

Weekly Report

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Signal study

- V0 /eos/atlas/atlascerngroupdisk/phys-hdbs/diHiggs/multilepton/signal/gn1/
- V10
 - user.sparajul.*hhmlv2_mc16_a_output_root
 - user.bali.*hhmlv2_mc16d_output_root
 - user.bzabinsk.*hhmlv2_mc16e2_output_root

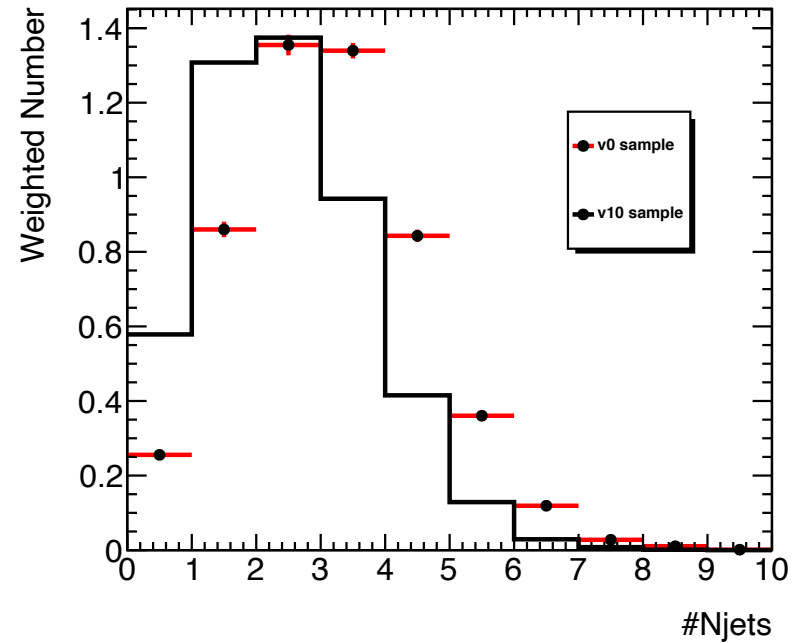
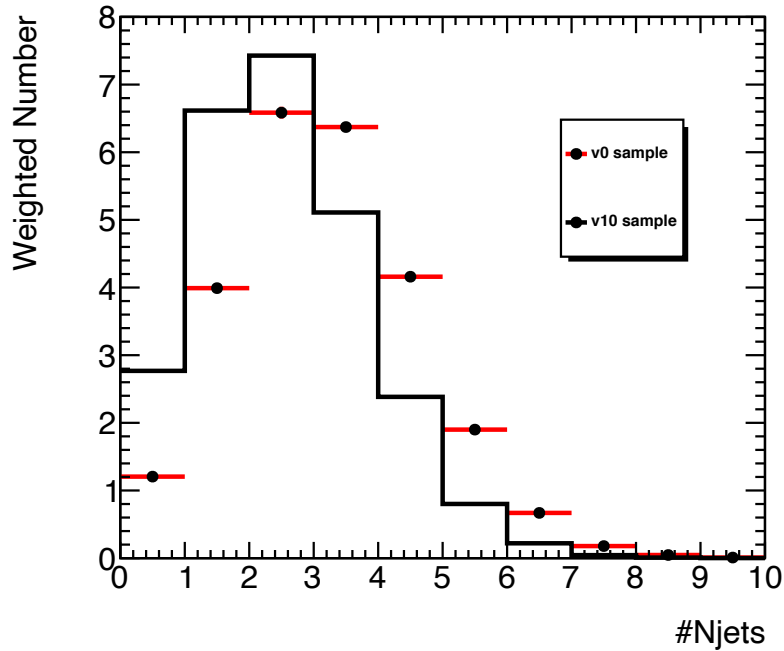
Signal study

- Cutflow

| | V0 sample | | V10 sample | |
|-----------------|-----------|-----------------|------------|-----------------|
| | Entries | Weighted number | Entries | Weighted number |
| Input | 423436 | 25.3793 | 454710 | 25.1145 |
| Loose Leptons | 107337 | 7.25683 | 130970 | 7.44254 |
| Loose isolation | 91328 | 6.37281 | 107002 | 6.59115 |
| mll | 75648 | 5.09875 | 93112 | 5.51063 |
| MET | 74564 | 5.00058 | 91904 | 5.4027 |
| DY | 74308 | 4.97361 | 91650 | 5.37541 |
| Zveto | 71961 | 4.78539 | 89005 | 5.17127 |
| Njet \geq 3 | 26306 | 1.52468 | 52731 | 2.70105 |
| B veto | 24147 | 1.39848 | 47360 | 2.43463 |
| Efficiency | | 5.51% | | 9.69% |

Jet quality

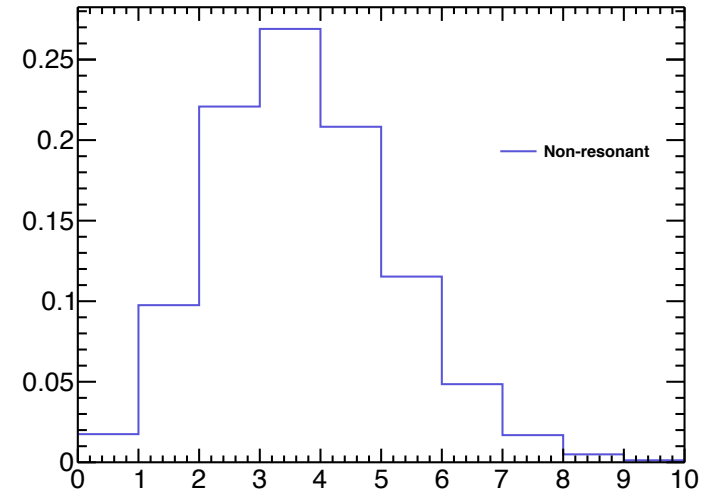
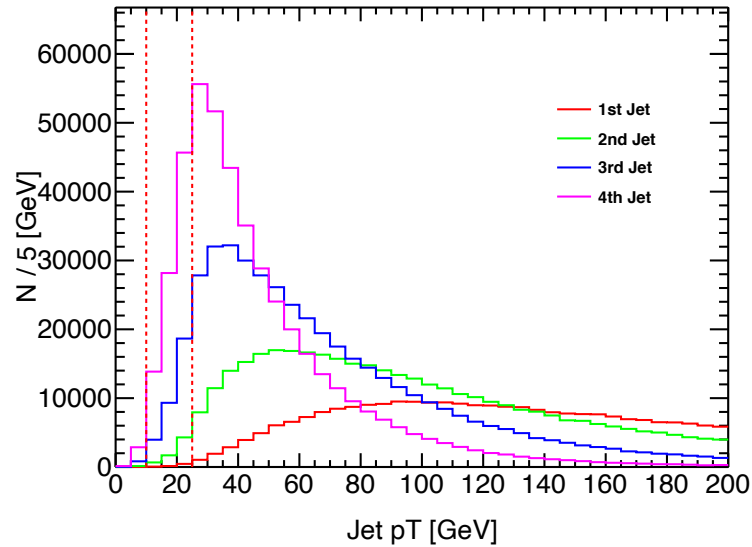
- Left at input raw ; right at Zveto row



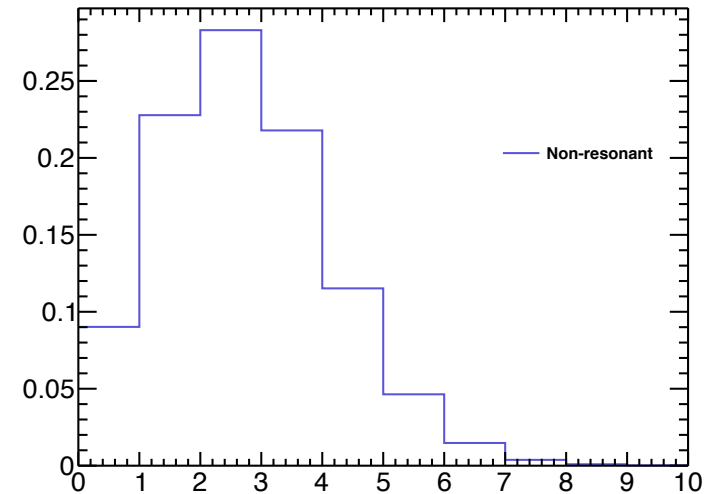
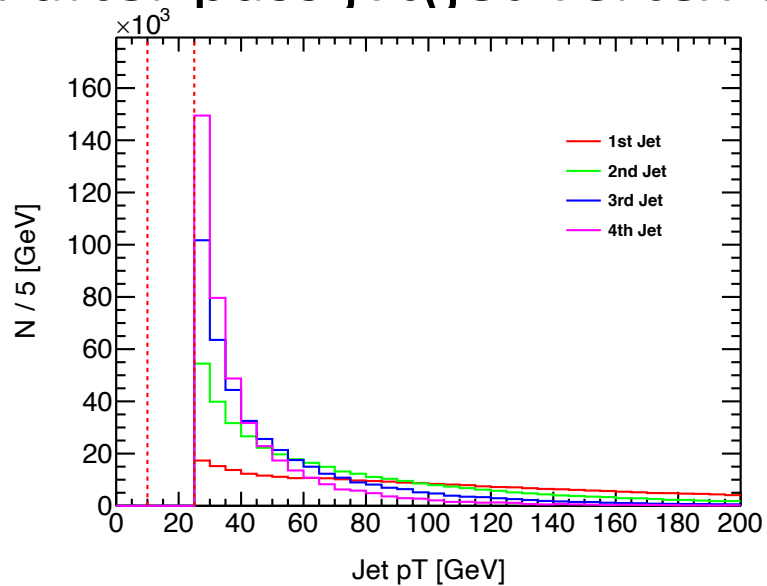
- #Njet moves forward to low side

Jet quality

- v0



- V10: after pass jvt(jet-vertex-tagger)



HHMLFW2 Bug fixing

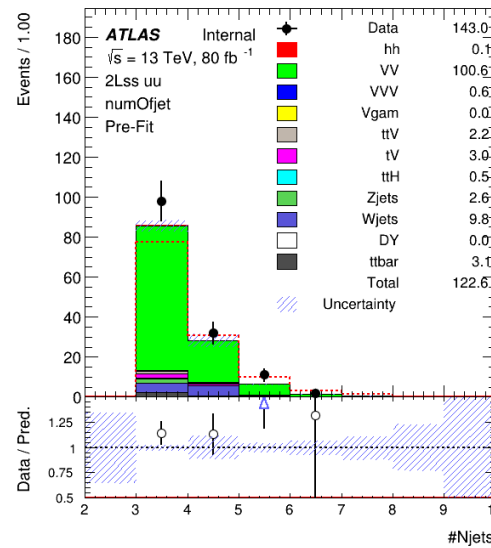
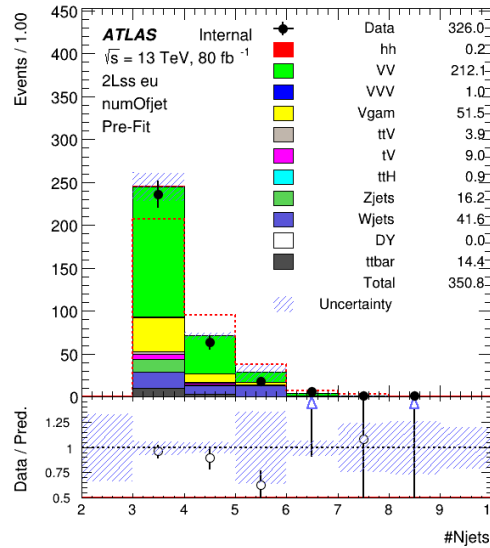
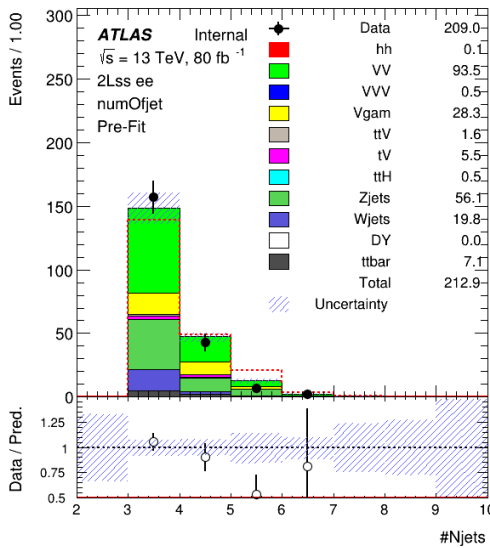
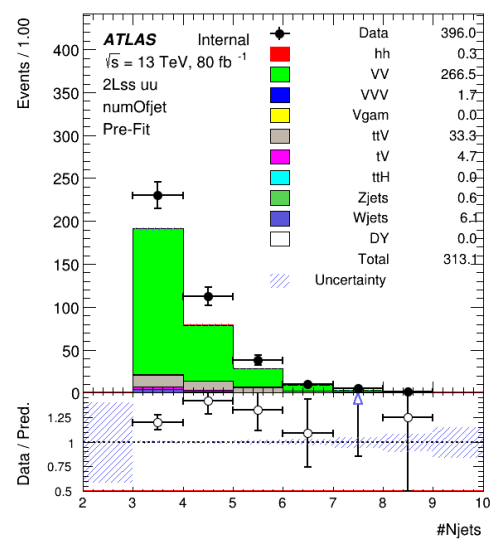
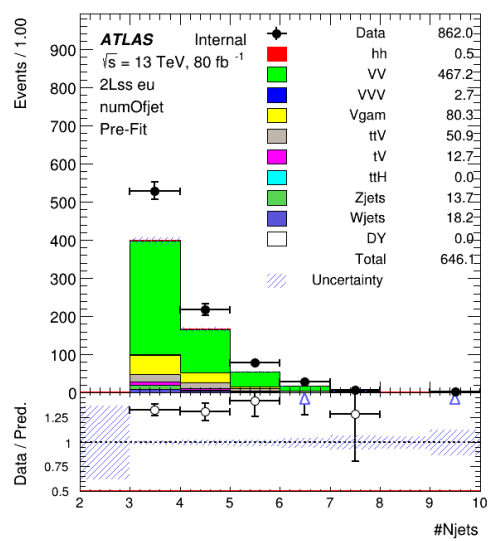
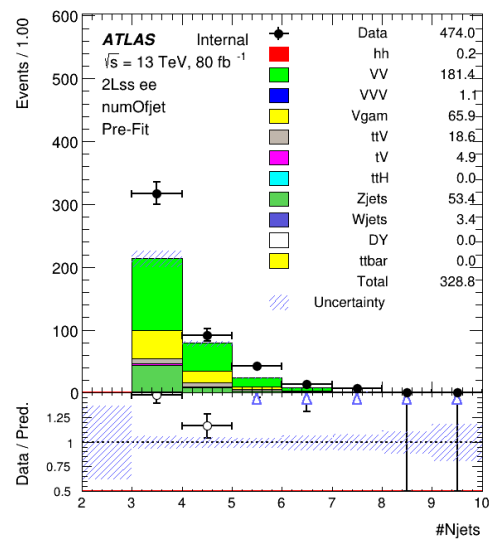
- Using an external file if run job on grid

```
import ROOT,sys
```

```
def saveHists(OF_name):  
    #infileList = open("input.txt",'r')  
    infileList = open(sys.argv[1],'r')  
    #roof_li      = [ROOT.TFile.Open(f.rstrip()) for f in i  
    roof_li      = [f for f in infileList.read().rsplit()]  
    print roof_li[0]  
    fout = ROOT.TFile.Open(OF_name, "RECREATE")  
    sumWeights=ROOT.TChain("sumWeights")  
    for files in roof_li:  
        sumWeights.Add(files)  
        print files  
    sumWeights.Write()  
    fout.Close()  
saveHists(sys.argv[2])
```

```
def getMrgdTotalWgths(self,filenames):  
    print filenames  
    roof_li      = [x for x in filenames]  
    sumWeights=ROOT.TChain("sumWeights") #to retrieve totalEventsWeighted from sumWeights tree  
    for files in roof_li:  
        sumWeights.Add(files)  
    nEntries=sumWeights.GetEntries()  
    MrgdTotalWgths=0.  
    for i in range(nEntries):  
        sumWeights.GetEntry(i)  
        totalEventsWeighted=getattr(sumWeights, 'totalEventsWeighted')  
        MrgdTotalWgths+=totalEventsWeighted  
    return(MrgdTotalWgths)
```

DATA/MC



DATA/MC

- Not well-modeled MC, slightly better than v0
- Yields&Significance

| | | | | | | | |
|----|-----------|----|------------|---------|----|---------|--------|
| ee | 0.0605959 | pm | 0.00365358 | 212.893 | pm | 13.0914 | 0.0042 |
| eu | 0.162297 | pm | 0.00640554 | 350.848 | pm | 19.7827 | 0.0087 |
| uu | 0.0980756 | pm | 0.00508015 | 122.555 | pm | 4.17218 | 0.0089 |

| | | | | | | | |
|----|----------|----|----------|---------|----|---------|--------|
| ee | 0.170738 | pm | 0.006625 | 328.815 | pm | 14.1344 | 0.0094 |
| eu | 0.505961 | pm | 0.011536 | 646.074 | pm | 10.9348 | 0.0199 |
| uu | 0.330132 | pm | 0.009105 | 313.117 | pm | 2.26445 | 0.0187 |