

VBF Higgs to Invisible

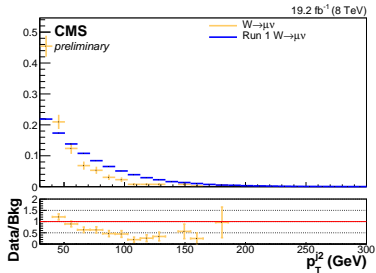
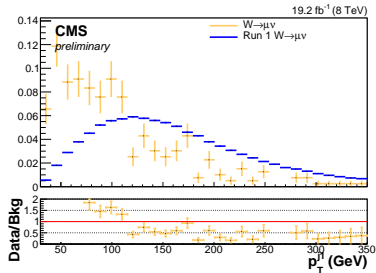
W MC Reminder

- ▶ Control plots shown last week
- ▶ Significant differences seen in shape between run 1 and run 2
 - Possible bias from Met Significance differences

Closer W Comparison

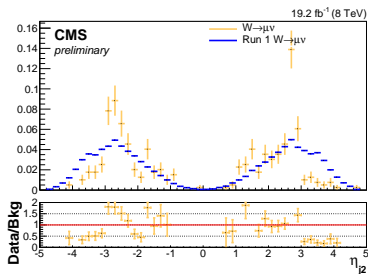
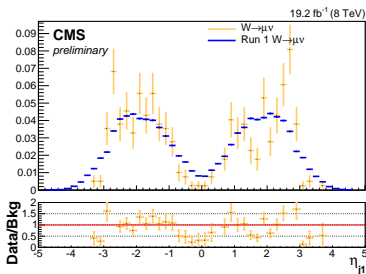
- ▶ Run 1 Met significance variable recalculated from light trees:
 - $\frac{MET}{\sqrt{\Sigma E_T}} > 3.0$
- ▶ Distributions still normalised to 1
- ▶ Selection as loose as possible:
 $\eta_{j1} \cdot \eta_{j2} < 0, \eta_{j1} < 4.7, \eta_{j2} < 4.7,$
 $p_T^{j1} > 30 \text{ GeV}, p_T^{j2} > 30 \text{ GeV}, \Delta\eta_{jj} > 3.6, MET_{sig} > 3.$
- ▶ Only $\mu\nu$ shown

W mu ν Comparison: run 1 vs run 2: Jet p_T

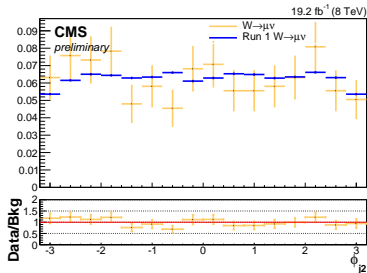
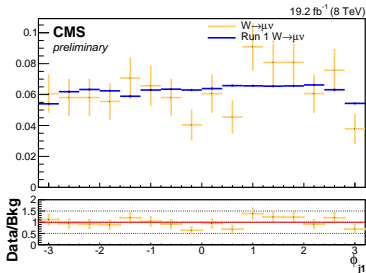


- Agreement better but still significant differences
- Especially for low values

W mu nu Comparison: run 1 vs run 2: Jet η

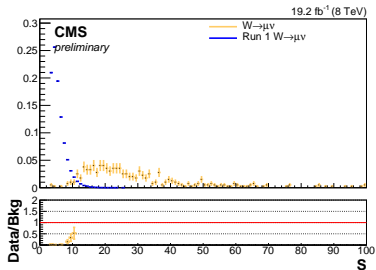
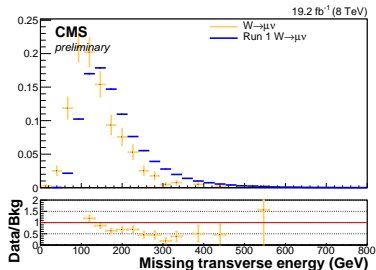


W $\mu\nu$ Comparison: run 1 vs run 2: Jet ϕ



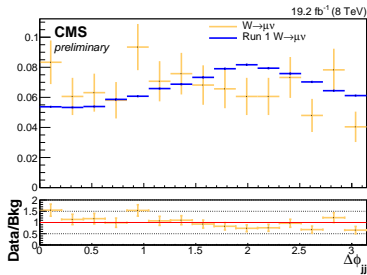
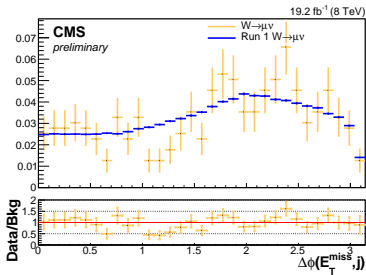
- ϕ distributions look similar within stat error

W muon Comparison: run 1 vs run 2: Met



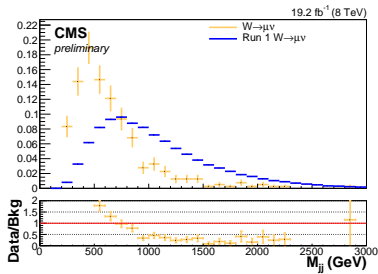
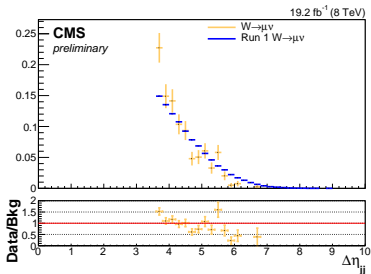
- ▶ Metnomu more similar
- ▶ Met significance variable difference now apparent

W muon Comparison: run 1 vs run 2: $\Delta\phi$ variables



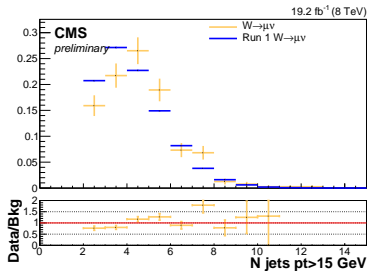
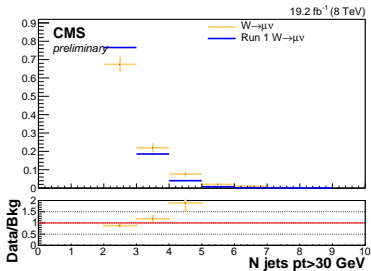
► Much more similar than last week

W mu nu Comparison: run 1 vs run 2: dijet variables



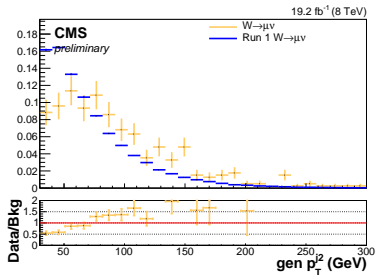
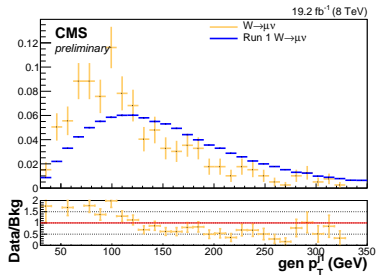
- M_{jj} distribution very different up to 800 GeV then similar

W $\mu\nu$ Comparison: run 1 vs run 2: N jets

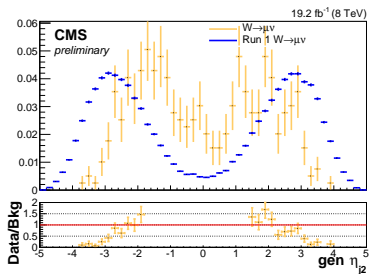
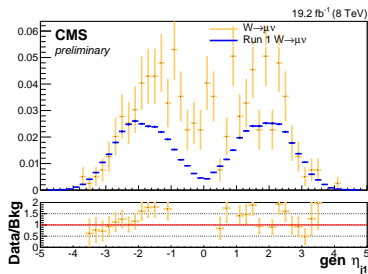


- ▶ Angular variables look more similar after like for like met sig cut
- ▶ Difference in M_{jj} and jet pt distributions at low values is interesting
 - Check gen information
- ▶ Plotting code issue necessitated restructuring of code

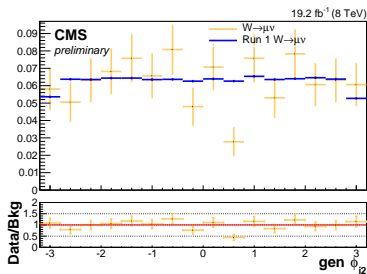
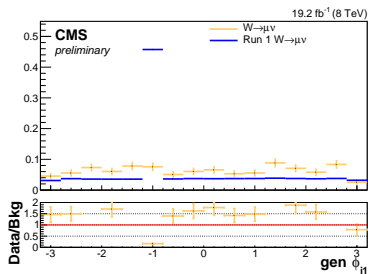
W mu nu Comparison: gen information



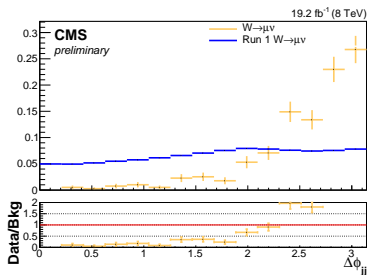
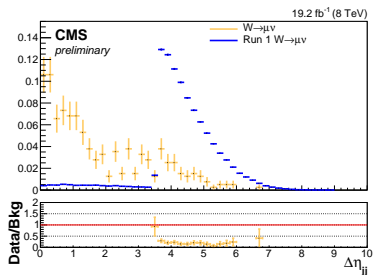
W muon Comparison: gen information



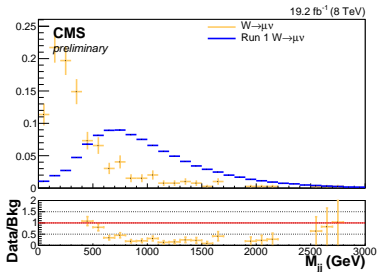
W muon Comparison: gen information



W mu ν Comparison: gen information



W mu nu Comparison: gen information



Summary

- ▶ Further investigation of W control plots
- ▶ Angular variables look very similar after like for like Met sig comparison
- ▶ Gen variables however very different
 - Looks like offline leading jets in run 2 are often not the same as at gen level

Backup