Update on the VBF Invisible cross check analysis

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2014-12-04

Topics

- Cross check framework updates
- Updated pre-selection yiels
- Electron+MET region yields

Cross check framework updates

Topics

- Core event processing code review and simplified
- Multiple sequences can be defined and executed in a single job, no module execution repetition.
- Using JSON language for configuration files (same role as python in CMSSW)
  - Each file can load other configuration files (allows splitting of cfg files)
  - Per modules/sequence parameter (like CMSSW)
  - Allows modules sequence definition outside of code (no recompilation)
  - No hard-coding of an parameter of sequence.
- Some limited C++ refection capabilities: Framework detects new (user defined) modules and the become automatically usable via configuration file.
- New modules to produce modified MET (necessary to produce MET-no-Muons and later MET scaling)

This new features will allow further implementation of all regions and systematic studies in a faster/modular way. Commissioning was made by reproducing exactly the yields for data at the pre-selection level.

Typo found

While converting framework to the new non-hard-coded structure I review all cuts already implemented and found a typo on the electron veto (specifically on the value of the relative combined isolation) which I corrected.

Pre-selection yields

	DATA MET 2012A	DATA MET 2012B	DATA MET 2012C	DATA MET 2012D	DATA VBF-Parked 2012B	DATA VBF-Parked 2012C	DATA VBF-Parked 2012D
Vertex Filter	3606391	15076553	21570165	59027309	132346320	228049748	308041846
Event Quality Filters	2658960	10926634	15555671	44411435	131554431	226680352	305918529
ECAL Laser Filter	2634271	10796003	15555671	44411435	131543040	226680352	305918529
HCAL Laser Filter	2634080	10796000	15554899	44411435	131543040	226679741	305918529
L1T ETM	2461217	9316076	13668424	37528140	88174347	160560859	227801622
HLT Path	97522	633305	1154795	2222706	75100422	137527238	152041761
Veto(Electrons)	96600	627254	1143298	2203960	74947192	137241812	151725585
Veto(Muon)	94864	619954	1129380	2187440	74913002	137179173	151652654
Dijet	28164	189270	358924	627128	23666926	43292391	42218637
MET	6252	32256	57239	71282	57929	102384	120600
MET Significance	3828	16475	29225	29964	24179	42683	41620
$Min(\Delta\phi(Met, Jets))$	405	1602	3053	3047	1824	3452	3374

Before typo fixing

Pre-selection yields

Dataset	Main Analysis	Cross Check Analysis	$1 - \frac{CC}{Main}$
Prompt A	405	406	+0.247%
Parked B	1824	1836	+0.658%
Parked C	3453	3466	+0.376%
Parked D	3374	3392	+0.533%
Total	9056	9100	+0.458%

After typo fixing

Pre-selection yields

Dataset	Main Analysis	Cross Check Analysis	$1 - \frac{CC}{Main}$
Prompt A	405	405	0.00%
Parked B	1824	1824	0.00%
Parked C	3453	3452	-0.03%
Parked D	3374	3374	0.00%
Total	9056	9055	-0.01%

First at Electron+MET region

Event selection

The electron veto selection consists of the following cuts

- Vertex cut
- Event quality filters (MET Filters)
- ECAL and HCAL Laser filters
- L1T ETM $>= 40$
- HLT path filter
- At least Electron Veto
- At least Electron Tight
- Muon Veto
- Dijet cut
  - Lead dijet $p_\perp > 50$ GeV
  - Sub-lead dijet $p_\perp > 45$ GeV
  - Jets $|\eta| < 4.7$
  - Dijet $\Delta\eta < 3.6$
  - Dijet $m_{jj} > 1200$ GeV
- MET > 90 GeV
- MET Significance > 4.0
- $Min(\Delta\phi(MET, Jet_{p_\perp > 30}))) > 2.3$

First at Electron+MET region

Yield

	DATA MET 2012A	DATA MET 2012B	DATA MET 2012C	DATA MET 2012D	DATA VBF-Parked 2012B	DATA VBF-Parked 2012C	DATA VBF-Parked 2012D
Vertex Filter	3606391	15076553	21570165	59027309	132346320	228049748	308041846
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Select Electrons(Veto)	922	6051	11497	18746	153230	285426	316176
Select Electrons(Tight)	453	2813	5280	6939	25375	47301	53678
Veto(Muon)	417	2692	5017	6670	25150	46895	53249
MET	287	1821	3395	3936	2243	4196	4837
MET Significance	133	843	1621	1681	863	1680	1727
Dijet	32	123	241	197	124	246	200
$Min(\Delta\phi(Met, Jets))$	4	17	24	24	17	24	24

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Yield

Dataset	Main Analysis	Cross Check Analysis	$1 - \frac{CC}{Main}$
Prompt A	4	4	0.00%
Parked B	17	16	5.88%
Parked C	24	24	0.00%
Parked D	24	24	0.00%
Total	69	68	-1.45%

Summary

Summary:

- Now better sync at pre-selection level
- Great sync at Electron-MET region
- Working on Muon+MET region

All results will be posted later today as usual at:

https://twiki.cern.ch/twiki/bin/viewauth/CMS/VBFHInvParkedDataCrossCheck