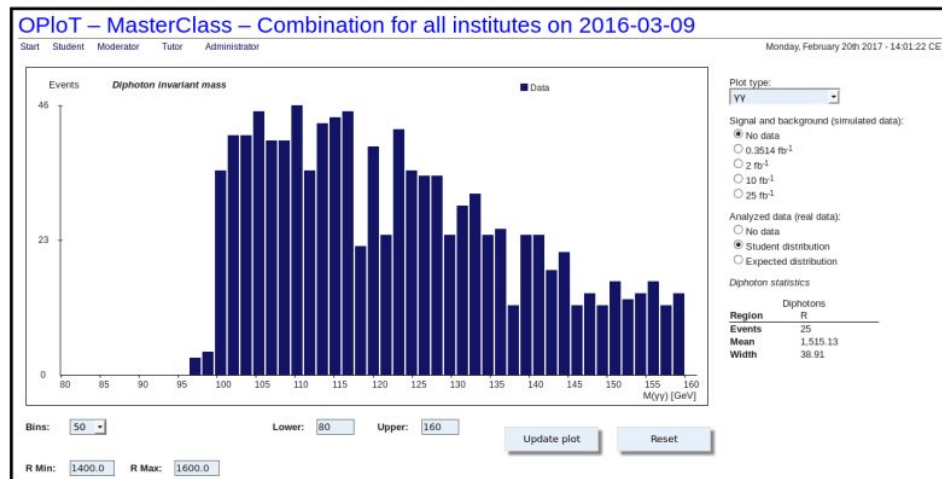
Moderators show the diphoton invariant mass distribution

### Possible question:

Do you see a peak corresponding to the Higgs boson?

### Moderator discussion:

Explain about statistical limitations of the measurements and that  $H \rightarrow \gamma\gamma$  is a very rare process.



# Open discussion

## Video Conference

- Discussion expands to more open and general questions. They can be on anything from...
  - Life at CERN.
  - LHC size/magnets/cost/power consumption.
  - The Big Bang, dark matter, black holes, time travel...
  - How to become a particle physicist.
- Repeat/rephrase the question to:
  - Make sure you understood correctly.
  - Help other groups understand.
- Ask the institutes to come up with more general questions. 1 question per institute per round.

**Give concise, interesting answers!**



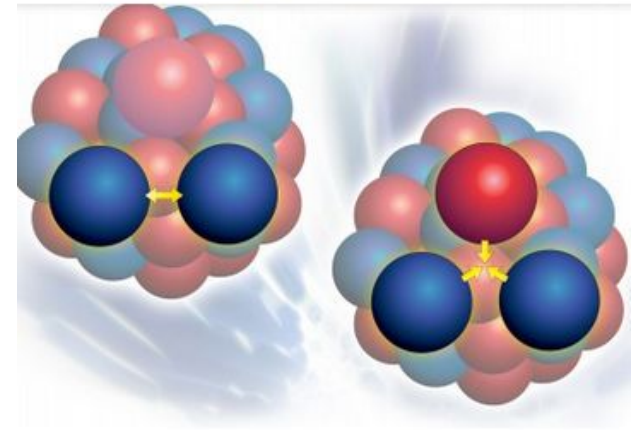
# Quiz

## Video Conference

### **“Who Wants To Be A Millionaire” style quiz**

- Using Kahoot: Interactive interface, shows breakdown of answers for each round.
- Students play on their smartphones. If they prefer or it is not possible, they can use paper to write down their answer and keep track of their game.
- Seven multiple-choice questions.
- Correct answer revealed after each question.
- Each student plays alone and knows their own scoring immediately after their answer.
- No comparisons, no prizes!

**Kahoot!**



**International  
Masterclasses quiz 1**

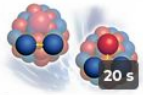
# Quiz

## Video Conference

1. Read out question
2. Start timer
3. Reveal correct answer and answer choices

1 - Quiz

Which particle is the mediator of the strong force?



Neutralino



Z boson



Gluon



Quark





# Goodbye Video Conference

**There must be a clear and common end to the VC after one hour.**

- Say goodbye to everyone and thank them for taking part.
- Do not keep discussion going even if the students are still asking questions.
  - If they and you want some discussion can continue after the goodbye on a voluntary basis.



# Summary

## Video Conference

- Arrive 30 minutes before the start of the VC.
- Set up the Zoom conference following the step by step instructions on the TWiki (instructions also in the manual).
- Have the “one pager for moderators” document to hand.
- Download the map - this must be done each time (also available in the Twiki).
- Have the link to the tables for the combination already open.
- Log into the Kahoot quiz - saved on the browser of the PC (if not it can be obtained from the TWiki).
  - Check that you can open the quiz with the “Play as guest” option.
- Agree with your co-moderators in advance who will do each step.
- Follow the suggested timeline where possible, but use some common sense too.
  - e.g. if there are few institutes joining and the students do not have lots of questions then you may finish a bit early - that’s fine!

All the info you need is on the TWiki and in the manual:

- <https://twiki.cern.ch/twiki/bin/view/Main/InternationalMasterclassesModeratorManual>

# Things it should not do

## Video Conference

### Things it should not do:

- Provide a deeper understanding of the physics.
- Teach English to the students.
- Contain a basic discussion of the measurement.
- Create a competition between the institutes.

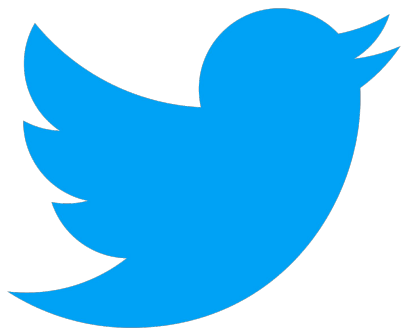
### Before your first moderation:

- Feel free to observe one of the other video conferences before moderating your first session - ask in the Mattermost for the Zoom link.
- Join the Mattermost channel for moderators - join [here](#)
  - Ask questions to organisers or other moderators.
  - Provide fast informal feedback to us about what's working well and what isn't.



# Social Media Video Conference

- Feel free to post on Twitter!
  - Interesting questions you were asked.
  - Anything unusual or interesting with the combination.
  - Links you wish to share.



#LHCIMC  
[@physicsIMC](https://twitter.com/physicsIMC)



**physicsIMC**

@physicsIMC Follows you

International Masterclasses is where high-school students become particle physicists for one day: [#physicsIMC](https://twitter.com/physicsIMC)

everywhere [physicsmasterclasses.org](https://physicsmasterclasses.org) Joined November 2015

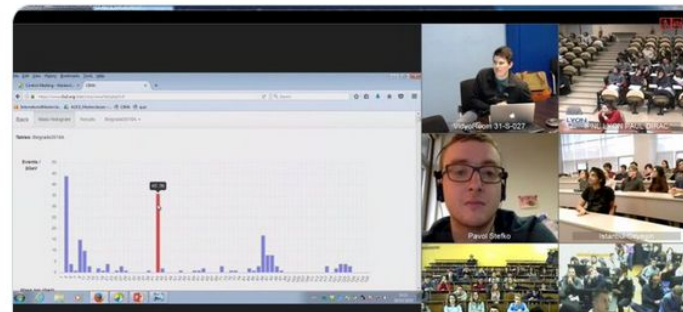
274 Following 1,575 Followers



**physicsIMC**  
@physicsIMC

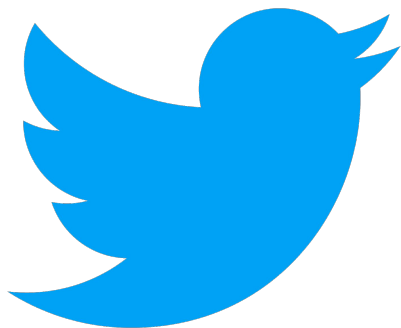
...

Discovery? Moderators at [@CERN](https://twitter.com/CERN) are discussing a peak in students' histogram with [@CMSexperiment](https://twitter.com/CMSexperiment) data.



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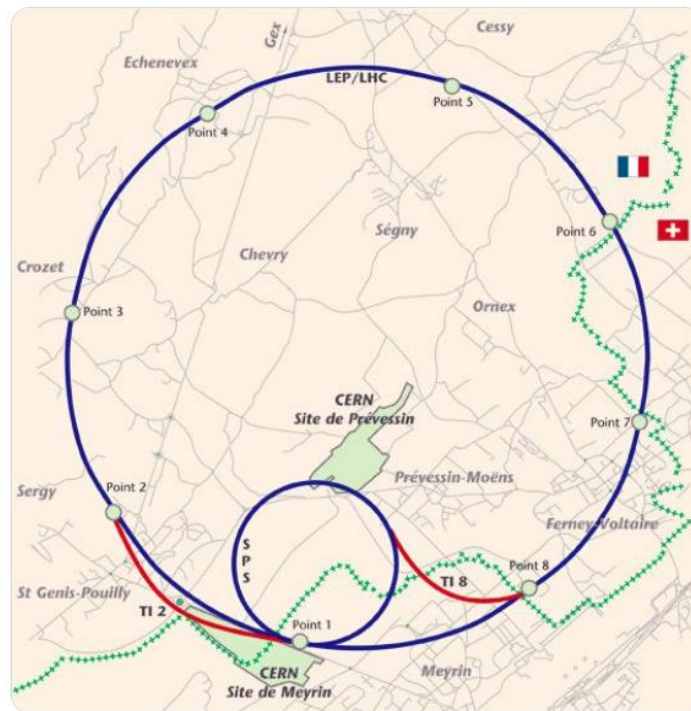
#LHCIMC  
[@physicsIMC](https://twitter.com/physicsIMC)



Dr. Ina Carli  
@Ina\_Carli

Replying to @physicsIMC @uniwue and 2 others

#ICYI Answer to a question from yesterday's #LHCIMC18 I was not sure about: about 2 out of 8 sectors = 1/4 of LHC are under Switzerland, have a look on map here or on [natronics.github.io/science-hack-d...](https://natronics.github.io/science-hack-d...)





# And finally!

## Video Conference



Join us for the moderators coffee time:  
every Tuesday from 10:30 - 11:00 in this [link](#)  
Mattermost channel: [here](#)

**Smile, initiate two-way conversations with the students, meet your colleagues and have FUN!**



# Thanks!