

Overlayered Tau Reconstruction Efficiencies

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MAIA Detector Tau Studies

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Motivation

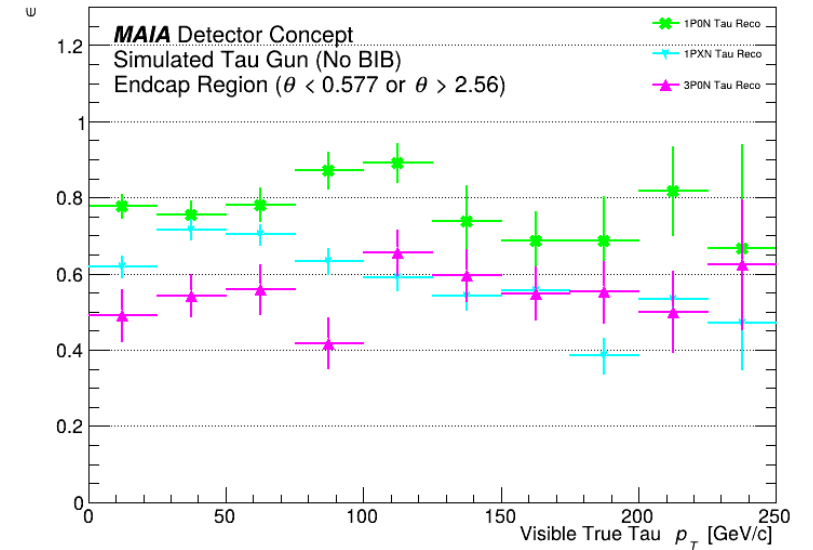
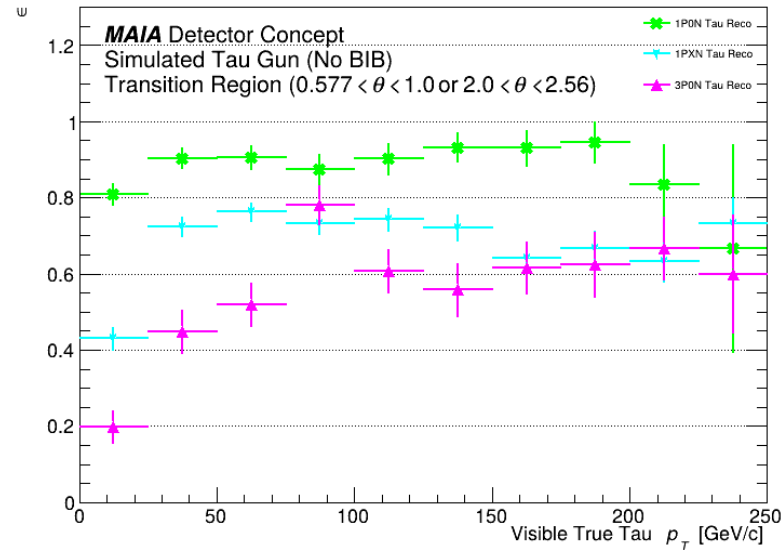
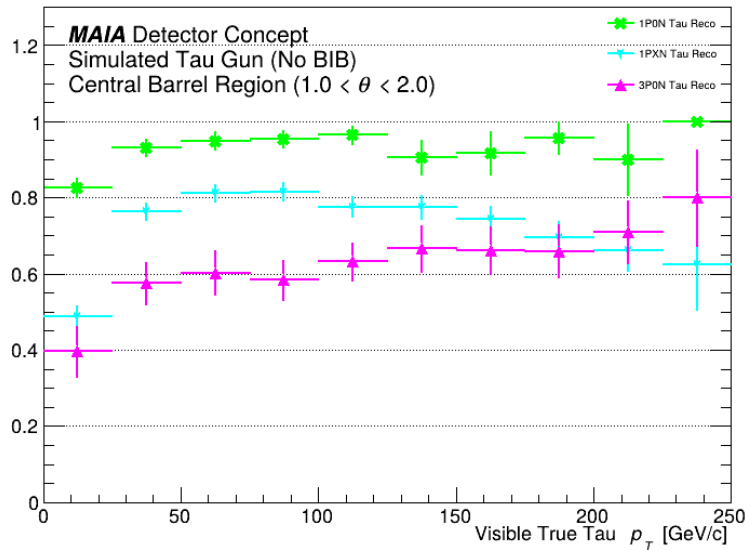
- Overlay reconstruction efficiencies for all hadronic tau decay modes in a “presentable” plot with simple Python scripts
 - As a function of true tau visible p_T and ϕ
 - Split into three detector regions
 - Central barrel
 - Transition
 - Endcap
- To be shared with MAIA tau group for uniform plot production

Tau Efficiency Scripts

- Create individual tau efficiency plots with [tau_eff.py](#)
 - Arguments for input and output files and histogram bounds
 - Creates efficiency plots for 1P0N, 1P1N, 1P2N, 3P0N, and 1PXN
 - Outputs a ROOT file containing efficiency histograms
- Overlay tau decay mode efficiencies with [overlay_tau_eff.py](#)
 - Takes the ROOT file from tau_eff.py as an input
 - Overlays tau decay mode efficiencies in 3 detector regions
 - Adds legends and text

Efficiencies vs p_T

- 1P0N and 3P0N efficiencies require 1 and 3 truth-matched charged pions associated with reconstructed tau, respectively
- 1PXN efficiency requires 1 truth-matched charged pion and ≥ 1 reconstructed neutral pion associated with reconstructed tau
 - Count number of neutral pions by counting number of photons
 - Currently, 1 photon = 1 neutral pion
- Counting photons as neutral pions will cause 1P0N taus to be identified as 1PXN taus
 - Introduce a neutral energy threshold?



Efficiencies vs ϕ

