Imperial College London

VBF Higgs to Invisible Trigger Efficiencies

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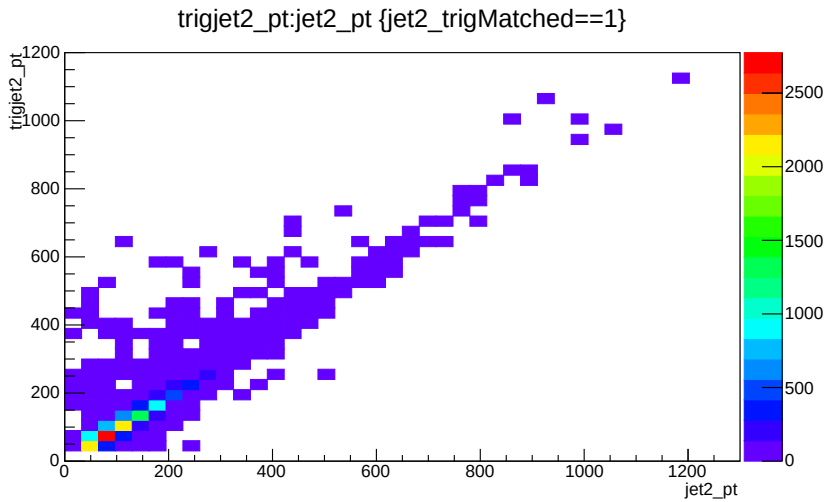
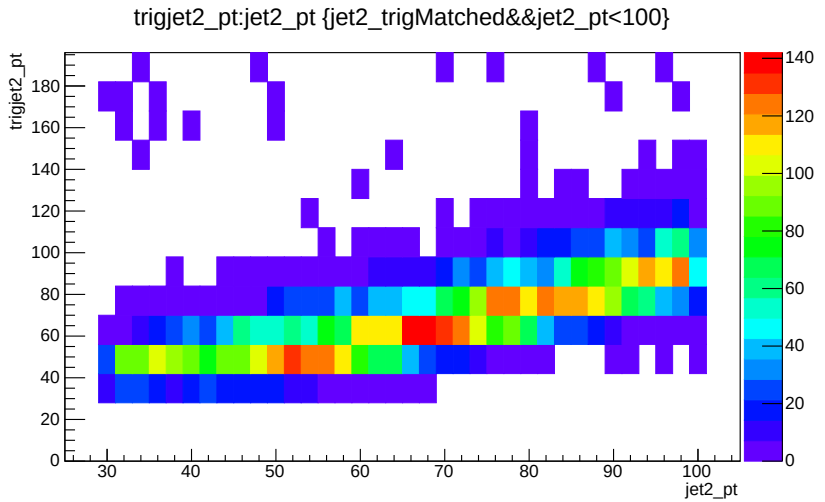
Reminder

- Presented trigger efficiency measurements using 1.28 fb^{-1} to H-Exo last week
- Suggested to look at jet turn on in jet only trigger
  - Added pass/fail information for HLT_DiPFJetAve40 and HLT_PFHT750_4JetPt50
- Also wanted to look at offline vs online jet p_T
  - Addedd HLT pf jets matched to offline leading jets
  - Added calo jets matched to offline leading jets
  - Trigger objects only present when event passes trigger

Offline to online resolution: PF

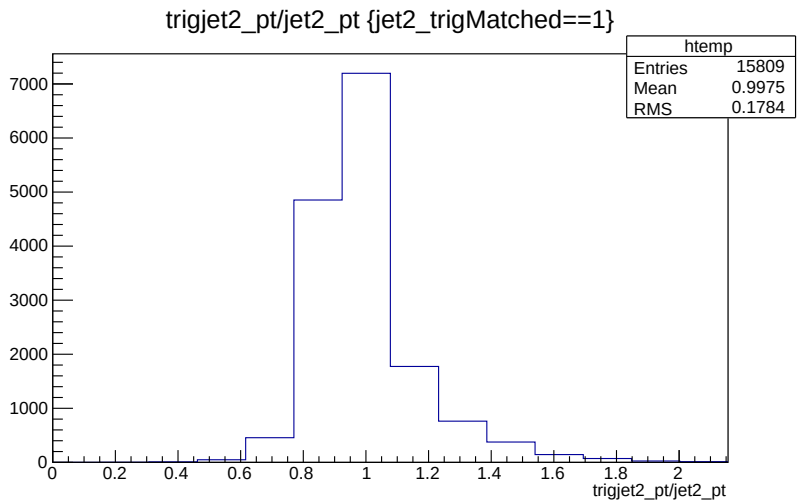
- Compare offline and online jet p_T
- Trigger cut is at 40 GeV

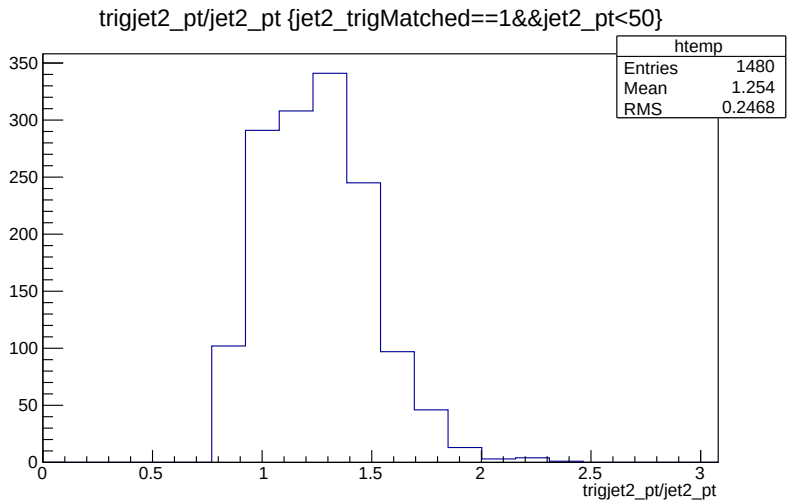




Offline to online resolution: PF

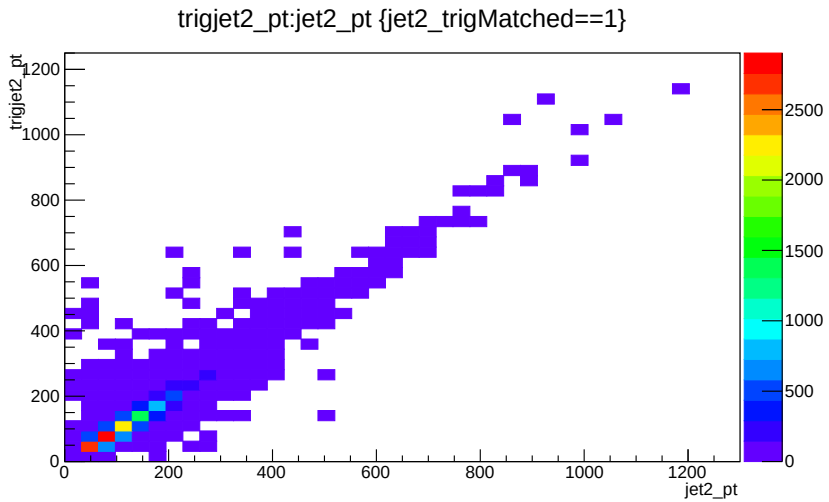
- Compare offline and online jet p_T
  - Left plot is for all jets right is for $p_T < 50$ GeV
- Trigger cut is at 40 GeV

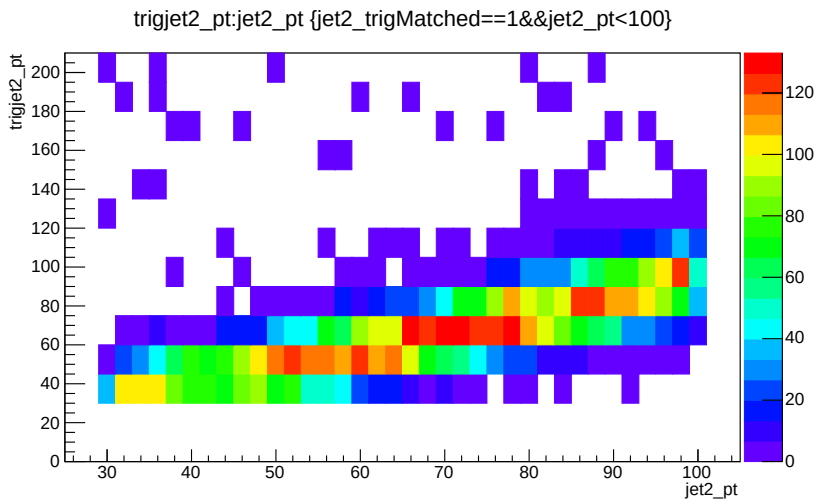




Offline to online resolution: Calo

- We have a calo jet prefilter at 30 GeV
- It has been found that the wrong JEC was used at HLT in Run2015
  - Slides here
  - this would have a larger effect on calo as the corrections are larger





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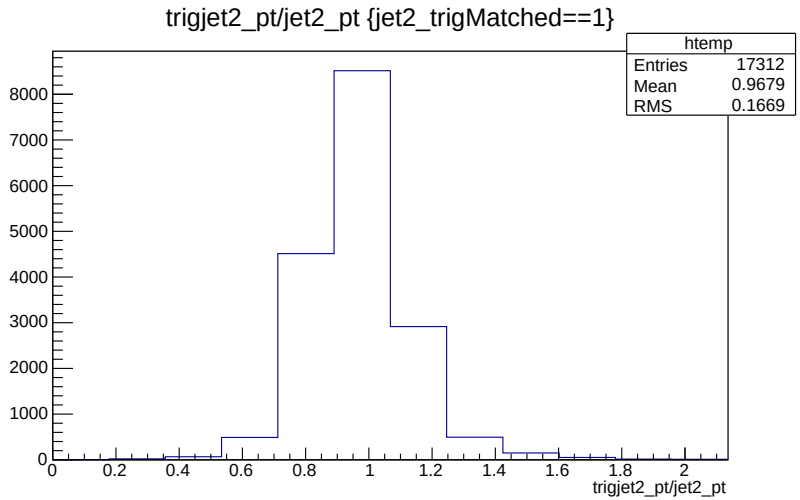
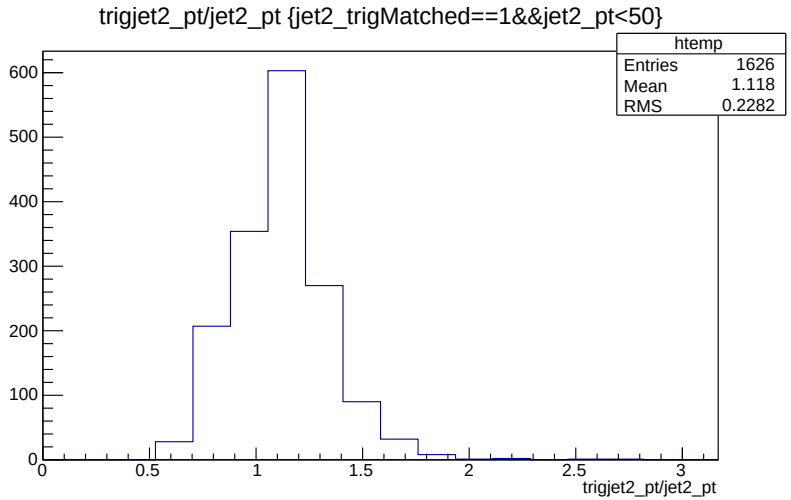
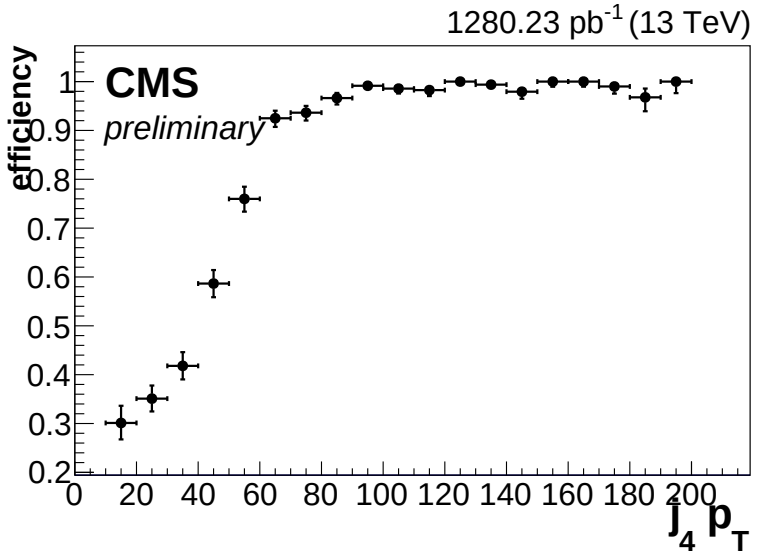




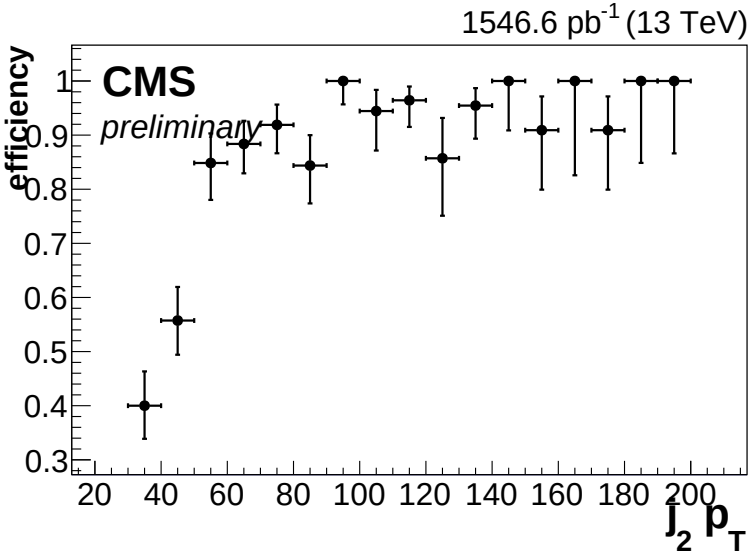
Turn on in jet only trigger

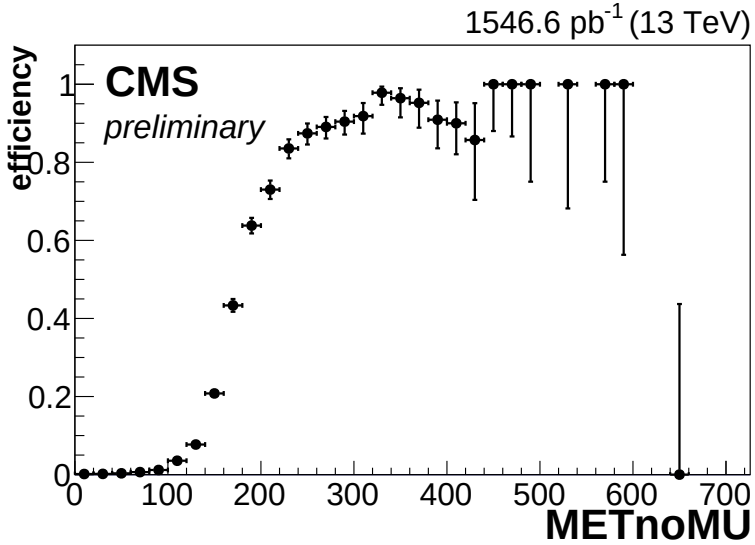
- Have pass/fail information for HLT_DiPFJetAve40 and HLT_PFHT750_4JetPt50
  - HLT_DiPFJetAve40 is so prescaled no events pass in singlemuon sample
- Study turn on in HLT_PFHT750_4JetPt50
  - HT turn on is 90% efficient at 1200 so cut there
- Over 90% efficient by 60 GeV
- No calo jet pt prefilter



Trigger efficiencies latest golden JSON

- HLT_DiPFJet40_DEta3p5_MJJ600_PFMETNoMu140
- Use SingleMuon dataset
- METnoMu> 300 GeV, DiPFJet> 80 GeV, $\Delta\eta_{jj} > 3.6$, M_{jj} >600





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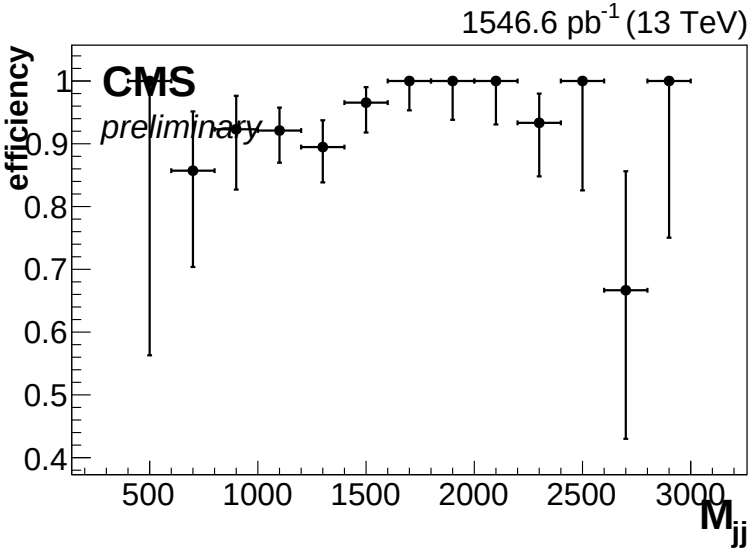

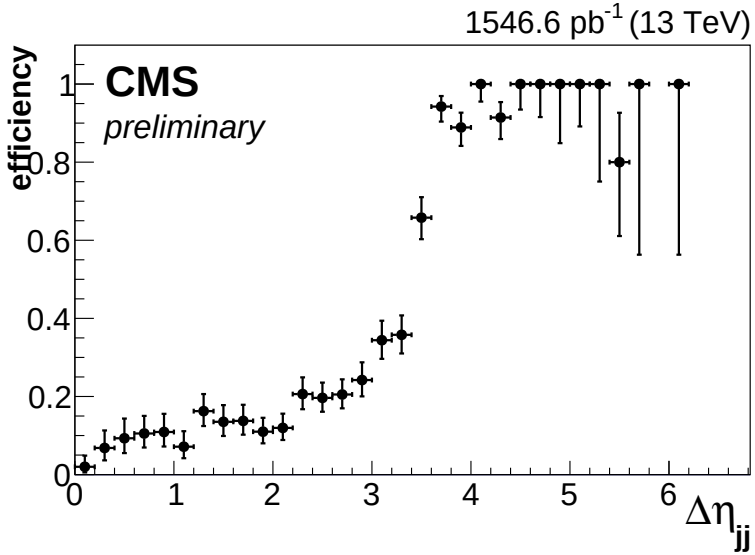

13 TeV projections for pheno work

- Scale all event yields by $\frac{\sigma_{13TeV}}{\sigma_{8TeV}}$
  - Cross-sections taken from public CMG tools repository
- Statistical errors scale with $\sqrt{yield}$
- Systematic errors constant
  - Will add scaling by $\sqrt{\mathcal{L}}$ in future
- Estimate 862 background events, 701 signal events
- Expected limit with 20 (2) fb^{-1} 26 (51)%

Summary

- Calo prefilter + wrong JEC possible candidate for slow trigger turn on but needs more investigation
  - Jim reemulating trigger on raw data so we can study events failing trigger
- CSC halo filter v1 list of veto events came out over the weekend
  - Need to switch to this but not expected to have a big effect
- We have a model of the analysis at 13 TeV which we can use for the phenomenology work

Backup


CMS