# Cross Check Analysis - Status Update and Unblind

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# Status and Plans

## Status

- Pre-selection: Synchronised
- Electron + MET: Synchronised
- Muon + MET: Synchronised
- Tau + MET: Analysis underway
- Z($\rightarrow \mu\mu$): Synchronised
- Top: Synchronised
- Signal region: Synchronised

## Plans

- Implement QCD regions
- Implement MC weights and MC processing (partly done)
- Produce all relevant plots
- Implement all background estimation methods
- Implement all systematic estimation methods
- Interface with limit code

# Tau + MET Region

## Data Yields

| | DATA MET-2012A | DATA MET-2012B | DATA MET-2012C | DATA MET-2012D | DATA VBF-Parked | 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 Filter | 2461217 | 9316076 | 13668424 | 37528140 | 88174347 | 160560859 | 227801622 |
| HLT Trigger | 97522 | 633305 | 1154795 | 2222706 | 75100422 | 137527238 | 152041761 |
| $N(Electron_{Veto}) = 0$ | 96600 | 627254 | 1143298 | 2203960 | 74947192 | 137241812 | 151725585 |
| $N(Muons_{Loose}) = 0$ | 94864 | 619954 | 1129380 | 2187440 | 74913002 | 137179173 | 151652654 |
| $N(Tau) = 1$ | 522 | 3769 | 6669 | 12364 | 434308 | 778575 | 898825 |
| Dijet | 78 | 536 | 1002 | 1724 | 51175 | 91871 | 92543 |
| MET Cut | 33 | 146 | 247 | 283 | 207 | 368 | 417 |
| $M_T(MET, \tau)$ | 32 | 144 | 243 | 278 | 204 | 363 | 411 |
| MET Significance | 11 | 42 | 62 | 58 | 46 | 63 | 58 |
| $Min(\Delta\phi(MET, jet(1,2)))$ | 5 | 26 | 34 | 38 | 28 | 34 | 38 |

## Comparison between analysis

| Dataset | Main Analysis | Cross Check Analysis | $\frac{CC}{Main} - 1$ |
|---|---|---|---|
| Prompt A | 2 | 5 | +150% |
| Parked B | 22 | 28 | +27.2% |
| Parked C | 25 | 34 | +36.0% |
| Parked D | 27 | 38 | +40.7% |
| Total | 76 | 105 | +38.2% |

After inspecting both framework codes, no obvious problem is visible, so requested yields for yellow lines from main analysis for tracking down where the problem is.

# Data Yields

| | DATA MET-2012A | DATA MET-2012B | DATA MET-2012C | DATA MET-2012D | DATA VBF-Parked | 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 |
| HCAL Laser Filter | 2634271 | 10796003 | 15555671 | 44411435 | 131543040 | 226680352 | 305918529 |
| ECAL Laser Filter | 2634080 | 10796000 | 15554899 | 44411435 | 131543040 | 226679741 | 305918529 |
| L1T ETM Filter | 2461217 | 9316076 | 13668424 | 37528140 | 88174347 | 160560859 | 227801622 |
| HLT Trigger | 97522 | 633305 | 1154795 | 2222706 | 75100422 | 137527238 | 152041761 |
| Electron veto | 96600 | 627254 | 1143298 | 2203960 | 74947192 | 137241812 | 151725585 |
| Muon veto | 94864 | 619954 | 1129380 | 2187440 | 74913002 | 137179173 | 151652654 |
| Dijet | 18338 | 120564 | 231884 | 404128 | 13678405 | 25090291 | 24082304 |
| MET Cut | 4167 | 21119 | 37848 | 47094 | 38178 | 68047 | 79723 |
| MET Significance | 786 | 2962 | 5325 | 4913 | 3396 | 5988 | 5567 |
| MET Jets DPhi | 34 | 88 | 204 | 176 | 91 | 205 | 178 |

Total events of MET A, parked (B,C,D) = 508, same number as the main analysis.

# Summary

- Cross check analysis is progressing well.
- Currently investigating the Tau + MET yields miss-match
- Signal region unblinded at the same time of main analysis and with the same exact yield :)
- More in the coming weeks.

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