

# A Look into Run3 Data

Search for Four top in Tau Final States

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# Outline

# Run3 2022 samples

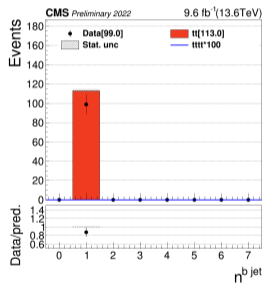
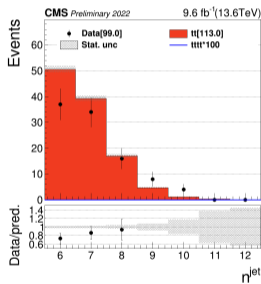
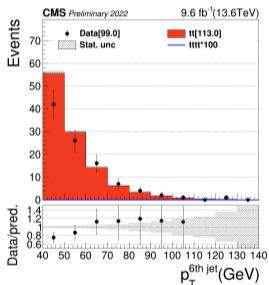
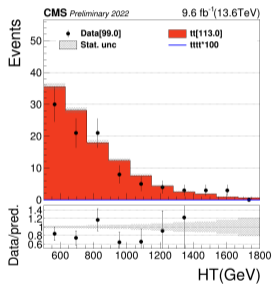
- Good for analysis 2022: CDEFG, 34.2 fb<sup>-1</sup>
- Focusing on 2022 preEE (CD(6.3+3.3=9.6fb<sup>-1</sup>)) due to ReReco EFG data not ready
- MC:
  - ABCD: Run3Summer22(2022preEE)
    - /TTto2L2Nu\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22NanoAODv11-126X\_mcRun3\_2022\_realistic\_v2-v1/NANOADSIM
    - /TTto4Q\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22NanoAODv11-126X\_mcRun3\_2022\_realistic\_v2-v1/NANOADSIM
    - /TTtoLNU2Q\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22NanoAODv11-126X\_mcRun3\_2022\_realistic\_v2-v1/NANOADSIM
  - EFG: Run3Summer22EE(postEE)
    - /TTto2L2Nu\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22ENanoAODv11-126X\_mcRun3\_2022\_realistic\_postEE\_v1-v1/NANOADSIM
    - /TTto4Q\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22ENanoAODv11-126X\_mcRun3\_2022\_realistic\_postEE\_v1-v1/NANOADSIM
    - /TTtoLNU2Q\_TuneCP5\_13p6TeV\_powheg-pythia8/Run3Summer22ENanoAODv11-126X\_mcRun3\_2022\_realistic\_postEE\_v1-v1/NANOADSIM
- Data(ReReco)
  - /JetHT/Run2022C-ReRecoNanoAODv11-v1/NANOAO
  - /JetMET/Run2022C-ReRecoNanoAODv11-v1/NANOAO
  - /JetMET/Run2022D-ReRecoNanoAODv11-v1/NANOAO
  - /JetMET/Run2022E-ReRecoNanoAODv11-v1/NANOAO
- <https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVRun3Analysis>
- NanoAODv11: <https://gitlab.cern.ch/cms-nanoAOD/nanoaod-doc/-/wikis/Releases/NanoAODv11>

- HLT\_PFHT450\_SixPFJet36\_PFBTagDeepJet\_1p59
- HLT\_PFHT400\_SixPFJet32\_DoublePFBTagDeepJet\_2p94
- HLT\_PFJet500

# Objects

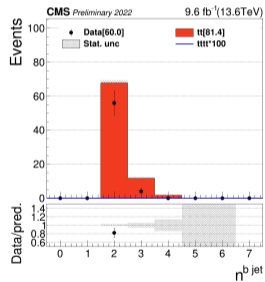
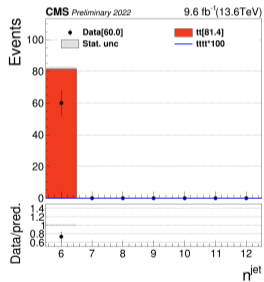
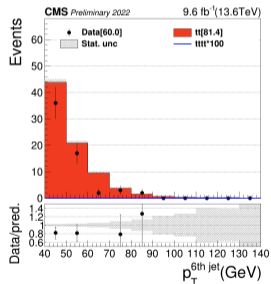
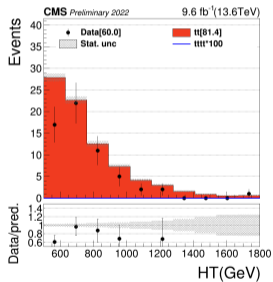
- Electron and Muon:
  - No Top Lepton MVA available for Run3
  - Use POG ID instead
  - Electron: Electron\_mvalso\_Fall17V2\_WP90 and some additional cut
  - Muon: medium ID and some additional cut
- Tau
  - <https://twiki.cern.ch/twiki/bin/view/CMS/TauIDRecommendationForRun3>
  - New DeepTaufv2p5 for 2022 recommended
  - Still using DeepTaufv2p1, need to switch
- Jet
  - <https://twiki.cern.ch/twiki/bin/view/CMS/JetID13p6TeV>
  - Loose ID, same as Run2
- B jet
  - Use 2018 deepJet working point for 2022
  - No TWiki for Run3 found

# 1tau1 CR1



- No MC corrections!
- Look good already!

# 1tau1 CR2



# Cutflow of all processes



Section 1

**Back up**



# MC entry Differences in run2 and ru3

- TTTto4Q
- 2022: 79045976 events
- 2018: 334206000

# Integrated lumilosity

- <https://twiki.cern.ch/twiki/bin/view/CMS/LumiRecommendationsRun3>

# Cross section for MC samples

- Xsec DB (Not reliable!!!)
  - <https://twiki.cern.ch/twiki/bin/view/CMS/XSecDBTool>
- GenXSecAnalyzer
  - <https://twiki.cern.ch/twiki/bin/viewauth/CMS/HowToGenXSecAnalyzer>