WG3 Introduction

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WG3 Targets

- Promote and develop **algorithms** that can help the optimisation of VBS analyses in hadron collider experiments, as ATLAS and CMS

- Definition of the most significant **observables** at hadron colliders, to isolate with maximal significance the VBS topology and to maximise sensitivity to physics BSM

- Implementation of the **data** analysis with the datasets collected by experiments at hadron colliders

- Define the procedure to **combine** separate experimental **results** obtained by the two experiments

WG3 activities

We had **seven meetings** since the begin of the Action

- Reviews on **VBS analyses in ATLAS and CMS**:
- Reviews on **experimental techniques**:
- Overview talk on **Delphes** simulation
- Long discussions on how to overcome the **privacy issues** of the two experiments
- Joint meetings with WG2 on the **combination effort** (see next slides)

WG3 activities

- Together with WG2 we started working on the **combination** of the anomalous couplings with ATLAS and CMS results
- The combination of experimental results is one of the deliverables for WG3:

Research coordination 10:

Define the procedure to combine separate experimental results obtained by the ATLAS and CMS collaborations

- **Deliverable**: Definition of reference guidelines for the coherent combination of analysis results in different VBS studies (different experiments, different final states) within the first two years of the Action.
- **Deliverable**: Statistical combination of the results obtained by the data analyses and their interpretation in the frame of models of new physics.

Combination

https://twiki.cern.ch/twiki/bin/viewauth/VBSCan/CombinationKickoff
http://vbscan.fisica.unimib.it/VBSCan/ancofit

Ongoing combination of dim8 anomalous couplings

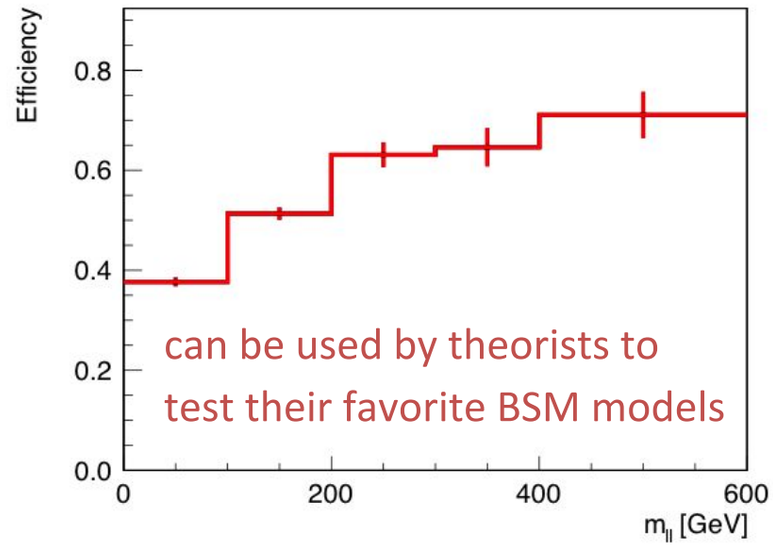
- VBS VV results from ATLAS and CMS
  - starting with public 13TeV results (CMS: ZZ and WWss VBS, ATLAS: ...)
  - using publicly provided information
- communication with WG1 on interpretation
  - parameters and basis
  - want to provide more information valuable to theory community (clipping)
- signal sample preparation studies
- backgrounds and systematics
  - HEPdata inputs
- limit setting tool
  - will use CMS limit setting public tool
    - will sync with ATLAS tool for validation

Combination

Combination will be performed using PUBLIC information

- HEPdata is our main source (together with paper text)
  - an effort was made to provide more useful information in HEPdata format for VBS ZZ and VBS WWss CMS 13 TeV analyses

- Reco-level distributions in observable used for anomalous coupling limit setting
- Systematic uncertainty of the most important systematic sources
- Background contributions separated by process
- Signal efficiency from the generator level fiducial definition to the reconstruction level selection (WWss)



ZZ->4l EWK (PLB 774 (2017) 682-705, CMS-SMP-17-006, published)

- HEPdatacards not public yet (in CMS review)

WWss EWK (PRL 120 (2018) 081801, CMS-SMP-17-004, published)

- HEPdatacards are public: https://www.hepdata.net/record/ins1624170

Objects reconstruction kickoff meeting

- We're planning to have a kickoff meeting about the physics object reconstruction activities for WG3
- Location and dates to be decided

Some possible topics of interest related to physics objects:

- Quark-gluon discrimination
- Boosted-jet topologies
- Tracker acceptance extension effect
- Central jet veto techniques with advanced PU mitigation
- Development of helicity tagging techniques

If you would like to volunteer to one of the over-mentioned studies or have new proposal, please let us know!

Contacts

Please subscribe to **our mailing list**!

Links to VBSCan twiki pages:

- General one here
- **WG3 dedicated here**

NB: are accessible only if you subscribe to the cern group vbscan-general

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For further informations, please write us an email senka.duric@cern.ch, lucrezia.stella.bruni@cern.ch