Current Updates QT and VBF Analysis

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

AG Biebel Analysis Meeting

26/11/24

Celine Stauch

- VBF Analysis: Progress update on easyjet VBF channel
- QT: Results for Dilepton Fake Rate Study

VBF – HH Analysis

Include VBF 1 lep Channel in [easyjet/bbVVAnalysis]:

- Include VBF boosted and splitboosted in list of channels ✓
- Add Lepton selection ✓
- Add Small R Jets Selection ✓
- Add Large R Jet Selection (work in progress)
  - Adapt Mass Jet Classification for LR Jets ✓
- Add VBF Jet Selection (work in progress)
- Adapt Tree to display the cuts in histograms (work in progress)

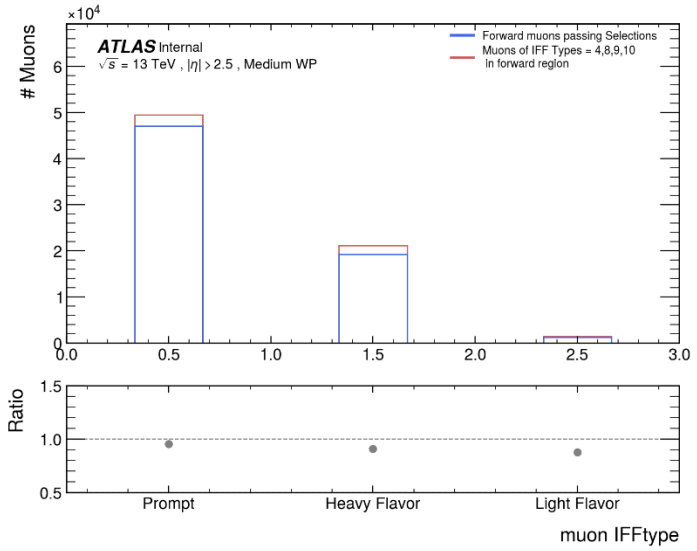
QT Progress

- Samples used for this study:
  mc20_13TeV.410470.PhPy8EG_A14_ttbar_hdamp258p75_nonallhad.deriv.DAOD_MUON1.e6337_s3681_r13167_p6380
  mc23_13p6TeV.601229.PhPy8EG_A14_ttbar_hdamp258p75_SingleLep.recon.AOD.e8514_s4162_r15540
  mc23_13p6TeV.601229.PhPy8EG_A14_ttbar_hdamp258p75_SingleLep.recon.AOD.e8514_s4159_r15530

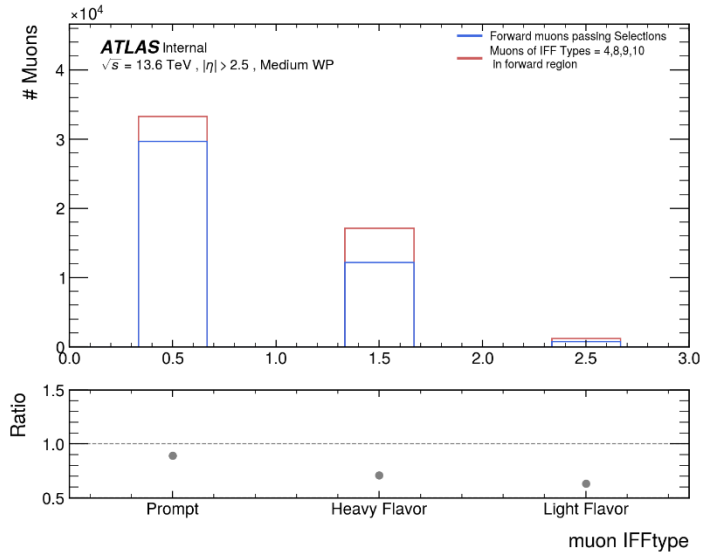
- Analysis done on ntuples produced from these samples with MuonxAODAnalysis
- Selected Muons (based on arXiv:2012.00578v2):
  - Forward Muon: $|\eta| > 2.5$ and nprecisionLayers > 2

Reminder – Fake Rates Medium WP

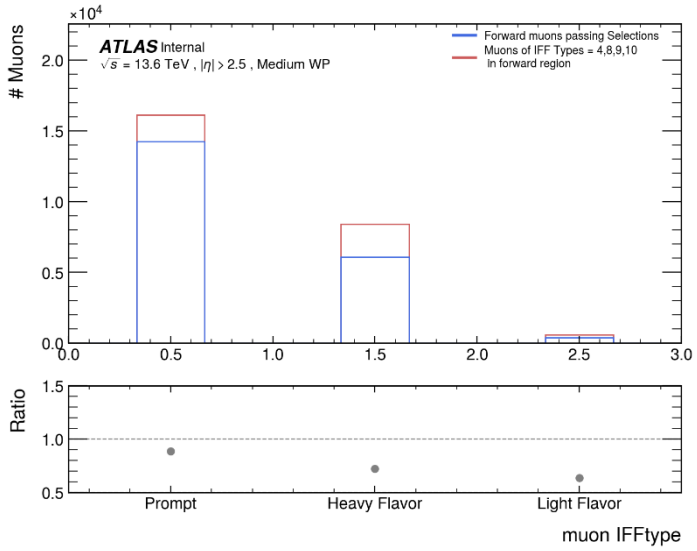
MC 20 a

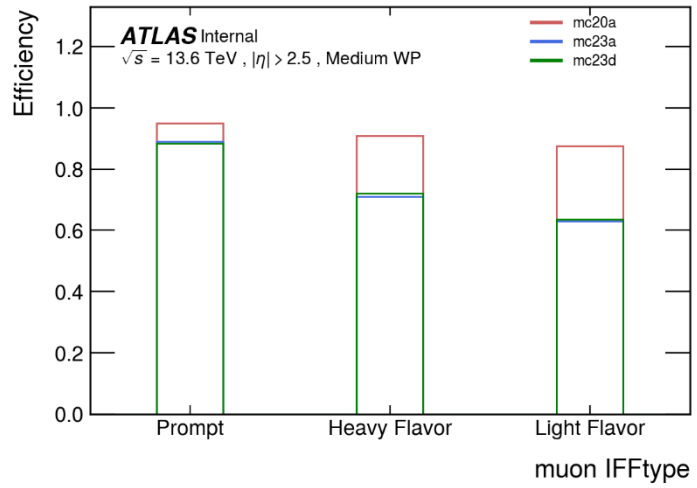


MC 23 a



MC 23 d



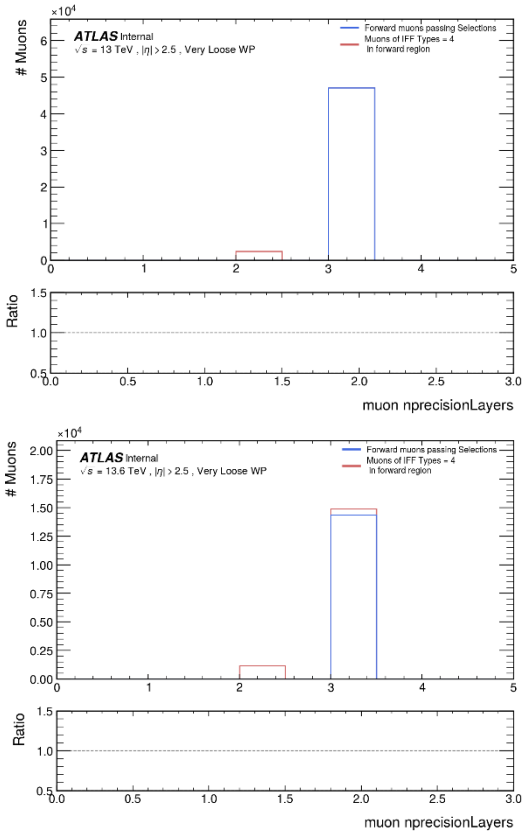


Why is the Rate for Run 2 much better than Run 3 ?

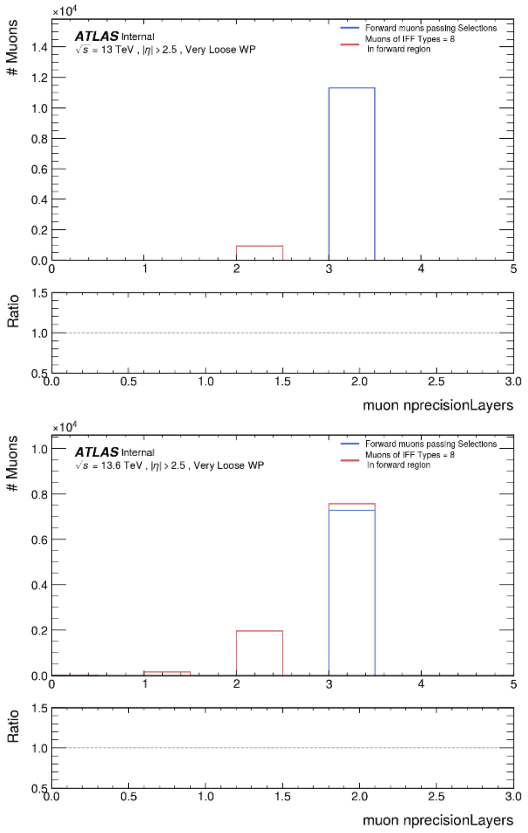
Medium WP

Investigate Variables defining Medium identification WP → nprecisionLayer

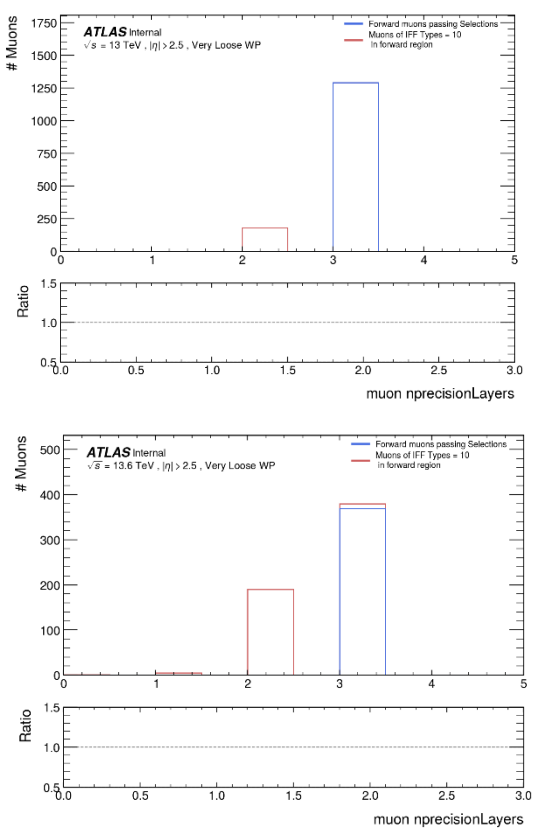
prompt



Heavy Flavor



Light Flavor



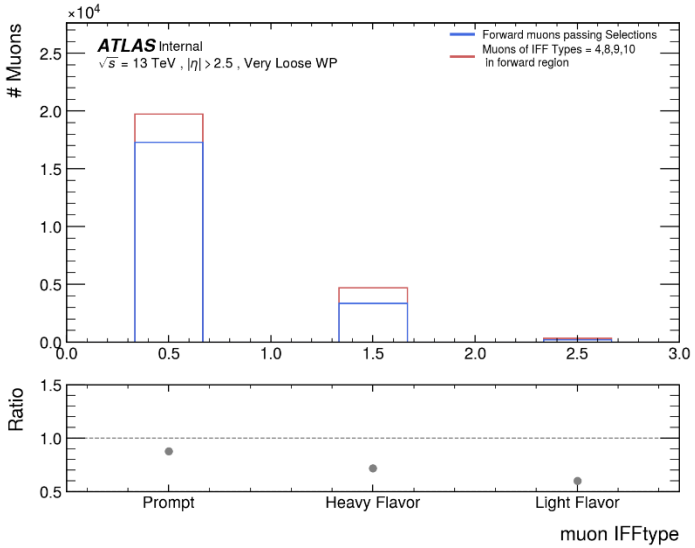
Fake Rates – Dilepton ttbar

- Samples used for this study:
  mc20_13TeV.410472.PhPy8EG_A14_ttbar_hdamp258p75_dil.recon.AOD.e6348_s3681_r13145
  mc23_13p6TeV.601230.PhPy8EG_A14_ttbar_hdamp258p75_dil.recon.AOD.e8514_s4159_r15530

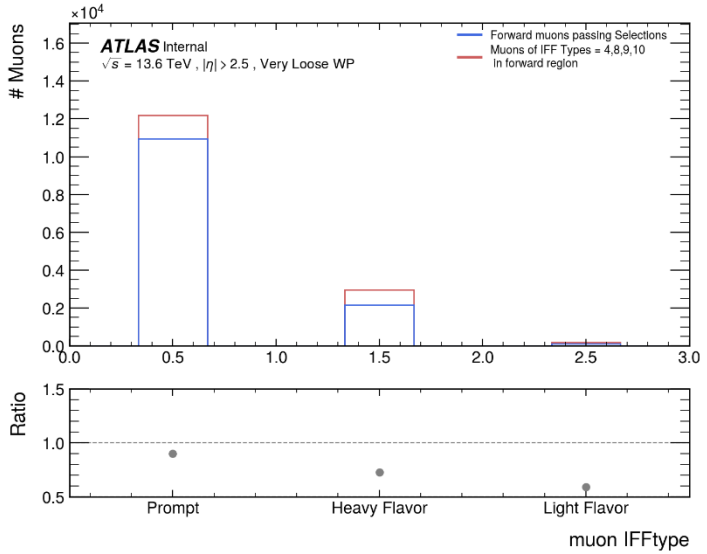
- Analysis done on ntuples produced from these samples with MuonxAODAnalysis
- Selected Muons (based on arXiv:2012.00578v2):
  - Forward Muon: $|\eta| > 2.5$ and nprecisionLayers > 2

nprecisionLayers > 2

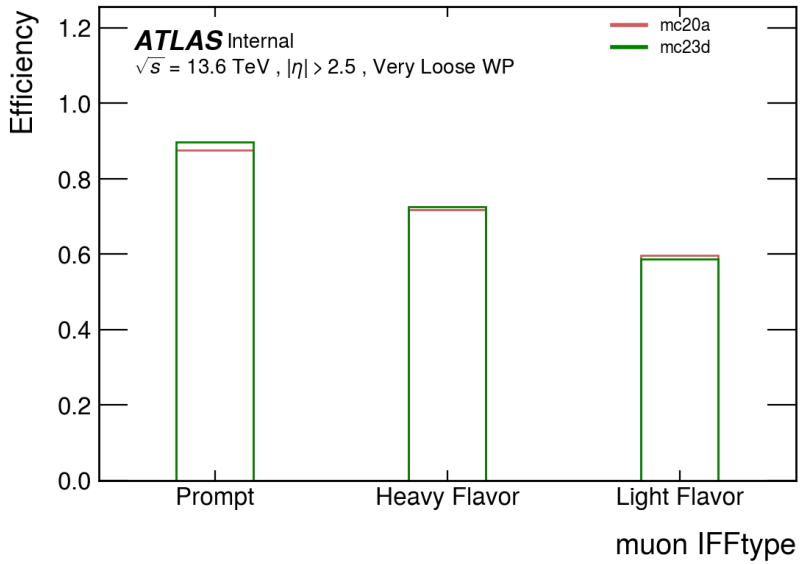
Run 2



Run 3



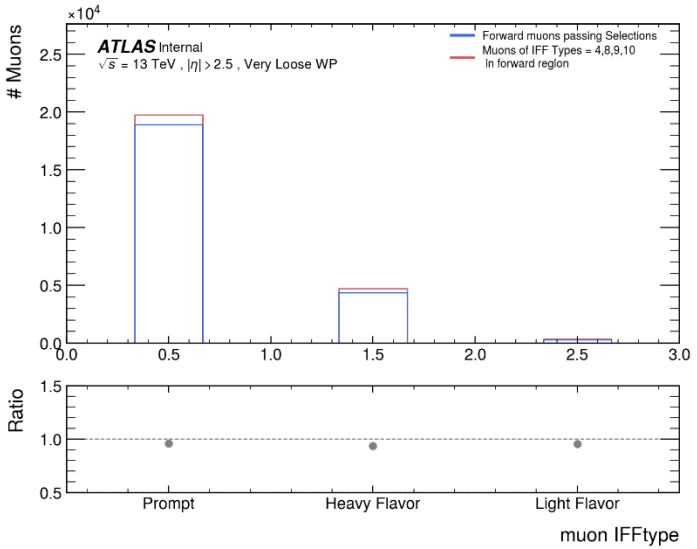
Comparison



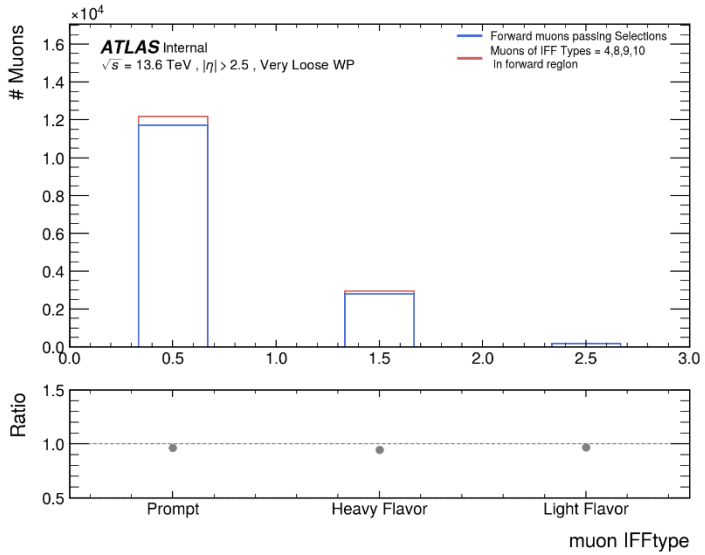
Rates for Run 2 and Run 3 almost identical

nprecisionLayers > 1

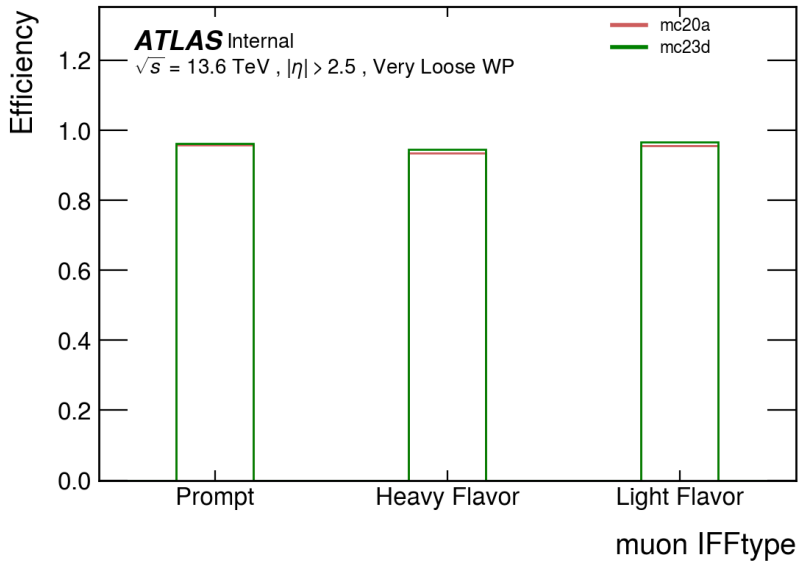
Run 2



Run 3



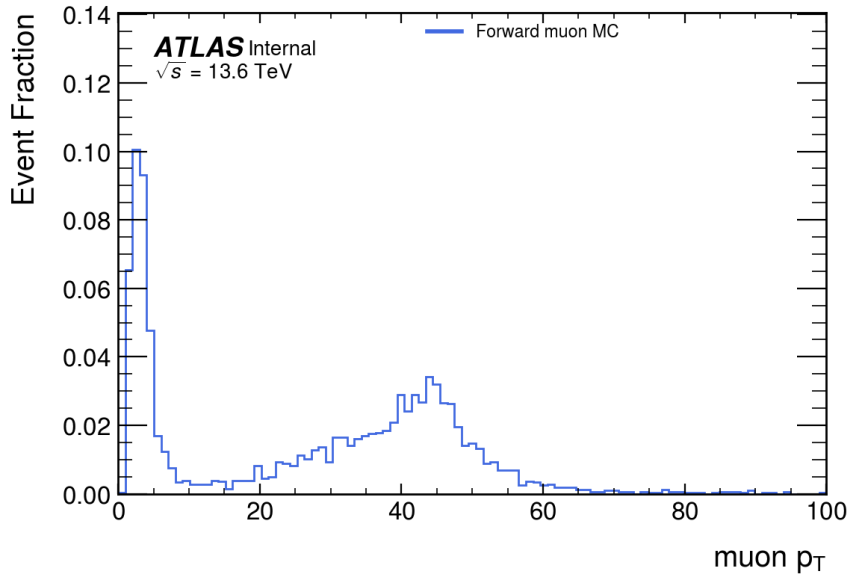
Comparison

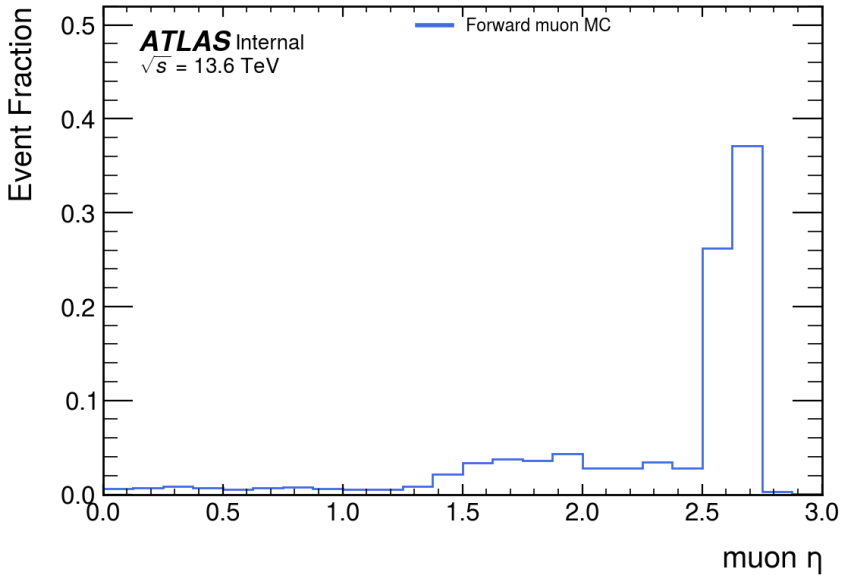


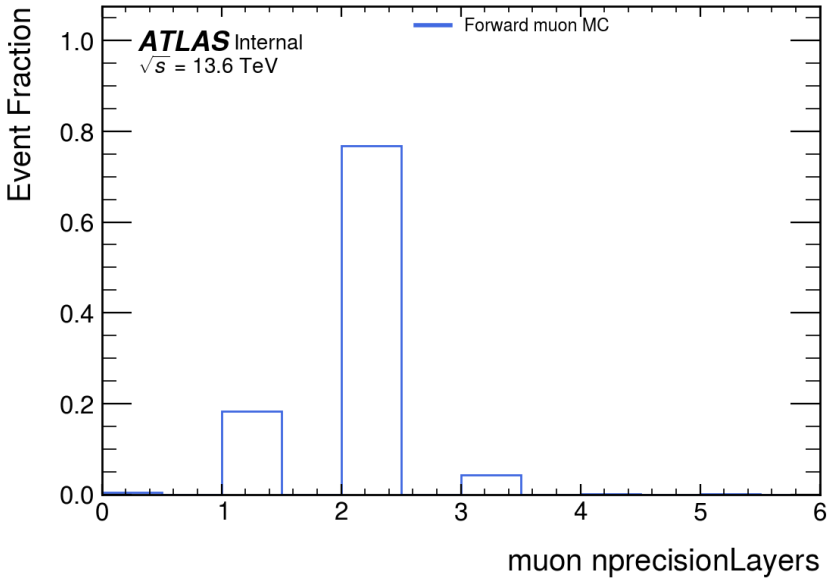
Rates for Run 2 and Run 3 almost identical

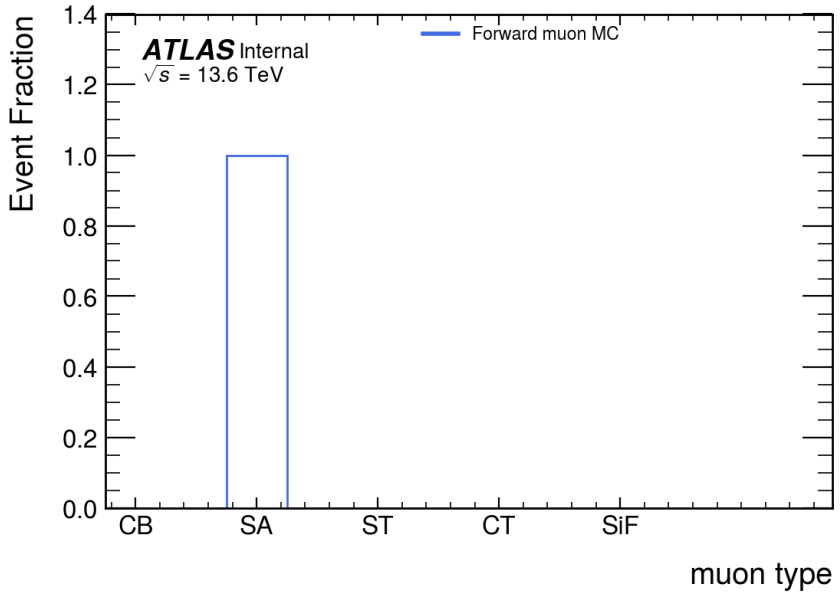
BackUp

Additional Plots – SA Muon Type



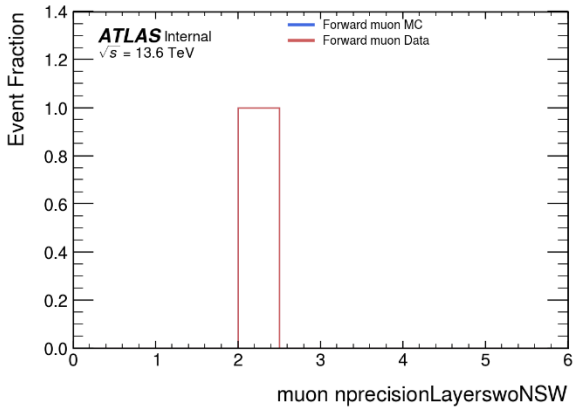


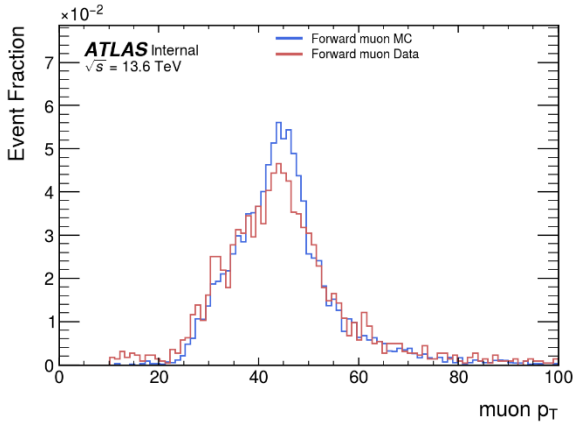




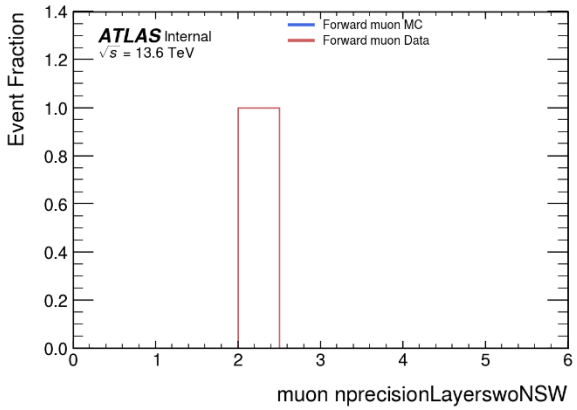
Additional Plots – Test Eta Range

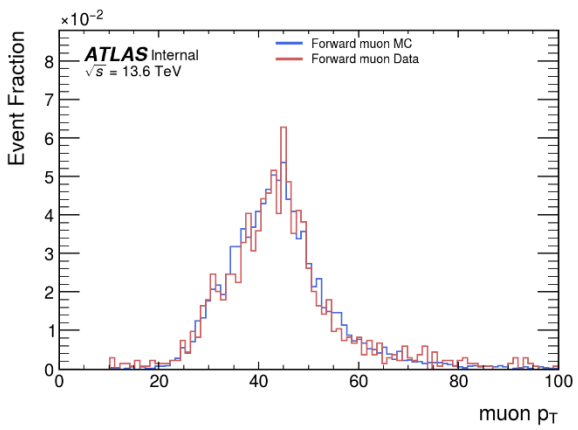
|η| >= 2.4



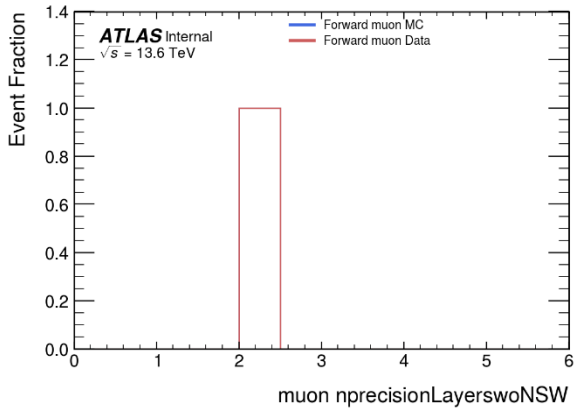


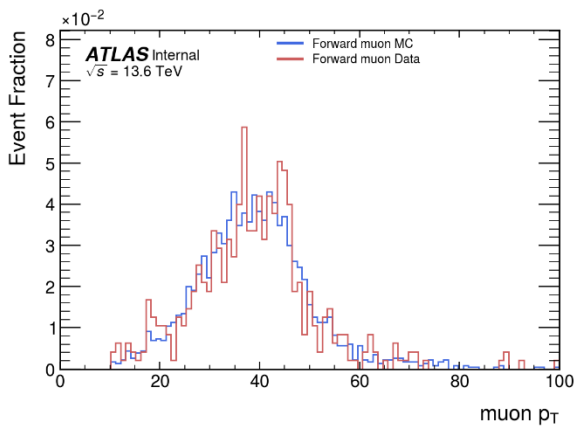
|η| >= 2.5



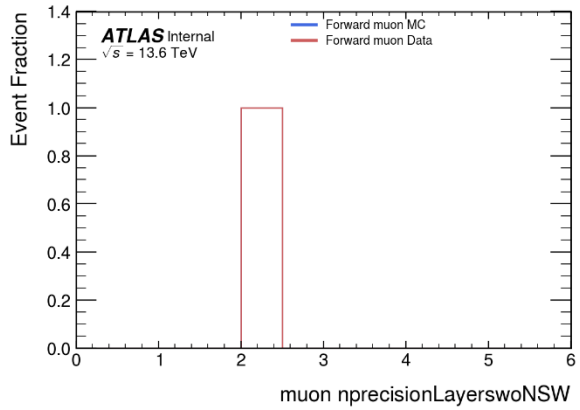


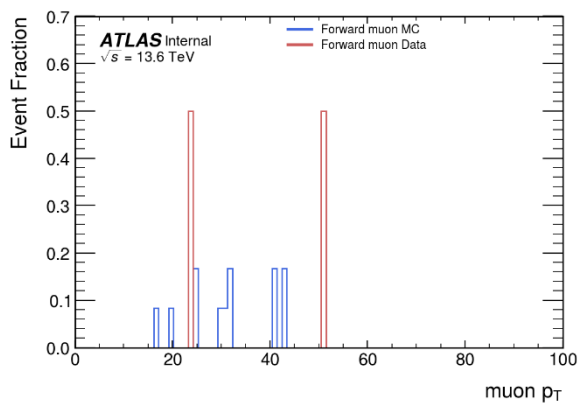
|η| >= 2.6





|η| >= 2.7





Previous Presentations

- July 10th 2024
- July 24th 2024
- September 18th 2024