Tight Muon Reconstruction Efficiency

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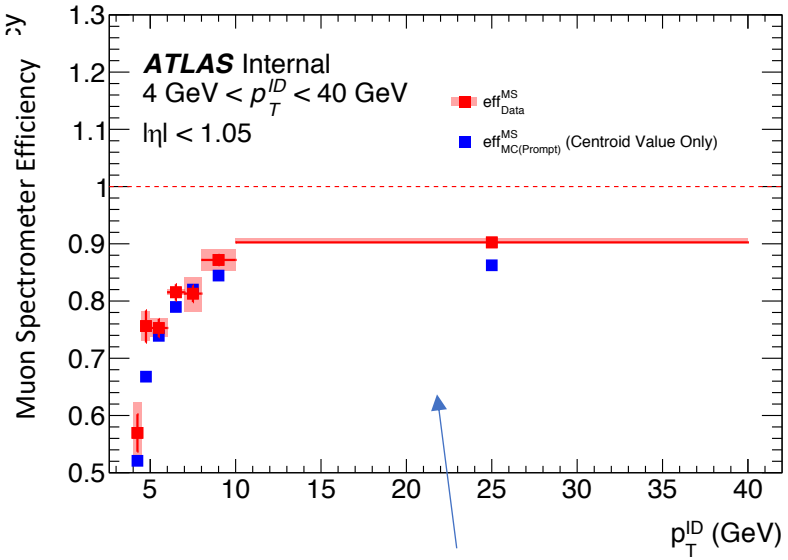
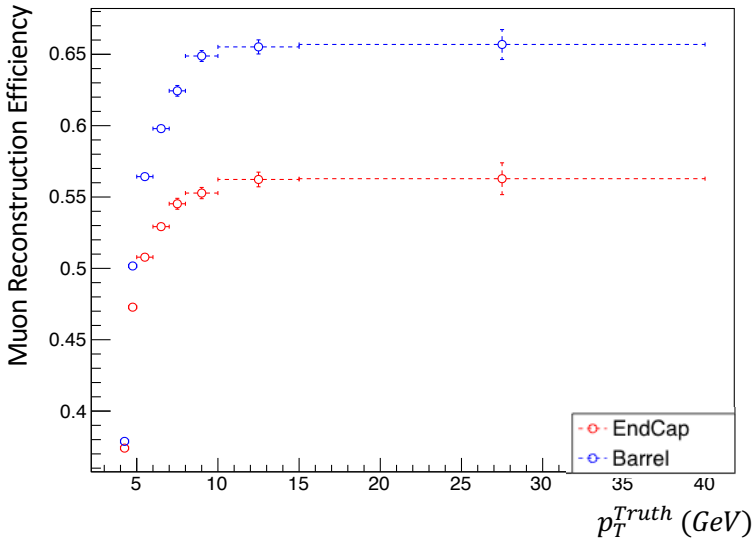
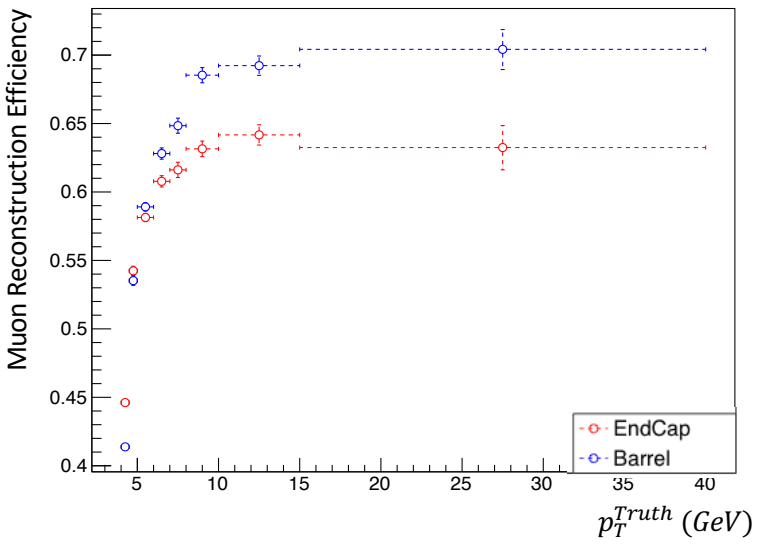
Summary

- Problem: Efficiency of tight muon construction differs by ~20% using ”Tag and Probe” method.



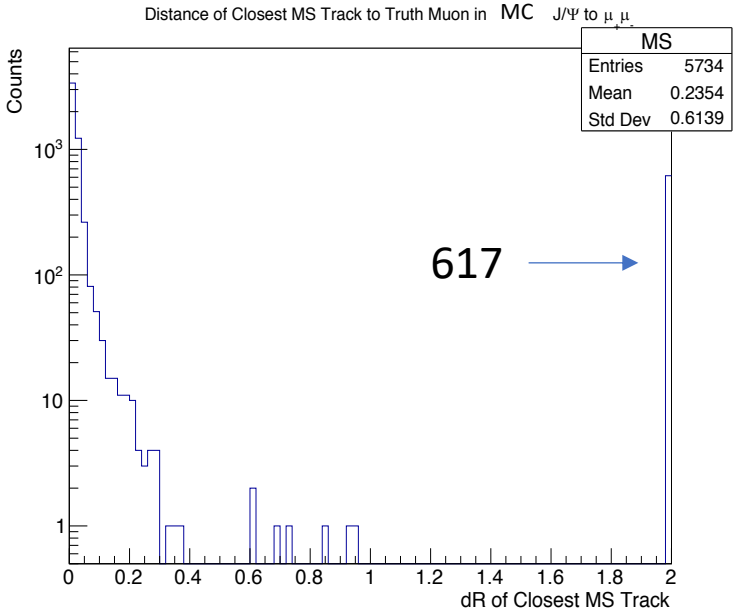


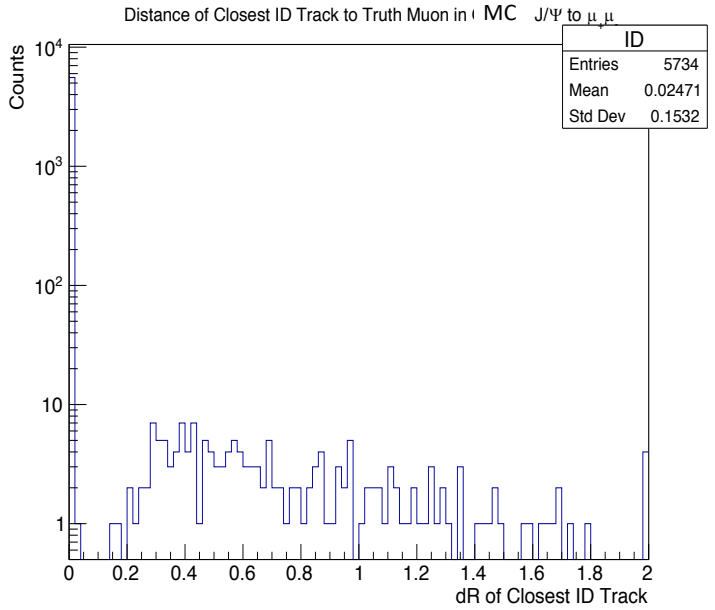


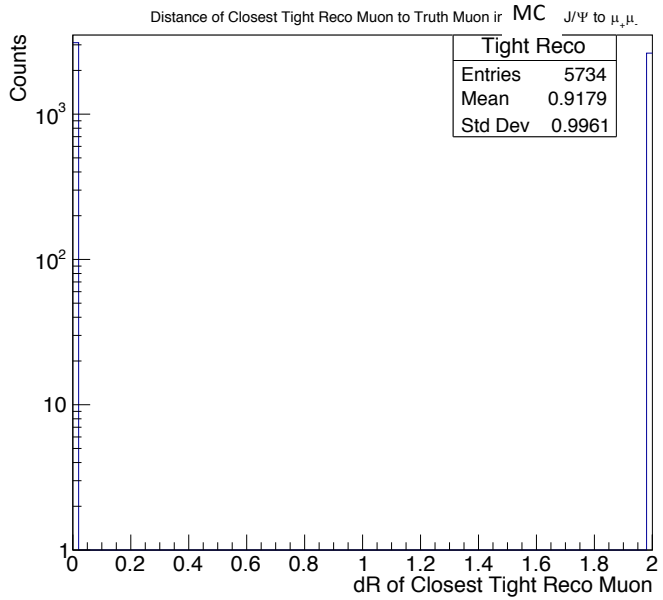
Inner Detector efficiency calculated by T&P has a 90%-98% efficiency for all p_T^{MS} range, so the reconstruction efficiency follows approximately the same curve as MS efficiency.

- Plan: Look into what’s missing in some events/where.
- Progress: tracks (ID & MS) that are close to truth muons are present, but some are not found in T&P method, thus missing some events with low reconstruction efficiency.
  - Lorentz vector summation method checked by hand, is correct.

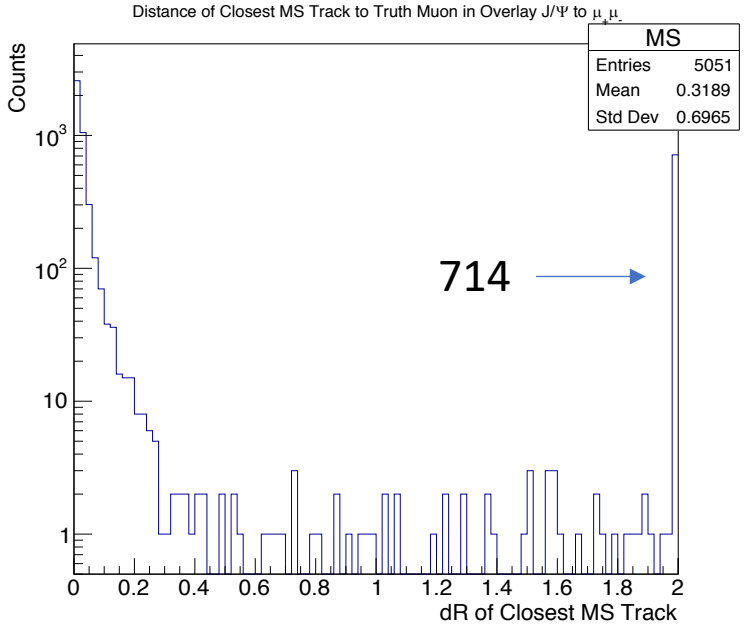
Small samples of events (~5000), p_T > 3.5 GeV

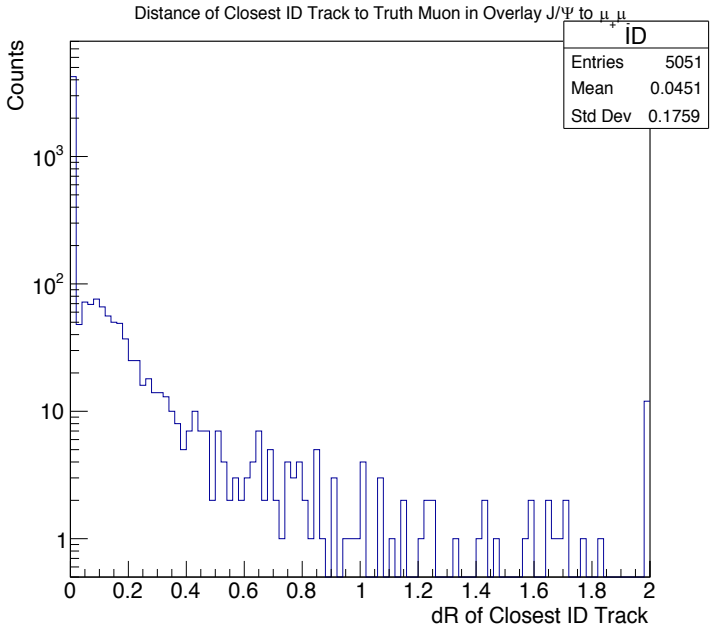


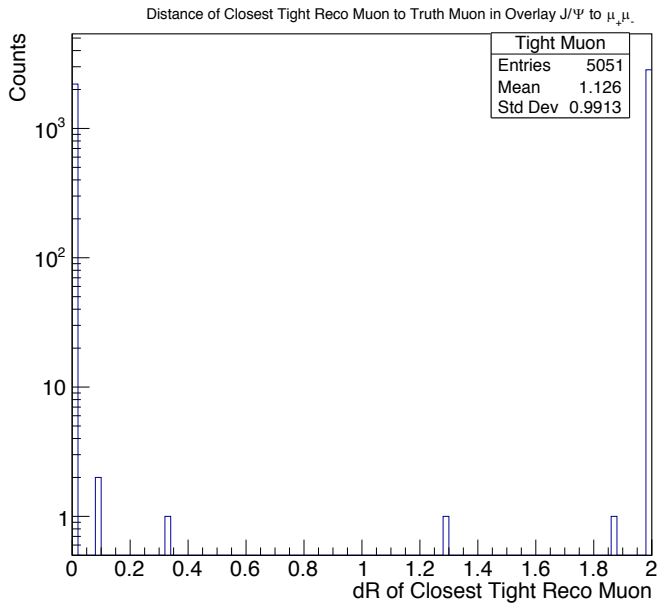




Row 1: MC
Row 2: MC overlay

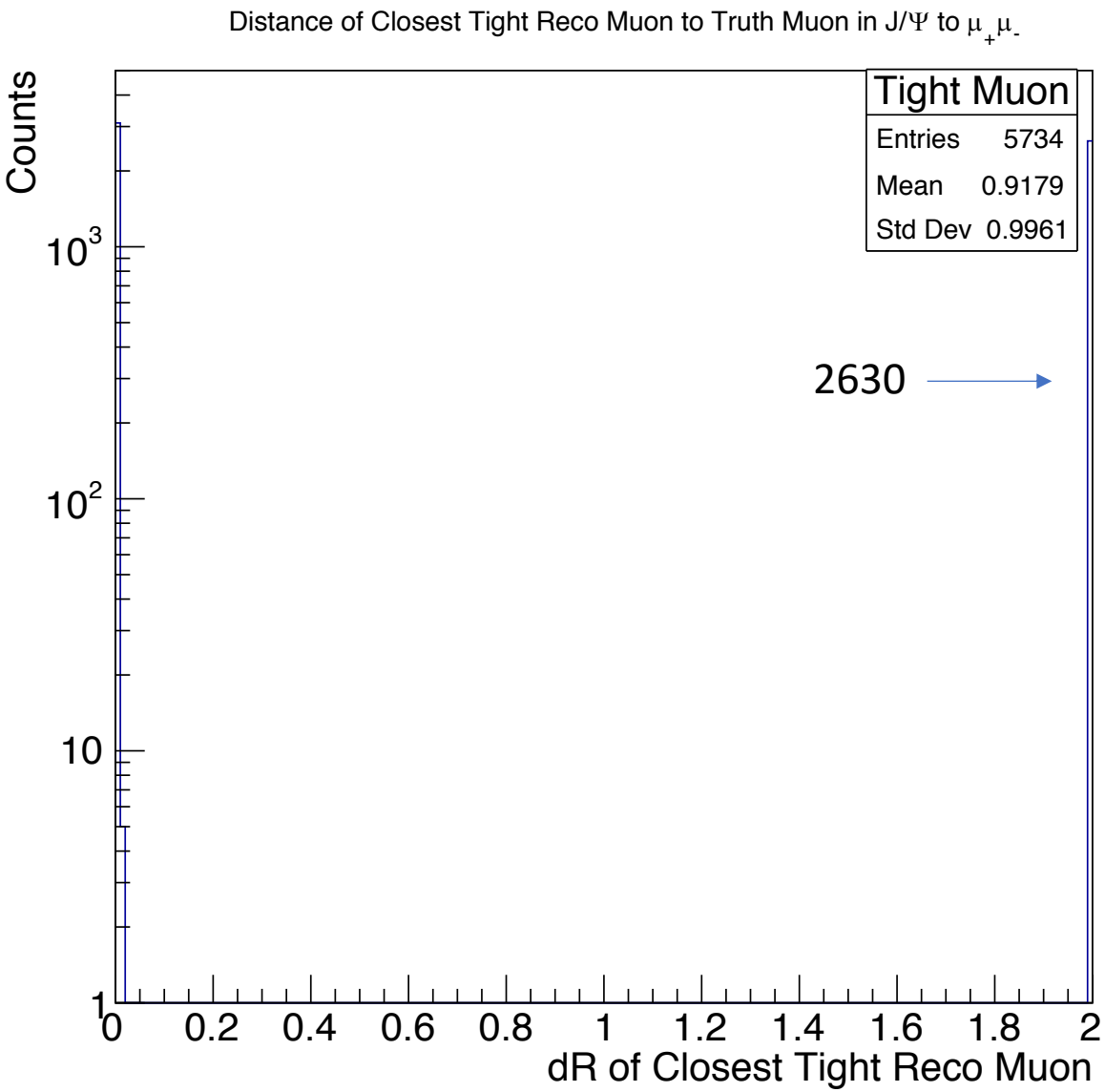


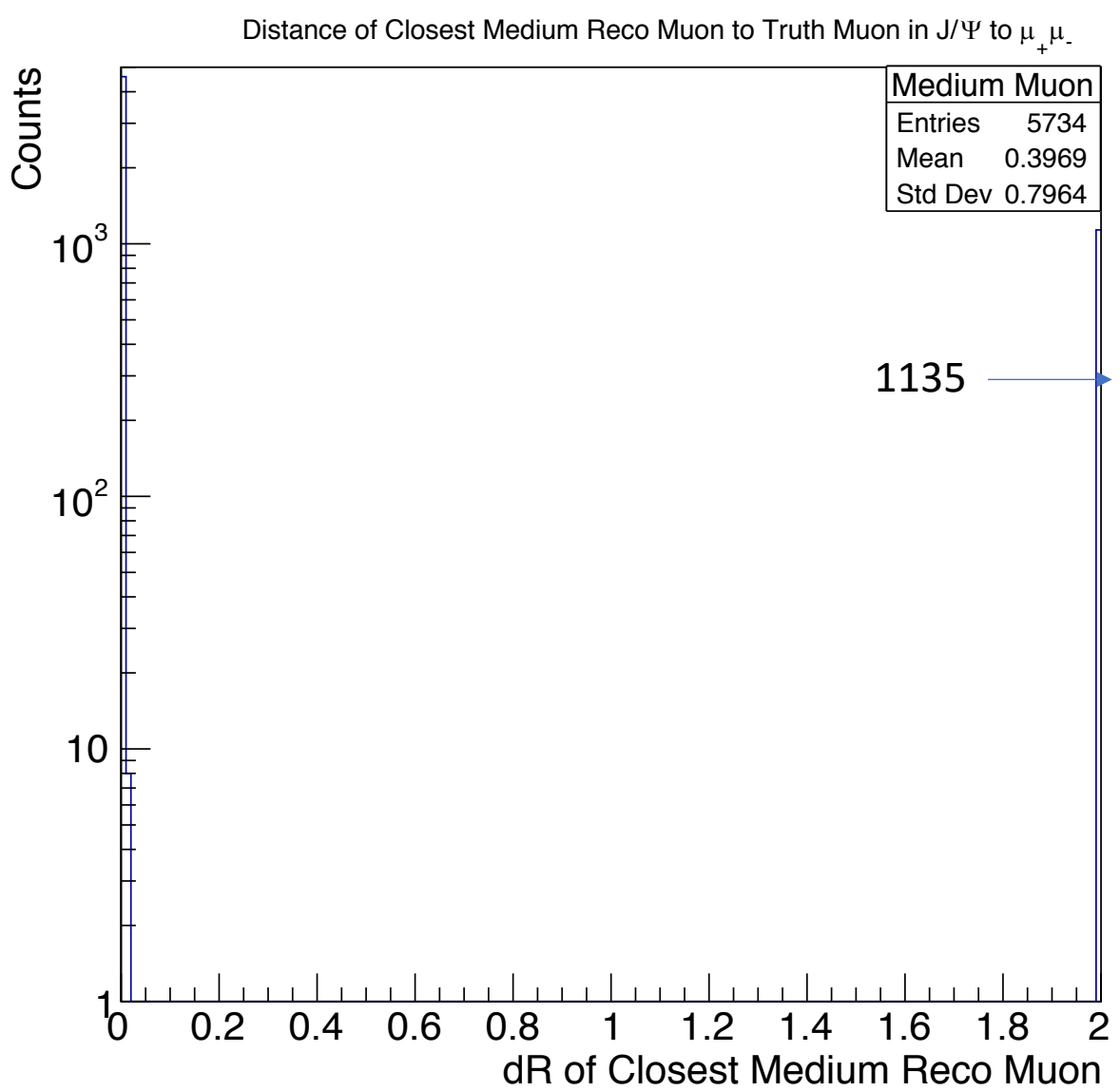




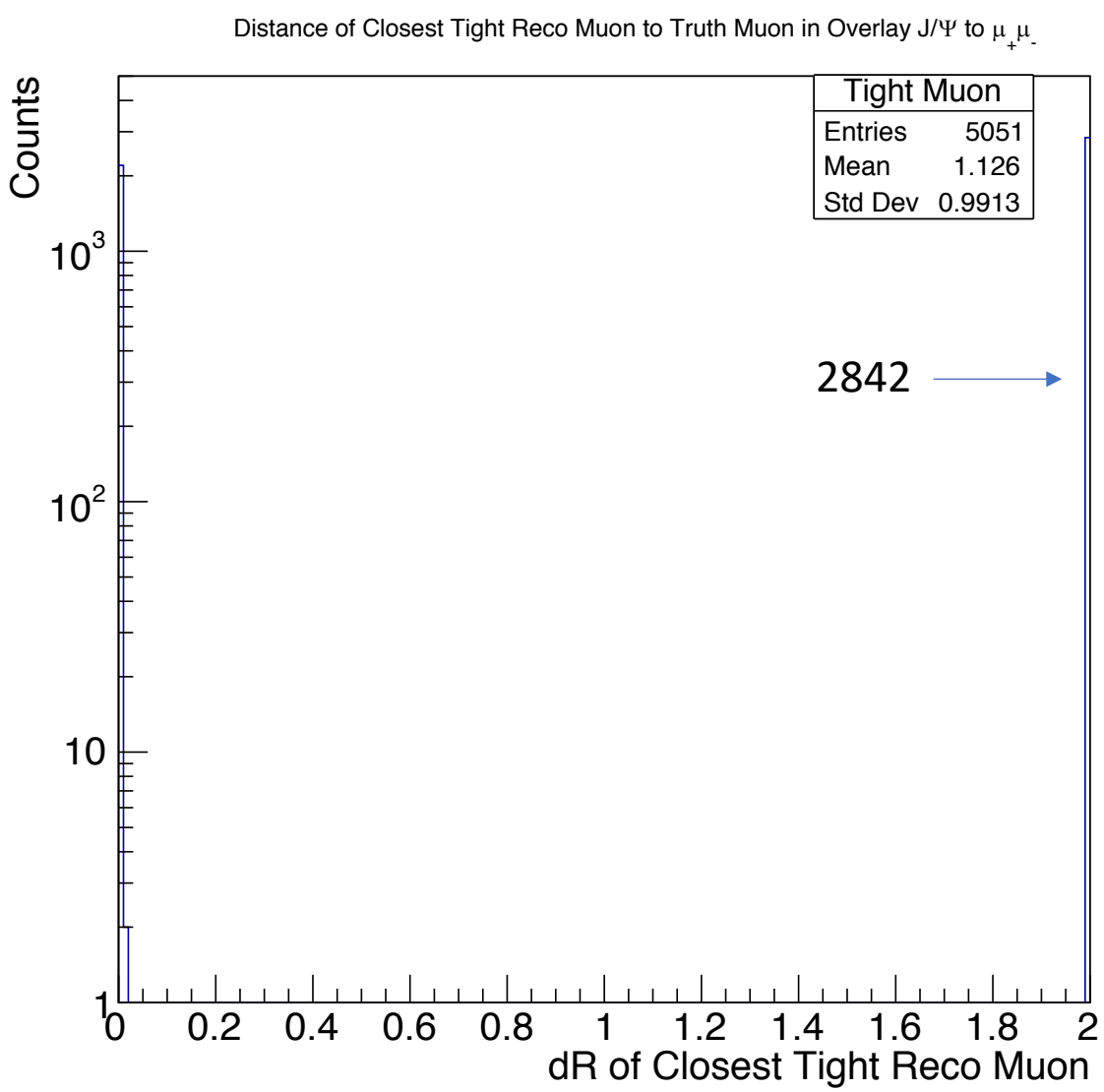
Reconstructed tight muons are mostly lost in matching ID & MS tracks in both pp and overlay.

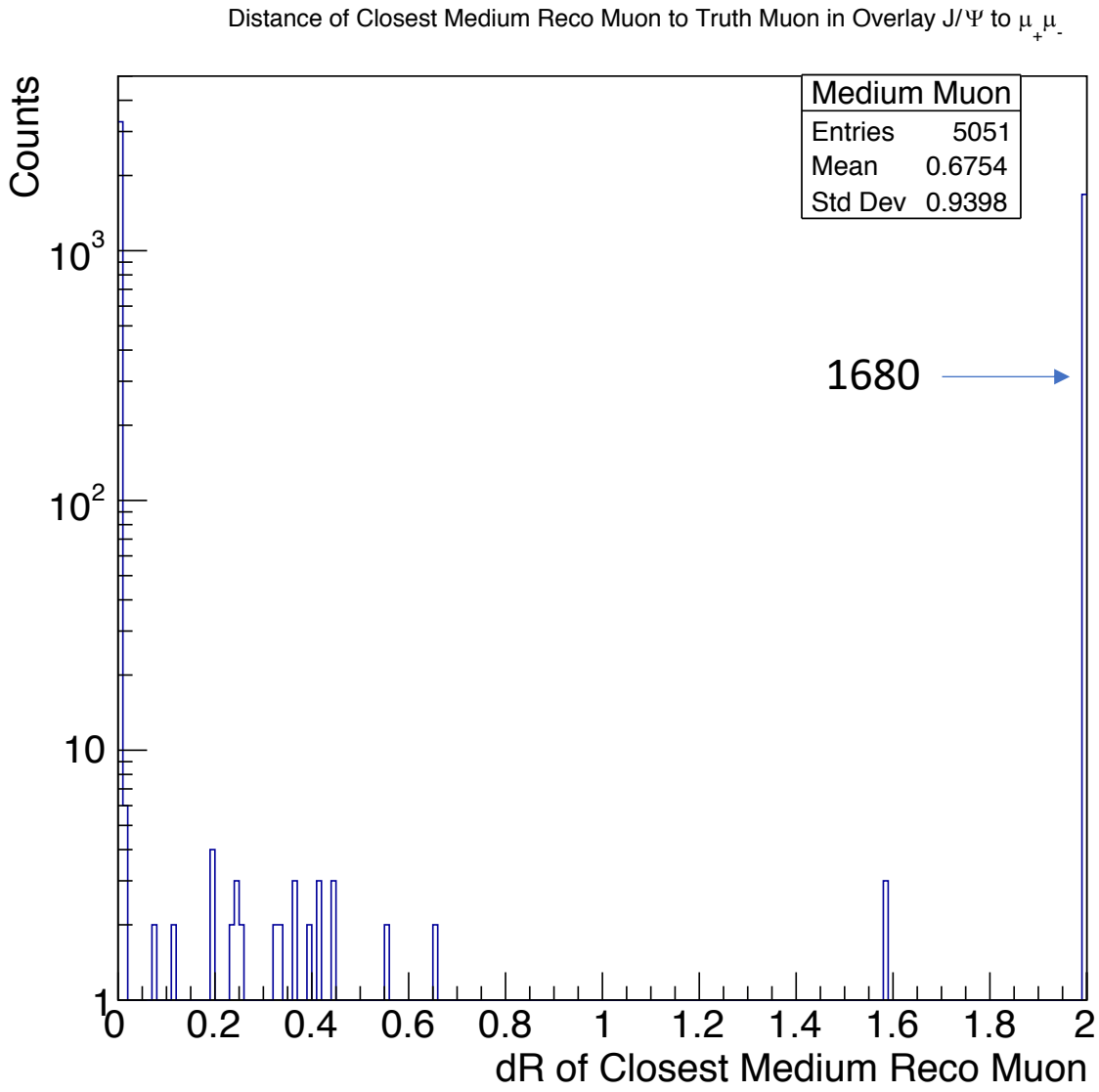
Comparison to Medium Muons (*pp*)





Comparison to Medium Muons (PbPb)





To do

- Print out all calculation steps throughout events in the analysis code
  - Suspicion: the track tagged by T&P are different from closest track with truth muon

- Debugging for Roofit with Weight still going on…

Back-Up

Fcal dependence in overlay