

HZZ 250 GeV Analysis - Update 1

Update on the HZZ 250 GeV +80/-30 250/fb Analysis for the 29 August 2013 SiD Meeting:

Archive of the preparation and analysis code:

[^subproclst-data8-delay-e250-350Gflav-4jets]

[^flavortag-all-batch-revtx-350-4jets.xml] [^revertex-all-batch.xml]

[^runitallbatch2] [^suballbatch2] [^allSME250p80m30.lst] [^ffhzzE250p80m30.lst]

[^FastJetProcessor.cpp]

All difference in the LCFIPlus routines were commented out; not including these should make no difference in the output.

[^algoEtc.cc] [^FlavorTag.cc] [^flavtag.cc]

Analysis code:

[^MyDBDvH.java]

[^MyDBDzHzzAnalysis.java]

[^IsolatedHighPElectronIdentifier.java]

Analysis:

- * divide into 4 jet / 6 jet topologies
- * apply preselection depending on topology
- * train/apply TMVA's
- * validate with cut table
- * check remaining backgrounds

[^variables_id_c1.png] [^variables_id_c2.png] [^variables_id_c3.png]

!variables_id_c1.png|border=1!
!variables_id_c2.png|border=1!
!variables_id_c3.png|border=1!

TMVA driver routine and cut-table code:

[^sidHZZtmva-v4.C]

[^zzhcuttabmini_v4.c]

Preselection variables:

Combined 4-jet 6-jet performance using a cut at EvisJETS of 140 GeV to determine the preselection cuts to be used:

!mvaeffs_BDT.png|border=1!

!mvaeffs_Fisher.png|border=1!

!rejBvsS.png|border=1!

Cut table for BDT:

[illegible]

Remaining backgrounds:

```
$ awk '{print $3,$7,$15}' zzhpassing.dat \ | sort \-n \ | uniq \-c \ | awk '{if (NF==4) print $1*$2*$4,$0}' \ | sort \-k 1,1 \-n
```

1278744							1	106562	4f_sz	12.500000
1278792							1	106566	4f_sw	12.500000
1278864							1	106572	4f_sz	12.500000
1278900							1	106575	4f_zz	12.500000
1279284							1	106607	2f_z_\	12.500000
2557224							2	106551	4f_ww	12.500000
2557272							2	106553	4f_zz	12.500000
2557704							2	106571	4f_sz	12.500000
2557752							2	106573	4f_zz	12.500000
3836664							3	106574	4f_zz	12.500000
3836808							3	106578	4f_ww	12.500000
12792960							10	106608	2f_z_\	12.500000
16625856							13	106576	4f_zz	12.500000
24299556							19	106577	4f_ww	12.500000

Variable distributions without any preselection:

[^variables_id_c1-nopresel.png] [^variables_id_c2-nopresel.png] [^variables_id_c3-nopresel.png]

nu nu H only:

[^variables_id_c1-4jonly.png]

qqH, llH only:

[^variables_id_c1-no4j.png]

[^TrackSubdetectorHitNumbersDriver.java]