
Introduction

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on behalf of the TOPLHCWG**

First open TOPLHCWG workshop

CERN, 19 July 2012

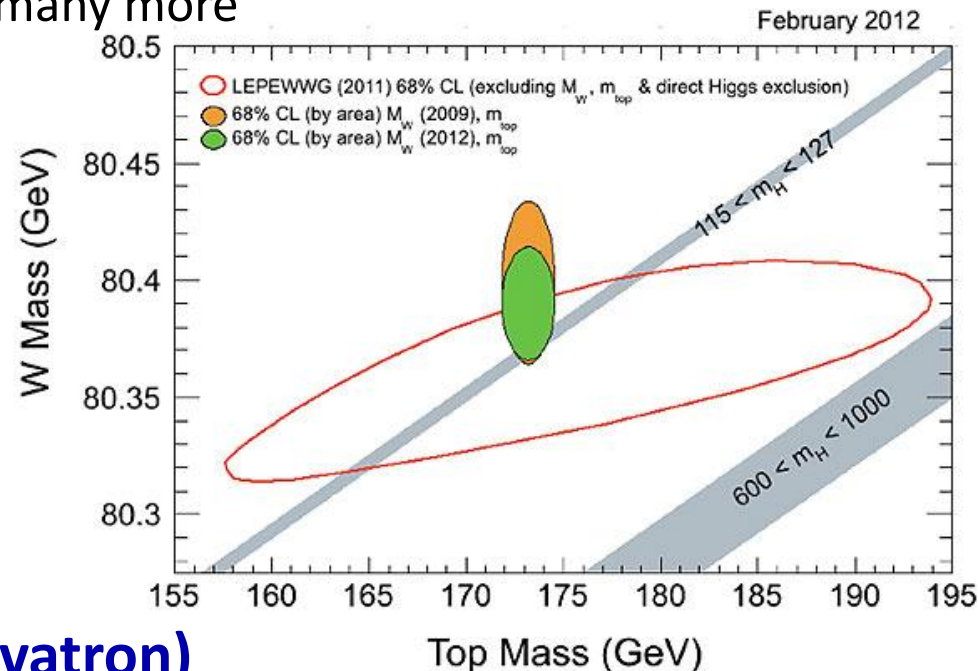
Motivation

Large sample of top quarks at the LHC

- With 5 fb^{-1} $\sim 10x$ more than at Tevatron
- Now accumulating also large samples of 8 TeV data
- Precision measurements emerge in ATLAS and CMS
 - $\sigma(tt)$ at 4% level
 - $m(\text{top})$ below 2 GeV
 - Spin correlations, W helicity and many more

In the spirit of the work of the **LEPEWWG** and **TEVEWWG** we are interested in the best possible determination of parameters, such as $m(\text{top})$

→ **Combine with CMS (and Tevatron)**



Implementation: TOPLHCWG

After Summer 2011 consensus grew around the project of a TOP WG for combination of ATLAS and CMS results

- Lead by experiments, strong connections to theory
- Preliminary discussions have involved ATLAS & CMS top conveners, physics coordination and the TH department at CERN, via LPCC
- Agreed on a mandate and structure of the group

The purpose of the TOPLHCWG is to define guidelines for the combination of results on top physics measurements from ATLAS and CMS. In particular, to specify what measurements are to be combined, identify the systematic uncertainties that can be considered as correlated among experiments, and agree on formats to be provided for the combinations.

Agree on the methods to be used for the combinations in consultation with the ATLAS-CMS Statistics Group, and prepare in time all software infrastructure needed to fulfill these goals. Individuals for running each combination will be identified.

Agree on the way combined results are presented (values with and without correction for acceptances, differential unfolded distributions, likelihoods) and the theory predictions -including theory errors- they should be compared to.

Mandate of the group

Prepare all relevant documentation. This includes notes and publications explaining the combination procedures and the results. This effort will happen in synchronization with the major HEP conferences. This documentation, as well as a more detailed presentation of the inputs by the Collaborations, the procedures chosen for the combinations and the results will also be made public via web pages that will be kept up to date.

Maintain a close connection to the equivalent group performing the combination at the Tevatron. The two groups will have to identify persons responsible for performing the world combination of relevant quantities in correspondence of any major update.

Approval procedure

For each new combination an internal document will be produced describing the agreed upon combination method and its result. Once this document is approved by the top working group conveners, it will be publicly released. **following the ATLAS and CMS approval procedures**

Treatment of confidential information

For the preparation of combination results, experiments may on occasion agree to share details of analysis results that are still in the approval process of the experiment. If such information is provided to the combination group, all members of the combination group will keep this information confidential and not disclose or discuss these confidential results with anyone, except other active members of the combination group.

Representatives

Top physics conveners/coordinators

- ATLAS(2) + CMS(2) + LHCb (when first results ready)
- ATLAS: M. Costa, M. Cristinziani
- CMS: R. Chierici, R. Tenchini

Current combination experts

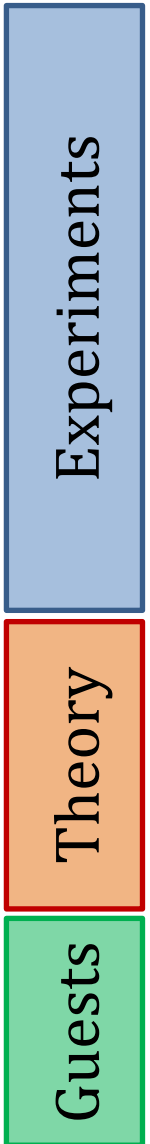
- **Top mass:** G. Cortiana (ATLAS), M. Mulders (CMS)
- **Top-pair cross-section:** G. Lewis, E. Shabalina (ATLAS), J. Ott (CMS)
- **Single top:** J. Donini (ATLAS), L. Lista (CMS)

Interlocutors from the various Monte-Carlo tools

- Omnipurpose generators
- NLO tools
- Matched tools

Key persons are invited in relevant meetings

- Examples: generator experts, TeVEWWG members,...



Modus operandi

The group acts in a transparent way

- [Mailing list](#) for internal discussions, plan for one open to everybody
- [Web pages](#) with updated results and link to documentation
- Frequent (closed) [working group meetings](#), regular open meetings

May 2012	
10 May	ATLAS+CMS Jet/ETmiss and b-tagging systematics (protected)
March 2012	
14 Mar	ATLAS+CMS Top generator systematics discussion (protected)
12 Mar	TOPLHCWG meeting with TH (protected)
January 2012	
25 Jan	TOPLHCWG meeting with TH (protected)
December 2011	
15 Dec	TOPLHCWG meeting (protected)
14 Dec	TOPLHCWG meeting with TH (protected)
October 2011	
13 Oct	TOPLHCWG meeting (protected)
September 2011	
19 Sep	TOPLHCWG kick-off meeting (protected)

Treatment of detector systematics

Discussions with theory

ATLAS + CMS: Combination technicalities

Kick-off: disclosure, plans, questions to theory

Workshop today

First open meeting of the TOPLHCWG

- Right after ICHEP, before TOP2012

Commercial

Register by July 25th, if you would like to participate

TOP 2012

**16 – 21 September 2012
Winchester, UK**

**5th International Workshop
on Top Quark Physics**

Local Organizing Committee:
Veronique Boisvert, chair (Royal Holloway, University of London)
Lucio Cerrito (Queen Mary, University of London)
Akram Khan (Brunel University, London)
Stefano Moretti (University of Southampton)
Mark Owen (University of Manchester)
Giuseppe Salamanna (Queen Mary, University of London)
Christian Schwanenberger (University of Manchester)

Contact: top2012@rhul.ac.uk

More info: <http://pprc.qmul.ac.uk/top2012>

International Advisory Committee:
Juan Antonio Aguilar Saavedra (University of Granada)
Werner Bernreuther (RWTH, Aachen)
Martine Bosman, chair (IFAE, Barcelona)
Roberto Chierici (CNRS, CERN)
Markus Cristinziani (University of Bonn, CERN)
Jorgen D'Hondt (VUB, Brussels)
Eric Laenen (NIKHEF)
Fabio Maltoni (UCL, Louvain)
Michelangelo Mangano (CERN)
Fabrizio Margaroli (INFN, Roma 1)
Antonio Onofre (LIP, Univ. Minho)
Yvonne Peters (University of Manchester)
Roberto Tenchini (INFN, Pisa)
Scott Willenbrock (University of Illinois, Urbana)

Photo courtesy of
Winchester Cathedral

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Review of the work done so far

- First combination results (m_{top}) and ongoing efforts (σ_{tt} , σ_{t})
- Compare approaches to evaluate systematic uncertainties
- Correlation of TH/EXP uncertainties
- Future directions (differential, W_{t} , cross-section, ...)

Extend the scope beyond ATLAS and CMS

- top mass combination at the Tevatron (towards a world average)
- top physics plans at LHCb

Invite feedback and new ideas by everybody !

- We will have a lot of time for discussion today