



International Masterclasses

CERN Videoconference

Manual

for **Local Organizers**

12.02.2021

Introductory Remarks

This manual is the result of a working group set up at the 1st IPPOG Meeting in Košice, in April 2011, consisting of two experienced videoconference moderators (Kate Shaw, Michael Hauschild), Uta Bilow, responsible for coordination of the International Masterclasses, and Laurenz Widhalm † as head of the group.

Based on feedback collected over the years from students, teachers, moderators, and (local and global) organizers, we defined the aims and structure of the videoconference, and compiled a list of dos and don'ts to achieve the best possible videoconference experience for the students. Current group members are: Uta Bilow, Ina Carli, and Katharine Leney.

Please read this manual carefully to be optimally prepared for your Masterclass videoconference!

Table of content

Introductory Remarks	2
The Aim of the Videoconference	4
Technical details	5
Elements of the Videoconference	5
1. Overview & Timing	5
2. Welcome & Icebreaker (10')	5
3. Combination & Discussion of Measurements (20')	6
4. Open Discussion (19')	6
5. Quiz (10')	6
6. Common Good Bye (01')	6

† This manual is dedicated to the memory of Laurenz Widhalm, who initiated the Masterclasses Videoconference WG, and died after long illness on December 24, 2012.

About International Masterclasses

International Masterclasses provide a unique opportunity for High school students to be "scientists for a day". 16- to 19-year-old students in 60 countries around the whole world are invited to one of about 220 nearby universities or research centers for one day in order to take part in an authentic research process. They hear lectures from active scientists and gain insight into topics and methods of basic research into the fundamentals of matter and the forces. Thus prepared, students perform measurements themselves on real data from particle physics experiments at the LHC (ALICE, ATLAS, CMS, LHCb) or the Belle II experiment, and there is a Masterclass on Particle Therapy. At the end of each day, up to five student groups join in a videoconference with CERN, Fermilab, KEK, GSI, or TRIUMF for discussion and combination of their results.

The International Masterclasses are a core activity of IPPOG, the International Particle Physics Outreach Group. The program is organized and run by Michael Kobel of the Technical University Dresden, Germany, and coordinated by Uta Bilow from TU Dresden and Ken Cecire, QuarkNet. A working group is preparing the videoconferences.

Particle Physics Masterclasses began in 1997 in the United Kingdom. The European program started in 2005, the World Year of Physics, and has grown constantly since then. In 2006 American students participated for the first time in a parallel program organized by QuarkNet, and since then more and more countries have joined in.

With its unique approach the International Masterclasses cover various aims:

- link school and research institutions
- bridge the gap between science education at school and modern scientific research
- stimulate interest in science
- improve understanding in science and scientific research
- demonstrate the scientific research process
- provide an attractive opportunity to get a first glimpse of modern physics research

More info:

Int. Masterclasses: <https://www.physicsmasterclasses.org/>

IPPOG: <https://ippog.org/>

QuarkNet: <https://quarknet.org/>

The Aim of the Videoconference

At the end of each day of International Masterclasses, students will participate in an international videoconference - together with up to four other institutes, according to the schedule, and moderators from CERN. The videoconference is from 4 pm to 5 pm CET. Moderators combine students' results and discuss them with the participants. In addition, the videoconference includes a Q & A session and a quiz.



Screenshot from a videoconference with 4 groups participating

The videoconference (VC) has to:

- convey the internationality of the event
- demonstrate how physicists work together internationally
- demonstrate improvement in accuracy by combination of different data sets
- most importantly: BE FUN FOR THE STUDENTS!

it is NOT supposed to:

- deepen the understanding of the physics
(better done locally in the native language)
- teach English vocabulary of particle physicists
(vocabulary should not distract from physics)
- contain a basic discussion of the measurement
(has to be done locally before)
- create a competition regarding the measurements
(“who is the best?”)

Technical details (Zoom webinar)

All videoconferences will use Zoom. To make the videoconference enjoyable for both moderators and students and to ensure a smooth flow of information, the “webinar” style will be used. While moderators transmit video and audio, participants cannot send video or audio. But they can interact via the Q&A feature and polls that moderators will launch.

If the number of participants in a videoconference is low, moderators can nevertheless decide to allow students to unmute themselves and to speak.

Zoom webinar IDs will be send ~ 1 week ahead of your Masterclass, so you can share it with participants, if students will connect individually. Avoid posting the Zoom meeting link on any public website (including in indico) to prevent the session from Zoombombing.

Elements of the Videoconference

1. Overview & Timing

Welcome & Icebreaker _____	10'	(16:00 – 16:10)
Combination & Discussion of Measurement _____	20'	(16:10 – 16:30)
Open Discussion _____	19'	(16:30 – 16:49)
Quiz _____	10'	(16:49 – 16:59)
Good Bye _____	01'	(16:59 – 17:00)

2. Welcome & Icebreaker (10')

Moderators will welcome participants, explain the timeline and Zoom functionalities. They will launch a Zoom poll as a warm-up activity and display a map showing all connecting sites. Example:



3. Combination & Discussion of Measurements (20')

Moderators show combined results. They will ask questions to participants on the measurements and the results. Answers from students will be collected via Zoom polls. It is **not** intended that institutes present reports.

4. Open Discussion (19')

After the specific discussion of the measurement, the discussion can expand to more open and general questions. The Zoom "Q&A" feature will be used. Students can type questions, and they can upvote questions from other participants.

5. Quiz (10')

The quiz will be played by moderators using the app www.kahoot.it. Moderators will share the game PIN. Students can do the quiz on PC or a second device, e.g. their smartphone. They don't need answer sheets.

The quiz includes 7 multiple choice questions (4 answers each), and every student plays on his/her own. The correct answer will be revealed immediately after each question.

6. Common Good Bye (01')

Moderators are supposed to close the session after 60 minutes!

Also in the case of very lively discussions, the moderators still have to officially end the VC in time. They can, however, offer to stay online after the official end. But this is completely on a voluntary basis. Alternatively, students can be offered to continue the discussion locally with the local experts.