Imperial College London

VBF Higgs to Invisible

HIG-14-038, AN-14-243

Overview

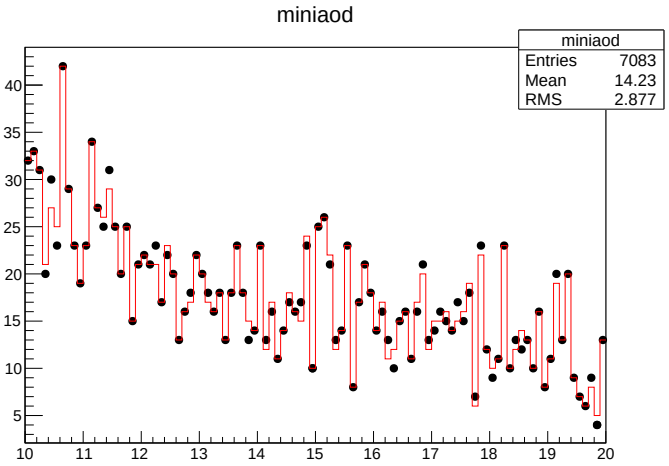
- Update given last week on run II ntuples:
- Leptons and photons were in a good state
- Jets were in progress:
  - ak4PFCHS jets were in and verified
  - ak4PF jets need to wait until 74X
- type 1 MET was added, other METs will have to wait for JME recipes

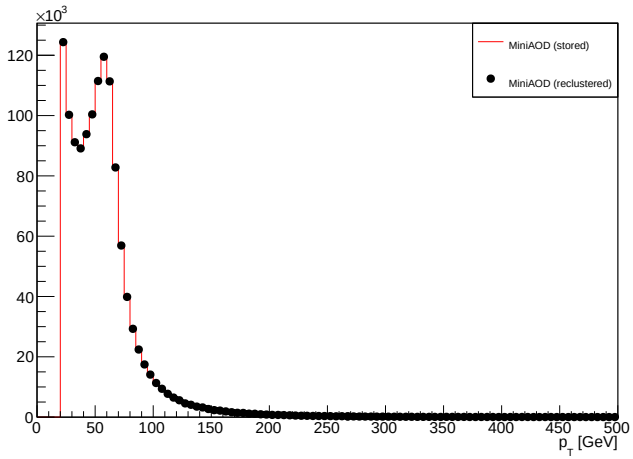
Generator information recap

- MiniAOD has two gen information collections:
- prunedGenCandidates: full info on a limited set of gen particles
  - Currently contains all leptons and b quarks
  - Evolving rapidly
- packedGenCandidates: packed info on all status 1
  - Mainly for clustering gen jets
- Currently working on storing the information we need

Generator information progress

- Gen jets and gen particles now stored
- Gen particles collection found to contain neutrinos and BSM particles
  - This is being fixed for 74X
- Reclustered gen jets very similar to stored ones
  - differences in the 4th SF





Trigger and tracks

- We store trigger paths and HLT objects
- L1 extra information now also stored
- We were going to store track information for a variable Joao suggested
  - Proportion of tracks from PV included in our tag jets
- Variable can also be implemented by storing charged PF candidates from the PV
  - These are present in miniAOD by default and are easy to put into our ntuples

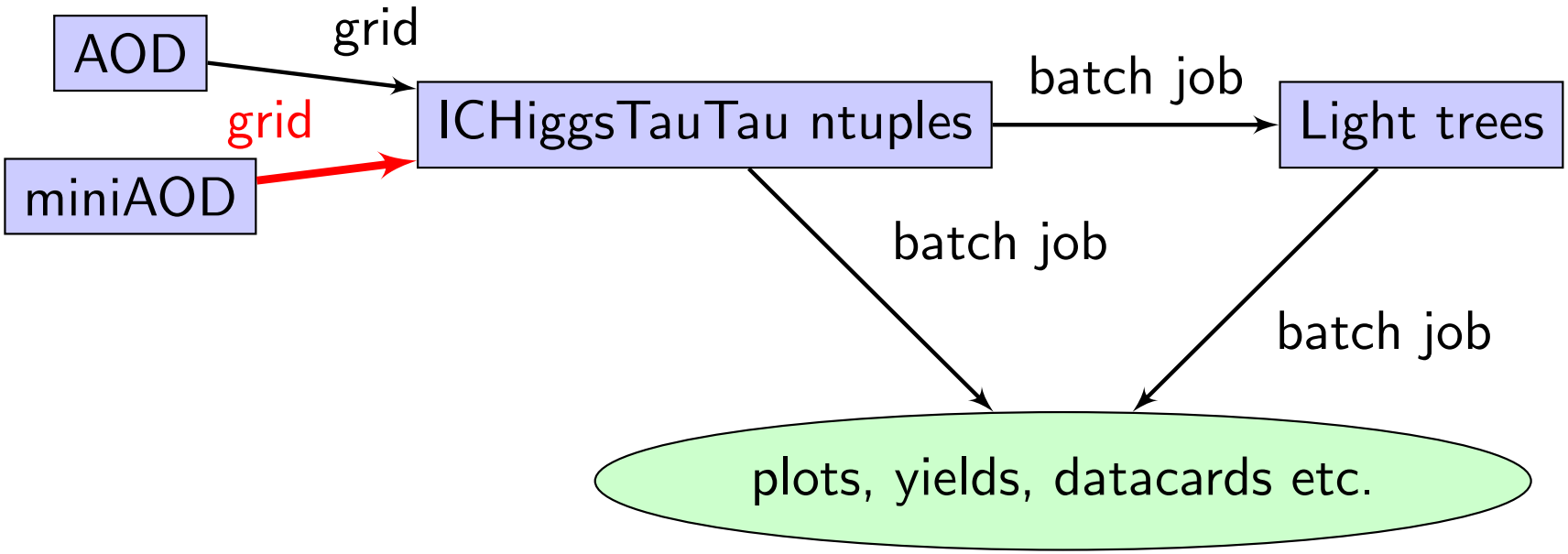
Summary

- All objects have at least a basic recipe in our ntuples
- ak4 non-CHS jets and MET need most work
  - Chayanit has said she'll keep us up to date on MET progress
- First production of signal and QCD samples completed
- Updating scripts to work with crab 3 outputs and new ntuples
  - Once this is done we can try to make light trees and exercise the full chain

Backup

Reminder of framework structure

- Focus today on miniAOD to ntuples



Electrons

- In run 1 we used cut based identification at veto and tight working points
- Updated for run 2
  - Ntuples already contain all required variables
  - istight() etc. functions will be updated to new cut values
  - Details here

Muons

- In run 1 we used cut based identification at loose and tight working points
  - These are currently unchanged for run 2
- In run 2 there is also a medium working point with better fake rejection than loose but still high efficiency
  - Ntuples have been updated to contain variables required
- Updated for run 2, code has been updated to store all needed variables in ntuples
  - Details here

Taus

- In run 1 we used same ID as $H \rightarrow \tau\tau$ group
- Baseline ID to be used by $H \rightarrow \tau\tau$ in run 2 currently being implemented
  - Details here

Jets

- In run 1 we used ak5 non-CHS jets
- Switching to ak4 for run 2
- Only CHS jets are stored in miniAOD
  - We can remake non-CHS jets from packed candidates but no pu jet ID available until CMSSW_7_4_X
- ak4PFCHS jets reclustered from packedCandidates now verified same as those in miniAOD
  - Gives confidence for remaking ak4PF jets without CHS
- B tag information is stored

MET

- In run 1 we used type0PC+type1 corrected MET
- type 1 corrected MET is stored in miniAOD
- Can remake raw PF met from packed candidates
  - No recipe to go from this to type0+1, Chayanit investigating
- JetMET may recommend use of MVA met
  - TauTau group use this already so we should be able to implement it as well

Photons

- Not used in run 1
- For run 2 we aim to use a γ+jets region
- Variables needed for POG cut based photon ID are now stored
  - Details here