

MB-YR: plan / discussion

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Theory: Celine Degrande (CERN), Jonas Lindert (Durham)

LHC Electroweak WG meeting
22. June 2018

Main Idea

- ▶ short experimental reviews of prior analyses, drafted per analysis channel
 - ▶ short theoretical overviews of state-of-the-art tools and predictions
 - ▶ short review for ETF interpretations
 - ▶ recommendations for combinations
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- ➡ Motivation for reviews: quick and clear references for analysis teams working with future data
 - ➡ Recommendations for measurements using LHC full Run-II data and early Run-III data:
MC event generation, definitions of common fiducial regions and BSM-sensitive variables/regions, EFT and anomalous coupling studies, measurement combinations, and possible other new ideas.

Preliminary Outline

Note: subject to changes after further discussions!

1. Introduction: general overview of multiboson studies; motivation
2. Experimental reviews & recommendations
 - planned structure (2-4 authors and 1-2 pages per channel):
 - diboson: **WW, ZZ, WZ, W/Z+ γ** ,
 - VBF/VBS: **VBF-V, VBS-V γ , VBS-WW, VBS-WZ, VBS-semileptonic**
 - other: **Triboson, photon-induced diboson**
 - coordinated between ATLAS and CMS (+ potentially LHCb) contributors
 - Goals:
 - main features of the channels
 - past and future precision
 - limitations
 - common fiducial definitions / strategy
 - etc...

Preliminary Outline

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3. Theory reviews & recommendations

A. review of theory predictions (1-2 authors and 1-2 pages per class):

a) **VV** b) **VBF** c) **VBS** d) **Triboson**

Topics: NNLO QCD, NLO EW, ggVV@NLO, Resummation, Uncertainties

B. Monte Carlo generators:

MadGraph_aMC@NLO, Sherpa, Herwig7, POWHEG

Goals: detail recommended settings, strengths, caveats+limitations for the various multiboson processes

C. Theory comparisons: see last talk

Preliminary Outline

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4. EFT review & recommendation
 - A. Parametrizations, basis
 - B. MC tools for EFT interpretations
 - C. Sensitive observables
 - D. Theory uncertainties
 - E. Possible combination of multiple channels (related to also next chapter)

5. Recommendations for combination of measurements
 - A. Examples: (e.g. 7 TeV ATLAS+CMS ZZ combination)
 - B. Technicality discussions: presentation of individual measurement results, uncertainty correlations, machinery, etc.
 - C. Prospects for future combinations

Preliminary Outline

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6. Others (TBD)

A. Ratio measurements: uncertainties (theory & experiment), potential for EFT

B. EFT interpretation at the level of fiducial measurements vs. detector-level

- pros & cons

- benchmark BSM models

....

7. Conclusions

Technical Details for editing

The screenshot displays the Overleaf web editor interface. The left pane shows the LaTeX source code for a document titled "Multiboson measurements at ATLAS and CMS: results and future plans". The code includes document class settings, author information, an abstract, keywords, and a table of contents with sections for Introduction, WW, WZ, ZZ, W/Z+ γ , W/Z VBF, W/Z γ VBS, WW VBS, Other VBS channels, Tribosons, photon-induced, and Section heading. The right pane shows the rendered preview of the document, which includes the title, author information, abstract, keywords, and the beginning of the introduction section.

```
1 \documentclass{cernrep}
2 \begin{document}
3 \title{Multiboson measurements at ATLAS and CMS: results and future plans}
4 \author{A.N. Author and A.N. Other\thanks
5         {On leave from another institute somewhere.}}
6 \institute{Institute name in English, Town, Country}
7
8
9 \begin{abstract}
10 Each paper should be preceded by a short abstract of not more
11 than 150-words, which should be written as a single paragraph
12 and should not contain references and notes.
13 \end{abstract}
14
15 \keywords{CERN report; contribution; template; example.}
16
17 \maketitle
18
19 \section{Introduction}
20
21
22 \section{WW}
23 \input{sections/ww}
24
25 \section{WZ}
26
27 \section{ZZ}
28
29 \section{W/Z+\gamma}
30
31 \section{W/Z VBF}
32
33 \section{W/Z \gamma VBS}
34
```

Multiboson measurements at ATLAS and CMS: results and future plans

*A.N. Author and A.N. Other**
Institute name in English, Town, Country

Abstract
Each paper should be preceded by a short abstract of not more than 150 words, which should be written as a single paragraph and should not contain references and notes.

Keywords
CERN report; contribution; template; example.

1 Introduction

2 WW
WW production is the multiboson production process with the largest cross section of all final states with multibosons. [...]

3 WZ

4 ZZ

5 WZ+ γ

6 WZ VBF

7 WZ γ VBS

8 WW VBS

9 Other VBS channels

10 Tribosons

11 photon-induced

12 Section heading
A section title is styled as above, and first paragraphs after headings are not indented. References appear in numerical order [1, 2]. An itemized list looks like the following:

- the first item,
- the second item.

You can also have an enumerated list:

1. the first item,
2. the second item.

12.1 Subsection heading
As you see the first paragraph is not indented. References when part of the text use the term 'Ref.', for example, see Ref. [3] and Refs. [4].
Subsequent paragraphs are indented. See Table 1 for an example of how to display a table.

*On leave from another institute somewhere.

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