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H -> ZZ* Process

Goal of the group

Group Contacts

- Stathes Paganis (Sheffield), Nicola De Filippis (Bari)

Group Members

- Experiment: Chiara Mariotti, Cristina Botta (Torino), Gurpreet Singh Chahal (Bari), Marek Schoenherr (Dresden), Mario Pelliccioni (Torino), Sara Bolognesi (CERN)
- Theory: Everybody who wants to contribute

Plan of the Activity (both Higgs signals and SM backgrounds)

- differential K-factor
- overview of background determination methods (data-driven, non-data driven)

a) sidebands by extrapolating the bkg from a control region (measured with data) to a signal region
b) ABCD method: definition A,B,C,D control region based on two observables (isolation, impact parameter)
Strategies for the evaluation of ZZ and Zbb already defined but the results need to be compared

- list of LO/NLO Monte Carlo's

CMS: is going to produce PYHIA6 and POWHEG+ PYTHIA6; as soon as samples are available we will compare
is on going. I started to play by myself with POWGEG (with the help of Pietro Govoni) to evaluate
ATLAS: need to check asap with Stathes

- wish List for theorists

Common cuts definition between ATLAS and CMS

- 4l final state:

CMS + ATLAS

Skimming:

- * ≥ 3 leptons with $p_T > 5$ with $|\eta| < 2.5$
- * ≥ 2 leptons with $p_T > 10$ with $|\eta| < 2.5$

Preselection:

- * Electrons are required to satisfy $p_T > 5$ in $|\eta| < 2.5$ while muons are required to satisfy $p_T > 5$ in $|\eta| < 1.2$ and $p_T > 3 + p > 9$ in the endcap ($1.2 < |\eta| < 2.4$).
- * Loose identification criteria on leptons with opposite charge and matching flavour.
- * loose isolation on the 4 leptons ($\text{sum} p_T / p_{T_1} < 0.7$)
- * best di-candidate selection (close of Z nominal mass)
- * $m_{111} > 40$, $m_{211} > 12$, $m_{41} > 100$

- 2l2nu:

- * electrons: ID criteria + $p_T > 20$ and $|\eta| < 2.5$
- * muons: ID criteria + $p_T > 20$ and $|\eta| < 2.5$

```
* jets: anti-kt in 0.4 + pT>25 and !eta!<2.5
* exactly 2 electrons/muons opposite charge
* 76 < mll < 106
* events with btag jet rejected
* for mh < 260: deltaphi_ll > 1
* for mh < 280: MET > 66, deltaphi_ll < 2.64
* for mh > 280: MET > 82, deltaphi_ll < 2.25
```

- 2l2jet:

```
* electrons: ID criteria + pT>20 and !eta!<2.5
* muons: ID criteria + pT>20 and !eta!<2.5
* jets: anti-kt in 0.4 + pT>25 and !eta!<2.5
* exactly 2 electrons/muons opposite charge
* 76 < mll < 106
* MET < 50
* at least 2 jets
* for the two jets with highest pt: 70 < mjj < 105
* mh>=360:
  -- pt jets >50
  -- deltaphi_jetjet < pi/2, deltaphi_ll < pi/2
```

Available Tools

Results

References

Meetings

- CERN InDico Agenda [↗](#)

Links

-- ReiTanaka - 02-Oct-2010

This topic: LHCPHysics > LHCHWGZZ

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