

IPPOG International Masterclasses 2022

The Video Conference

Discussion of Measurements & Combination

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Discussion of Measurements & Combination

0'	10'	30'	50'
Welcome & icebreaker	Combination, discussion of measurement	Open discussion	Fun quiz

- 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).

Analysis

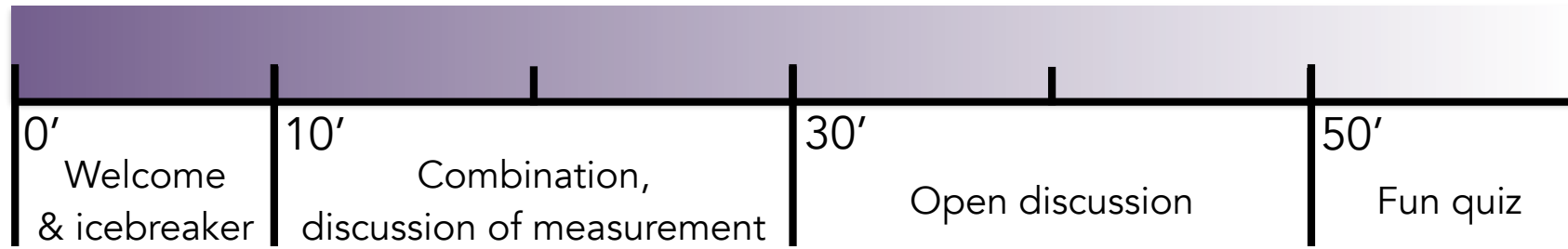
Total #	W → ... + ν				Background	WW
	e ⁺	e ⁻	μ ⁺	μ ⁻		
1615						
ATP	56	56	56	56	343	133
Bonn-NTW						
BSZ Riesa	18	27	22	16	86	21
Hamburg-NTW-1	25	17	19	14	149	20
R.-Hildebrand-Gym. Ma	0	0	0	0	390	91
Total	99	100	97	86	968	265
Σ W ⁺ Σ W ⁻	W ⁺	196	W ⁻	186	W ⁺ + W ⁻	382
Ratio	W ⁺ W ⁻		1.0538	±	0	

Comparison with results of the ATLAS collaboration (from 2011):
 Measurement of the W → lν and Z/γ → ll production cross sections in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*) and Search for the Standard Model Higgs boson in the H → WW(*) → lνlν decay mode using 1.7 fb⁻¹ of data collected with the ATLAS detector at sqrt(s) = 7 TeV**)

*) Authors: The ATLAS Collaboration (Submitted on 5 Dec 2011): <http://arxiv.org/abs/1109.5141.pdf>
 **) Authors: The ATLAS Collaboration [24 Aug 2011]: ATLAS-CONF-2011-134

	W → ... + ν				Background	WW cand.
	e ⁺	e ⁻	μ ⁺	μ ⁻		
Total	77885	52856	84514	55234	21930	469
Σ W ⁺ Σ W ⁻	W ⁺	162399	W ⁻	108090	W ⁺ + W ⁻	270489
Ratio	W ⁺ W ⁻		1.50	±	0.01	

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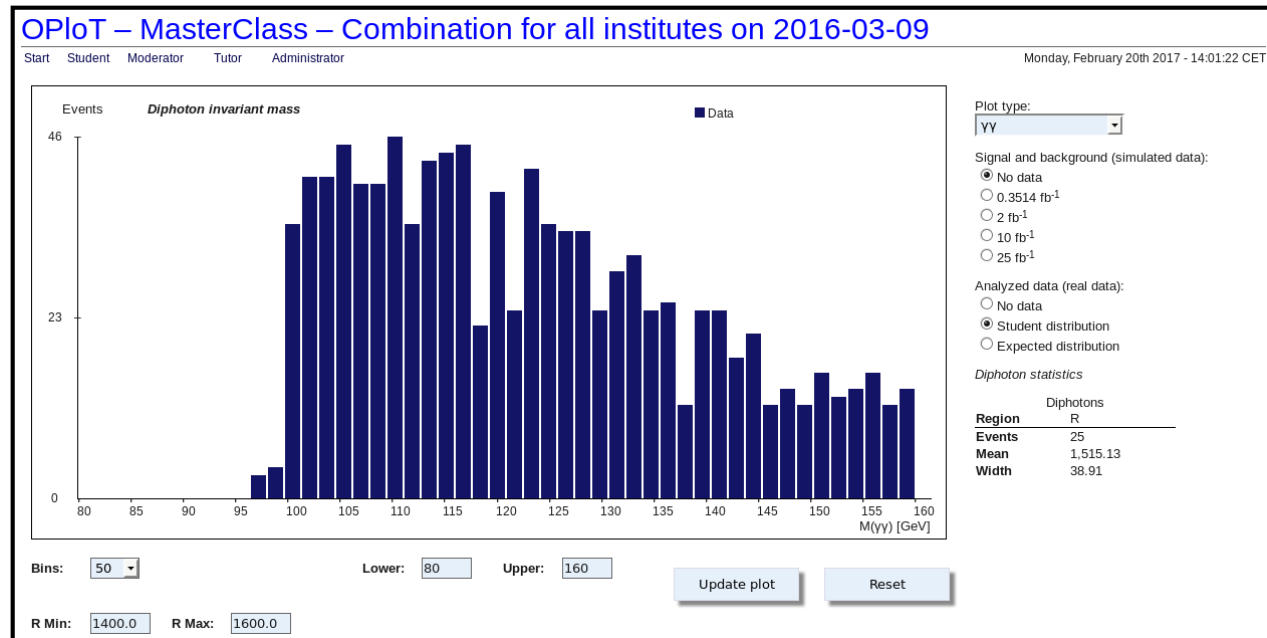
- Follow the individual training for the measurement you're doing!
 - [ATLAS Z path](#)
 - [ATLAS W path](#)
 - [CMS](#)
- Run a series of Zoom polls to ask students questions about the measurements.
 - The poll questions are 'pre-loaded' in Zoom - you just need to select the right one.



The [TWiki](#) contains information about each measurement, and the list of poll questions for each measurement.

Example Question

Example from ATLAS Z-path:
Moderators show the di-photon mass distribution



- Poll question: Do you see a peak corresponding to the Higgs boson?
 - A. Yes
 - B. No
 - C. Maybe, but I'd need more data to be sure
- After the students have voted, the moderators reveal the right answer, explain about statistical limitations of the measurements, and that $H \rightarrow \gamma\gamma$ is a very rare process.