

IPPOG International Masterclasses 2015

# The video conference

**Kate Shaw**  
**Udine/ICTP Group**

**Katharine Leney**  
**UCL**



The Abdus Salam  
**International Centre  
for Theoretical Physics**



- 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 Vidyo to group of institutes who have all done the same masterclass exercise during their day
- The video conference allows the students to come together to combine and discuss their results under your guidance in a light hearted fun way 😊



- Aims of the 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 FUN for the students!**



- It's **NOT** supposed to:
  - Deepen the understanding of the physics
  - Teach English to the students
  - Contain a basic discussion of the measurement
  - Create a competition between the institutes



- Moderators Manual – has all the information you need for the VC!  
[https://twiki.cern.ch/twiki/pub/Main/InternationalMasterclassesModeratorManual/Manual\\_Videoconference\\_Moderators\\_v10.pdf](https://twiki.cern.ch/twiki/pub/Main/InternationalMasterclassesModeratorManual/Manual_Videoconference_Moderators_v10.pdf)
- Twiki has quick links and information (on the tool bar of internet explorer in the VC rooms)  
<https://twiki.cern.ch/twiki/bin/view/Main/InternationalMasterclassesModeratorManual>

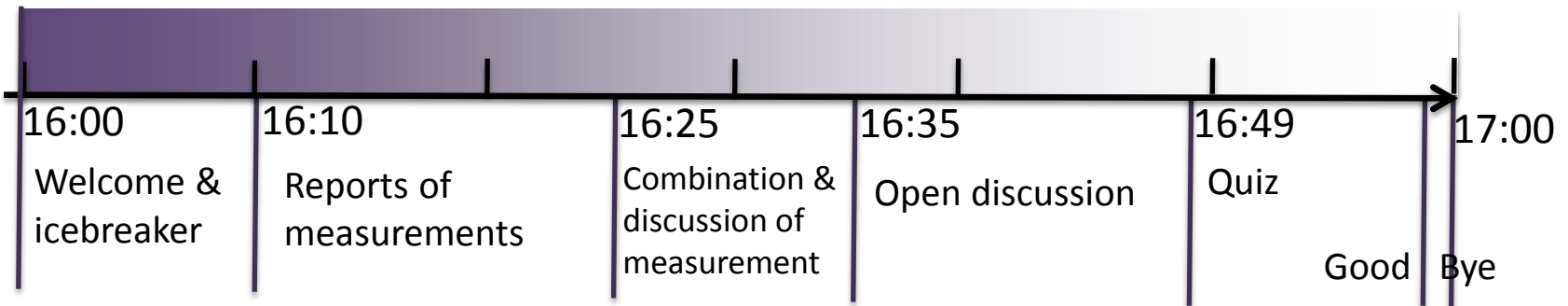
## Preparation for the video conference

Arrive 30 minutes before the start of your video conference and prepare/upload all the material, including:

- masterclass [map](#)
- [table/website](#) for combination of results
- animated [quiz](#)
- **NEW** for ATLAS Zpath - a great animation for the evolution of the [Higgs->gammagamma signal](#) and for the [Higgs->ZZ](#). These demonstrations can help with explaining to students who claim they have discovered the Higgs, that they probably will need more statistics.

Make sure you have downloaded what you need onto the desktop (quiz and map), you are able to access the tables and results, you know how to share these on vidyo, especially the animated quiz!

- You will use Vidyo to setup the video conference
  - Step by step instructions are in the twiki
  - Make sure you know how to use the shared desktop.
  - Mute any noisy participants if necessary!



- One hour video conference (16 – 17 sharp) with 3-6 institutes
- Arrive at the correct room at 15:30 to get everything setup and prepared
- Two Locations for the VC
  - 33-R-016 (key will be left in an envelope addressed to “Masterclass” in the mailbox opposite the door – please replace it afterwards!!)
  - CMS center (building 354-1-002, first floor, main room) Get ACCESS rights for CMS center (details p10 in manual)
- Details for contact people for both rooms are available on the TWiki and in the Manual

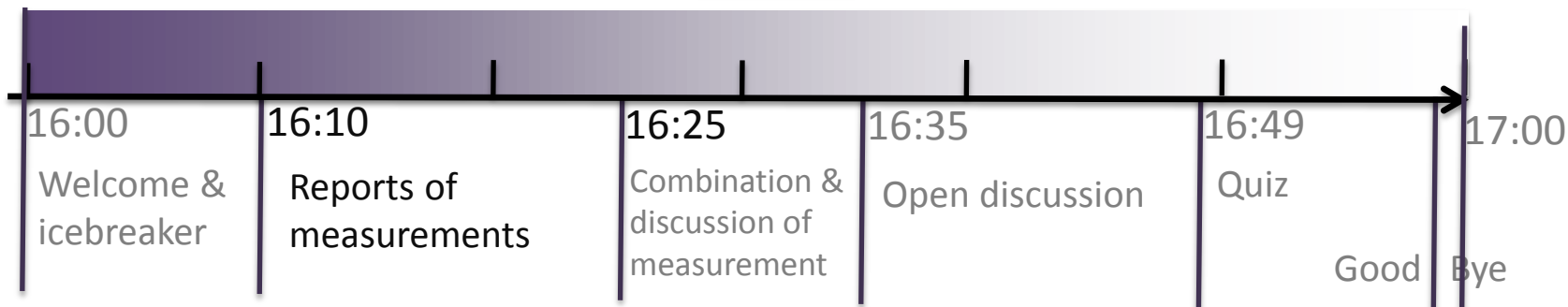
|                      |                         |   |                 |       |          |
|----------------------|-------------------------|---|-----------------|-------|----------|
| 16:00                | 16:10                   | 16:25                                   | 16:35           | 16:49 | 17:00    |
| Welcome & icebreaker | Reports of measurements | Combination & discussion of measurement | Open discussion | Quiz  | Good Bye |

**The welcome has to be on schedule, common and interactive!!**

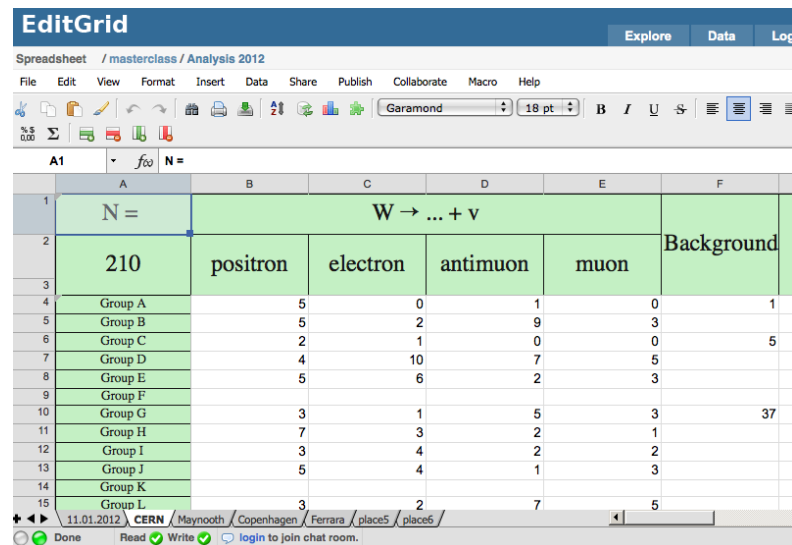
➤ Students should immediately feel they should actively take part in the VC

- Introduce yourself and explain where you are
  - A little about CERN and your research
  - The status of the LHC
- Explain what will be happening in the next hour
  - Go through the agenda
- Share a map showing all the connected sites
- Ask one short question to each institute
  - Just a nice friendly question





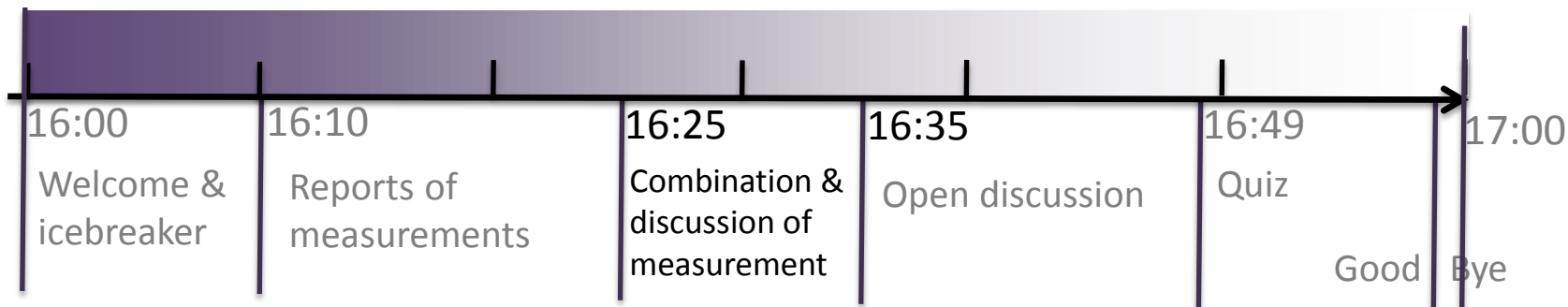
- Put up the results page onto the shared desktop and address each masterclass one by one
- Students should report for up to two minutes on results, uncertainties, difficulties and express any questions they had
- All reports should be given sequentially – NOT interrupted by questions or comments
- Then at the end students have the chance to comment and ask questions



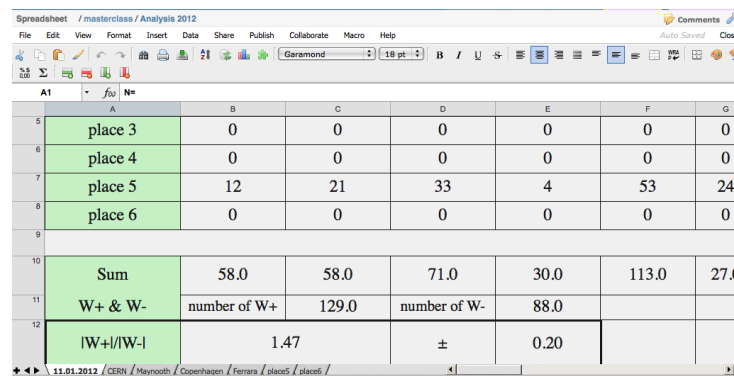
Spreadsheet / masterclass / Analysis 2012

|    | A       | B           | C        | D        | E    | F          |
|----|---------|-------------|----------|----------|------|------------|
| 1  | N =     | W → ... + v |          |          |      |            |
| 2  | 210     | positron    | electron | antimuon | muon | Background |
| 3  |         |             |          |          |      |            |
| 4  | Group A | 5           | 0        | 1        | 0    | 1          |
| 5  | Group B | 5           | 2        | 9        | 3    |            |
| 6  | Group C | 2           | 1        | 0        | 0    | 5          |
| 7  | Group D | 4           | 10       | 7        | 5    |            |
| 8  | Group E | 5           | 6        | 2        | 3    |            |
| 9  | Group F |             |          |          |      |            |
| 10 | Group G | 3           | 1        | 5        | 3    | 37         |
| 11 | Group H | 7           | 3        | 2        | 1    |            |
| 12 | Group I | 3           | 4        | 2        | 2    |            |
| 13 | Group J | 5           | 4        | 1        | 3    |            |
| 14 | Group K |             |          |          |      |            |
| 15 | Group L | 3           | 2        | 7        | 5    |            |

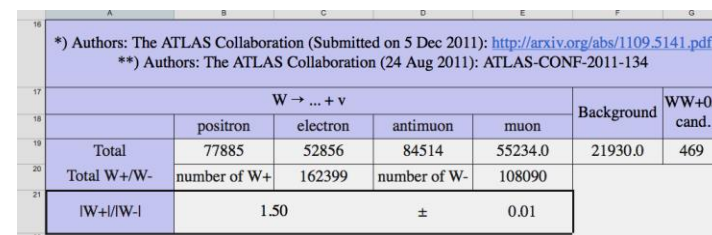




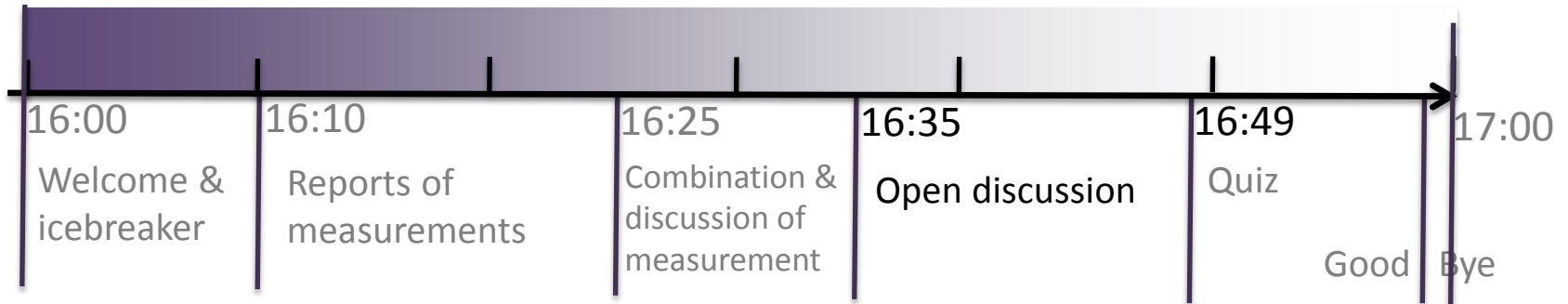
- All masterclasses will do the same measurement but different data
- Combine the results in the table
- Summarize and comment
- Compare to the theory/experimental results
- Stress why using different data from different sources is beneficial (stats and reduces bias)
- Students here can ask questions. Encourage discussion between the masterclasses



|    | A       | B            | C    | D            | E    | F     | G    |
|----|---------|--------------|------|--------------|------|-------|------|
| 5  | place 3 | 0            | 0    | 0            | 0    | 0     | 0    |
| 6  | place 4 | 0            | 0    | 0            | 0    | 0     | 0    |
| 7  | place 5 | 12           | 21   | 33           | 4    | 53    | 24   |
| 8  | place 6 | 0            | 0    | 0            | 0    | 0     | 0    |
| 10 | Sum     | 58.0         | 58.0 | 71.0         | 30.0 | 113.0 | 27.4 |
| 11 | W+ & W- | number of W+ |      | number of W- |      |       |      |
|    |         | 129.0        |      | 88.0         |      |       |      |
| 12 | W+ / W- | 1.47         |      | ±            | 0.20 |       |      |



| *) Authors: The ATLAS Collaboration (Submitted on 5 Dec 2011): <a href="http://arxiv.org/abs/1109.5141.pdf">http://arxiv.org/abs/1109.5141.pdf</a> |              |          |              |         |            |             |
|--|--------------|----------|--------------|---------|------------|-------------|
| **) Authors: The ATLAS Collaboration (24 Aug 2011): ATLAS-CONF-2011-134  |              |          |              |         |            |             |
| W → ... + ν  |              |          |              |         | Background | WW+0J cand. |
|  | positron     | electron | antimuon     | muon    |            |             |
| Total  | 77885        | 52856    | 84514        | 55234.0 | 21930.0    | 469         |
| Total W+/W-  | number of W+ |          | number of W- |         |            |             |
|  | 162399       |          | 108090       |         |            |             |
| W+ / W-  | 1.50         |          | ±            | 0.01    |            |             |



- Discussion can expand to more open and general questions
- They can be on anything from...
  - Life at CERN
  - LHC, size, magnets, cost, power consumption
  - Detectors & experiments
  - The Universe, the Big Bang, dark matter, black holes, time travel...
  - How to get into physics/working at CERN



**Give short interesting answers**

|                      |                         |   |                 |       |          |
|----------------------|-------------------------|---|-----------------|-------|----------|
| 16:00                | 16:10                   | 16:25                                   | 16:35           | 16:49 | 17:00    |
| Welcome & icebreaker | Reports of measurements | Combination & discussion of measurement | Open discussion | Quiz  | Good Bye |

## 7 TeV Quiz – *who wants to be a millionaire?*

- Moderators show English version on shared desktop.
- Seven questions – each multiple choice
- Each student plays alone
- Correct answer revealed after each question
- Scoring is done by each student
- No comparisons, no prizes

***Don't phone in it's just for fun!***

## Quiz Answer Sheet



**Your Answers**  
tick off your answer A, B, C or D

|   |                         |                         |
|---|-------------------------|-------------------------|
| 1 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 2 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 3 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 4 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 5 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 6 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |
| 7 | <input type="radio"/> A | <input type="radio"/> C |
|   | <input type="radio"/> B | <input type="radio"/> D |

**Your Score**  
tick off one energy step for each correctly answered question, starting at the bottom

|   |
|---|
| <b>7000000000000 eV</b><br><small>full beam energy of the LHC</small> |
| 172900000000 eV<br><small>mass of the top quark</small>               |
| 91187600000 eV<br><small>mass of the Z-Boson</small>                  |
| 938272013 eV<br><small>mass of the proton</small>                     |
| 105658367 eV<br><small>mass of the myon</small>                       |
| 2500000 eV<br><small>mass of the up quark</small>                     |
| 510999 eV<br><small>mass of the electron</small>                      |
| <input type="checkbox"/> 0 eV   |

# Welcome to the MASTERCLASSES QUIZ!

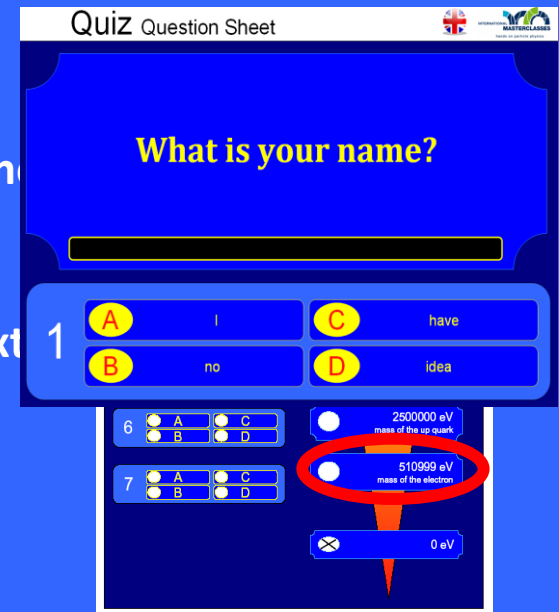
## Rules of the Game

- 7 questions, 4 answers to choose (A,B,C,D)
- **mark your answer on your answer sheet before the time ends!**
- moderators will then reveal the correct answer
- if you have answered correctly, you may **tick off the next energy level**

*Let's check which energy level you can reach!*

**Please note:**

- *this quiz is for fun, not for competition!*
- *we won't compare results*



Quiz Question Sheet

What is your name?

1  A I  C have  
 B no  D idea

6  A  C  
 B  D

7  A  C  
 B  D

2500000 eV  
mass of the up quark

510999 eV  
mass of the electron

0 eV



**Welcome to the  
MASTERCLASSES QUIZ!**

**Ready?**

# Quiz Question Sheet





## Which particle is the mediator of the Strong Force?



1

A

Neutralino

C

Gluon

B

Snail

D

Pigino



**How much of our universe  
is made of matter or energy,  
about which we know  
almost nothing about?**



2

A

13%

C

100%

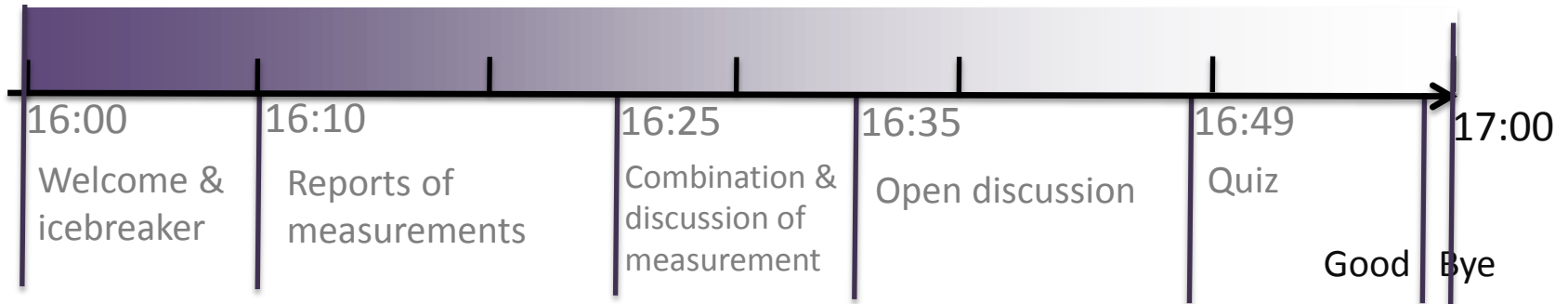
B

96%

D

32.8%





**There has to be a clear common end of the VC after 60 minutes!**

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



- Arrive 30 minutes before the start of the VC
- Set up the Vidyo conference following the step by step instructions on the twiki/ in the manual
- The quiz should already be downloaded on the desktop
  - Check that you can open the quiz as a slide show and share it.
- Download the map - this must be done each time
- Have open the link to the tables for the combination

Post on the facebook page!

- Interesting questions you were asked.
- Anything unusual or interesting with the combination.
- Any links you wish to share



The screenshot shows the Facebook page for 'International Particle Physics Masterclasses'. The page header includes the name and a search bar. The main image shows a person pointing at a laptop screen displaying a particle detector simulation. Below the image is the page name and 'Product/Service' label. The page has 8,631 likes and is followed by several people. A post from the page is visible, dated 9 September 2014, with the text: 'Seen International Masterclasses in CERN Courier? Look here: <http://cerncourier.com/cws/article/cern/57305> .'

<https://www.facebook.com/pages/International-Particle-Physics-Masterclasses/114950505201581>

Watch this recording of a previous VC  
<http://cds.cern.ch/record/1662361>

*So smile, initiate dialogue and  
make it fun! The success of the  
conference relies on you!  
(no pressure)*