TnP status

KiSoo Lee

J/psi TnP condition

- acceptance
  - if |η| ≦ 1.3, pt > 3.3
  - if 1.3 < |η| ≦ 2.2, p > 2.9
  - if 2.2 < |η| ≦ 2.4, pt > 0.8

- muon chamber cut
  - isTrackerMuon
  - muonID(‘TrackerMuonArbitrated')
  - muonID('TMOneStationTight')

- track cut(new soft muon cut)
  - track.hitPattern.trackerLayersWithMeasurement > 5
  - track.hitPattern.pixelLayersWithMeasurement > 0
  - abs(dB) < 0.3
  - abs(track.dz) < 20
  - track.quality.highPurity

definition of tag muon

- satisfy STA cut + track cut + acceptance

- (!triggerObjectMatchesByPath('HLT_PAMu3_v*').empty()
  ||!triggerObjectMatchesByPath('HLT_PAMu7_v*').empty()
  ||!triggerObjectMatchesByPath('HLT_PAMu12_v*').empty())

- pt range

- 0.0, 1.5, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5, 8.5, 9.5, 11, 14, 30

- eta range

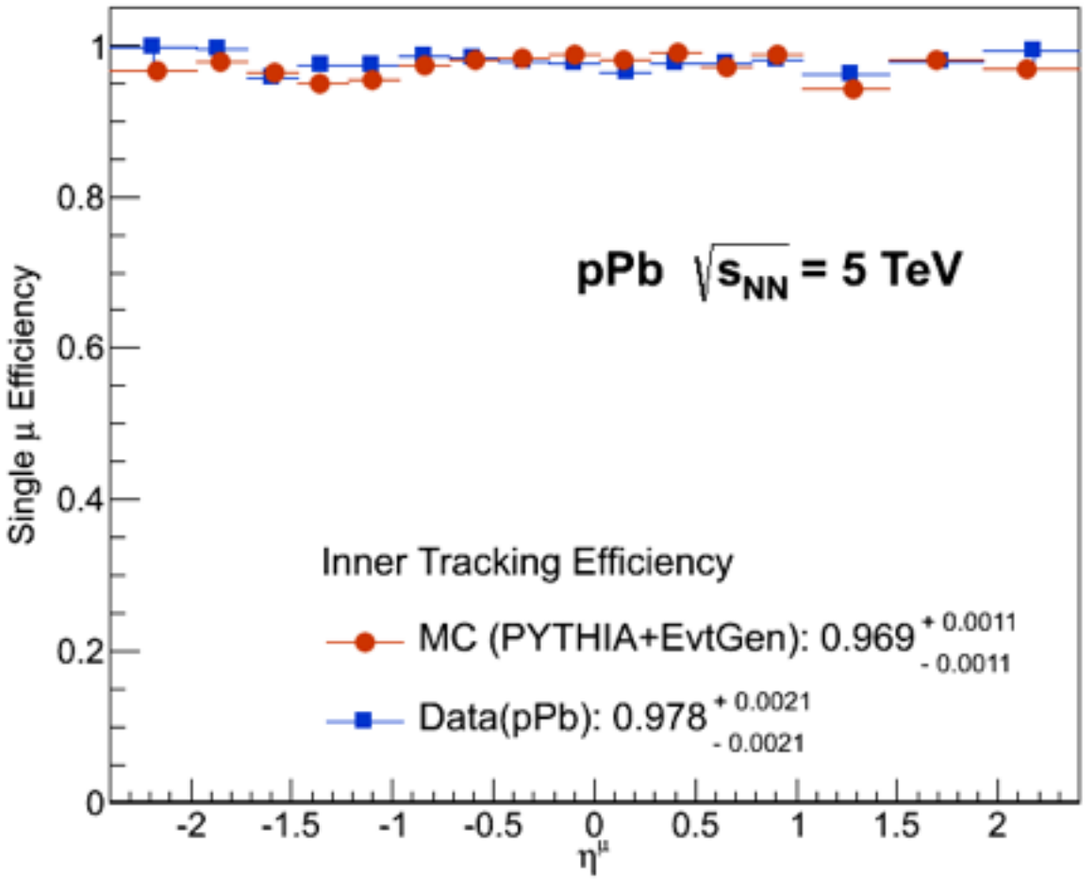
- -2.4, -1.97, -1.72, -1.47, -1.22, -0.97, -0.72, -0.47, -0.22, 0.03, 0.28, 0.53, 0.78, 1.03, 1.46, 1.93, 2.4

tracking efficiency probe

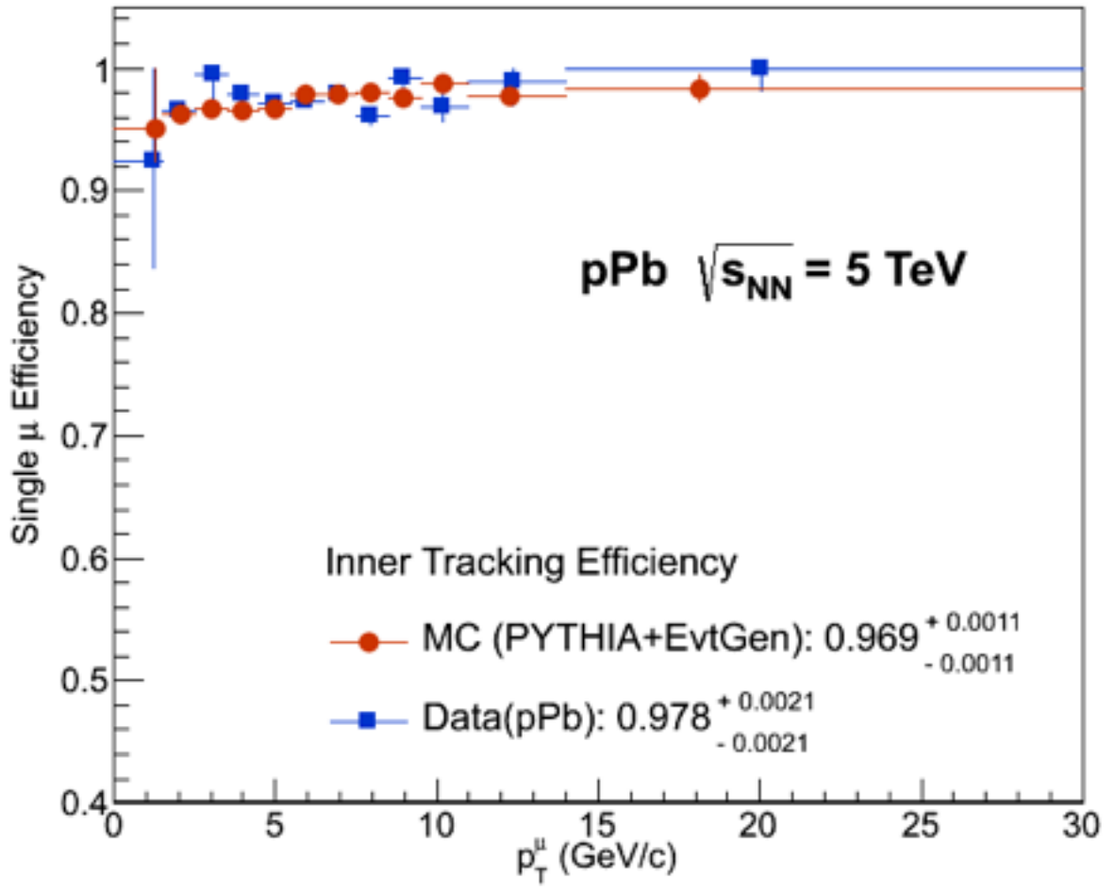
- all probe
  - outerTrack.isNonnull && acceptance
  - tag probe mass range 2.0 < m < 5.0
- passing probe
  - isTrackerMuon + track cut
- fit function
  - signal: 2 gaussian
  - background: Chebychev 4th order

tracking efficiency

eta



pt



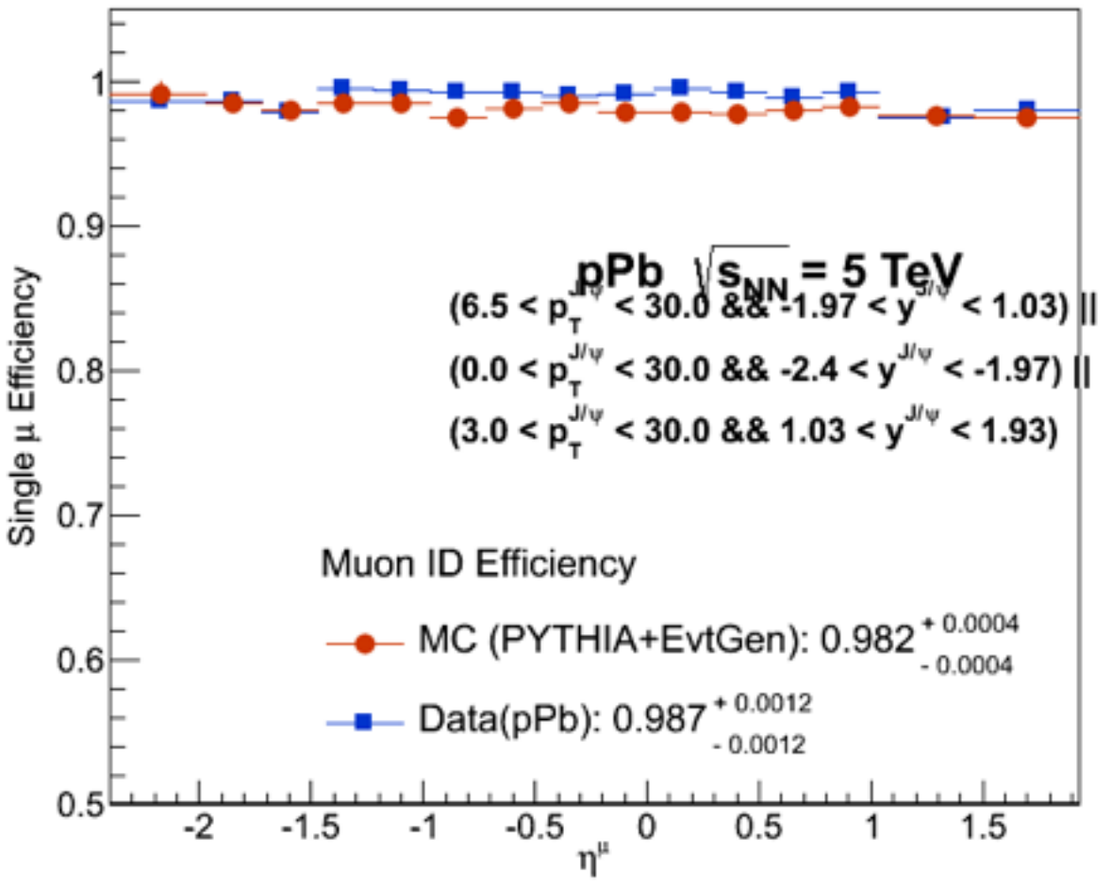
- almost similar distribution

Muon ID efficiency probe

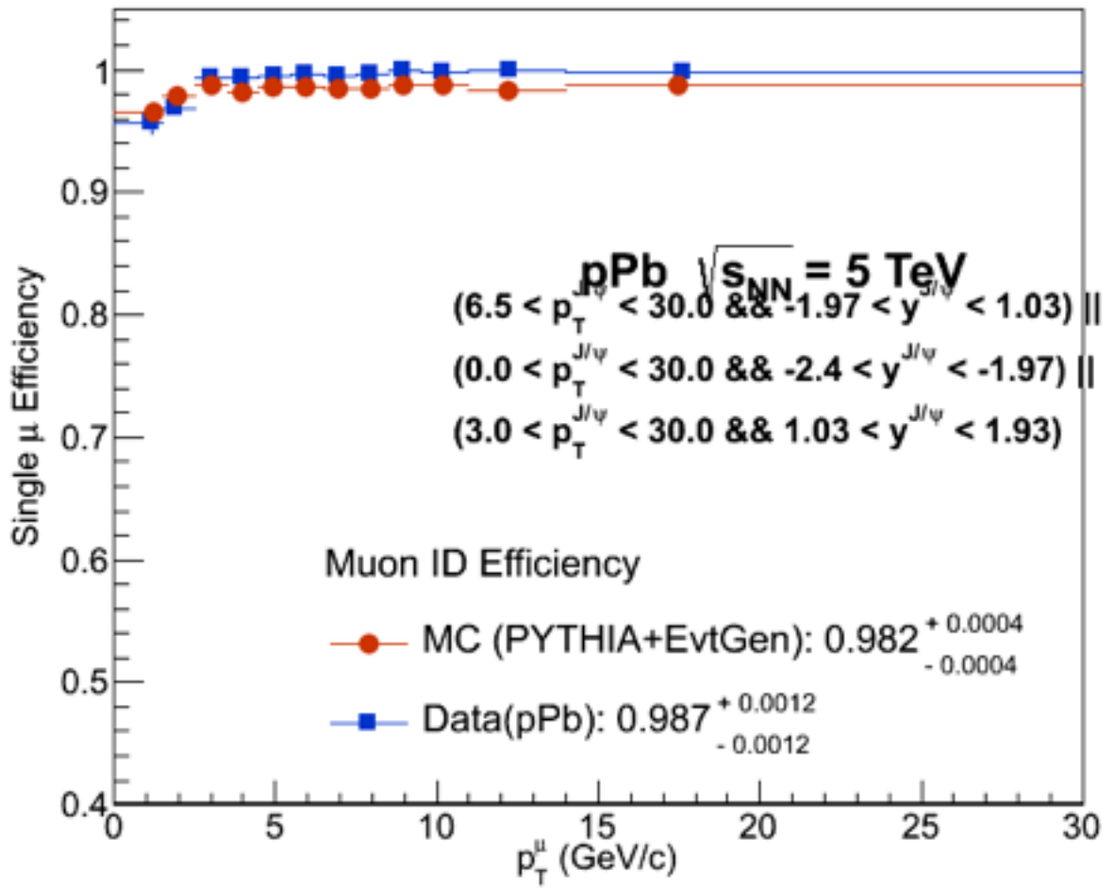
- all probe
  - isTrackerMuon + isCaloMuon + track cut + acceptance
- tag probe mass range $2.6 < m < 4.0$
  - passing probe
    - isTrackerMuon + STA cut
- fit function
  - signal: Crystal Ball
  - background: Chebychev 1st order

Muon ID efficiency

eta



pt



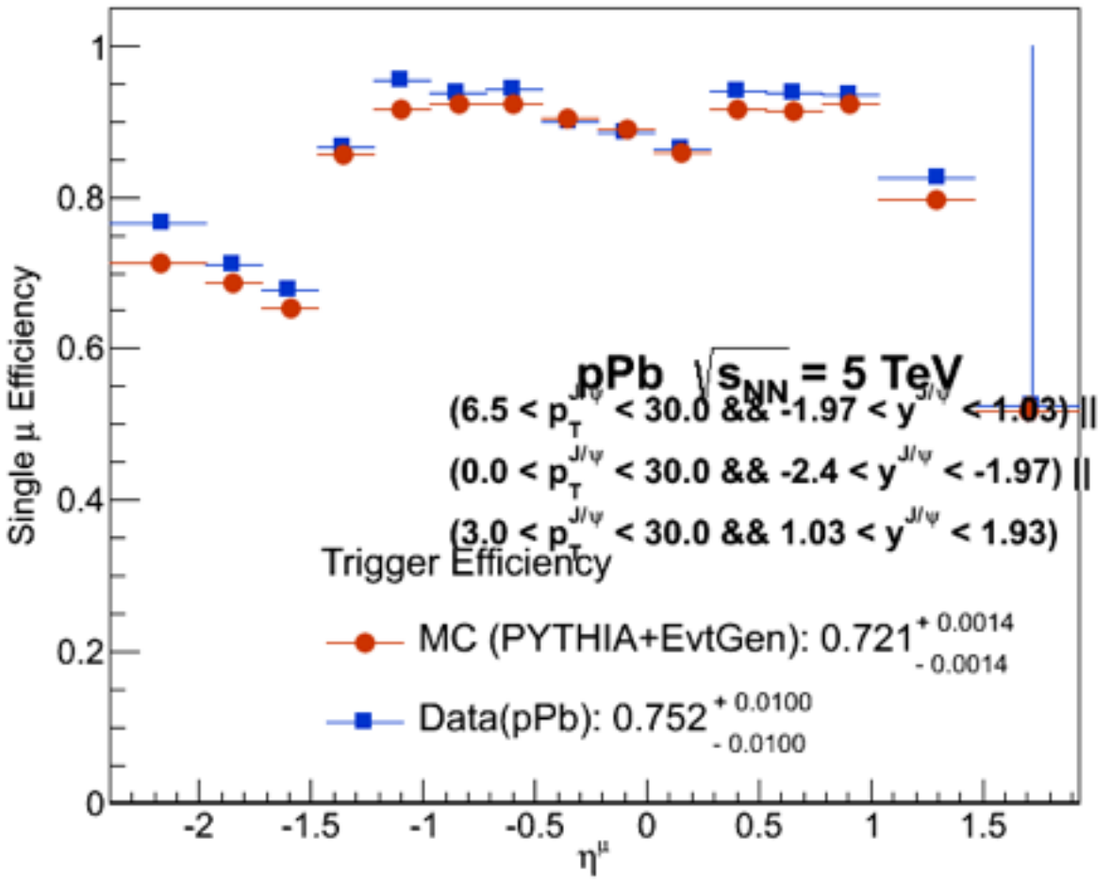
- MC distribution slightly low

trigger efficiency probe

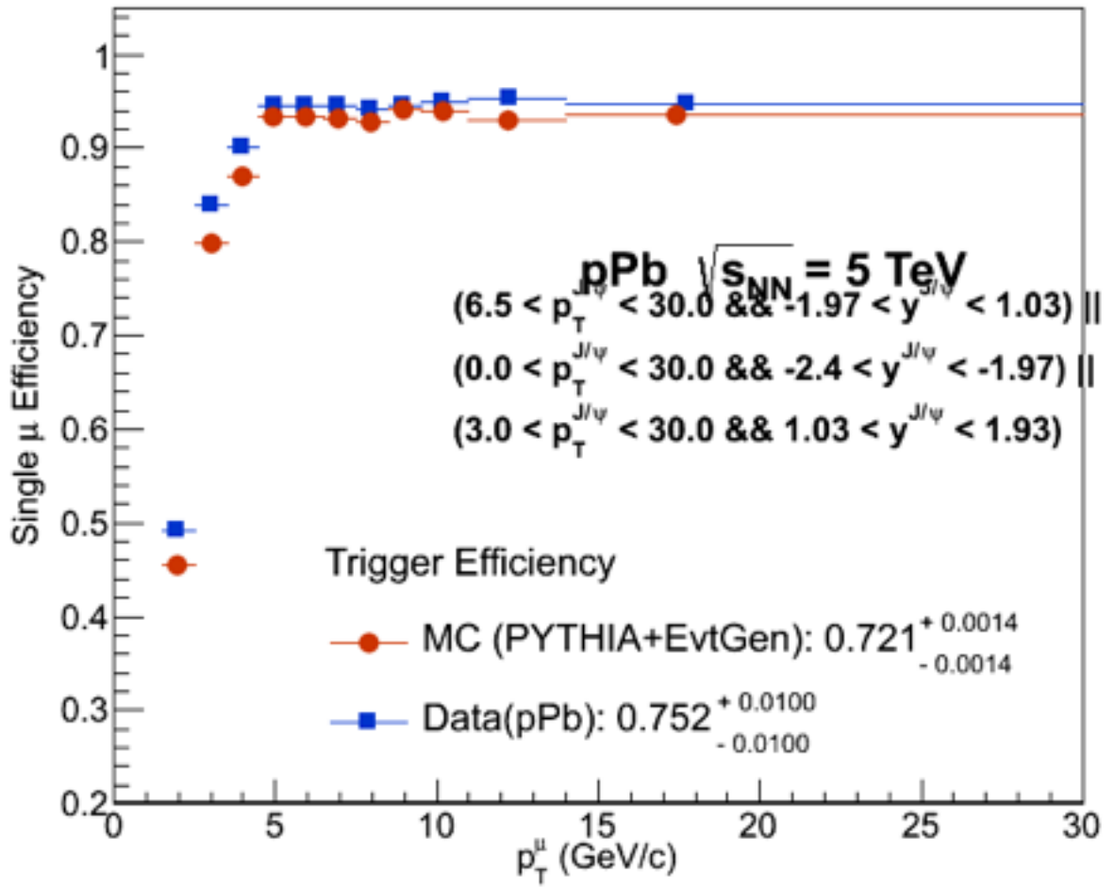
- all probe
  - isTrackerMuon + track cut + STA cut + acceptance
  - tag probe mass range 2.6 < m < 4.0
- passing probe
  - !triggerObjectMatchesByPath('HLT_PAL1DoubleMuOpen_v1', 1,0).empty()
- fit function
  - signal: Crystal Ball + Gaussian
  - background: Exponential

trigger efficiency data

eta



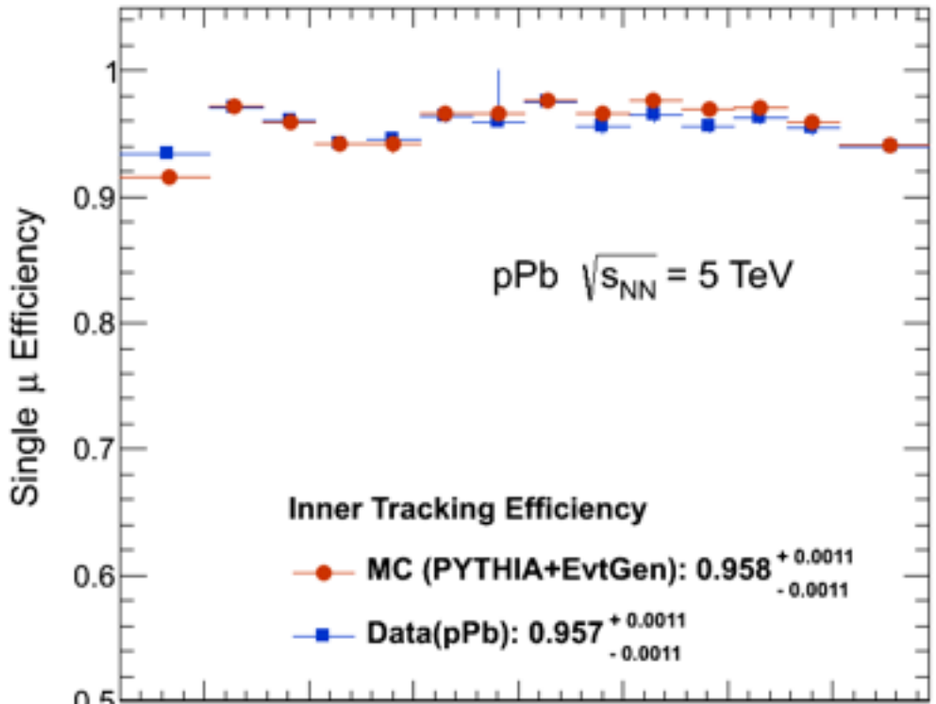
pt

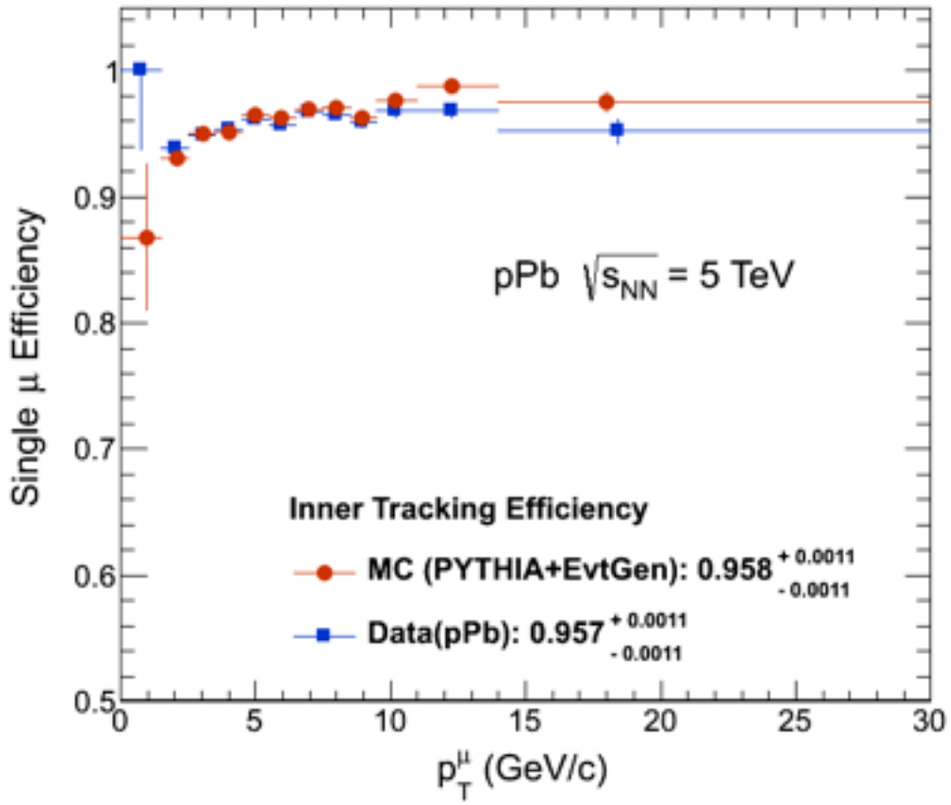


- MC efficiency is slightly low

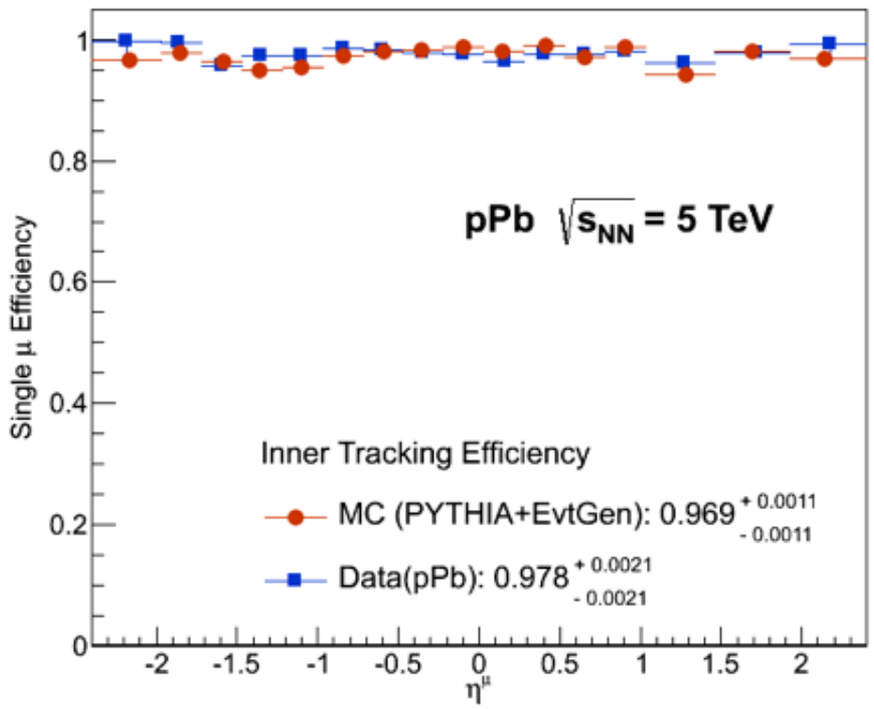
comparison with QM result(tracking)

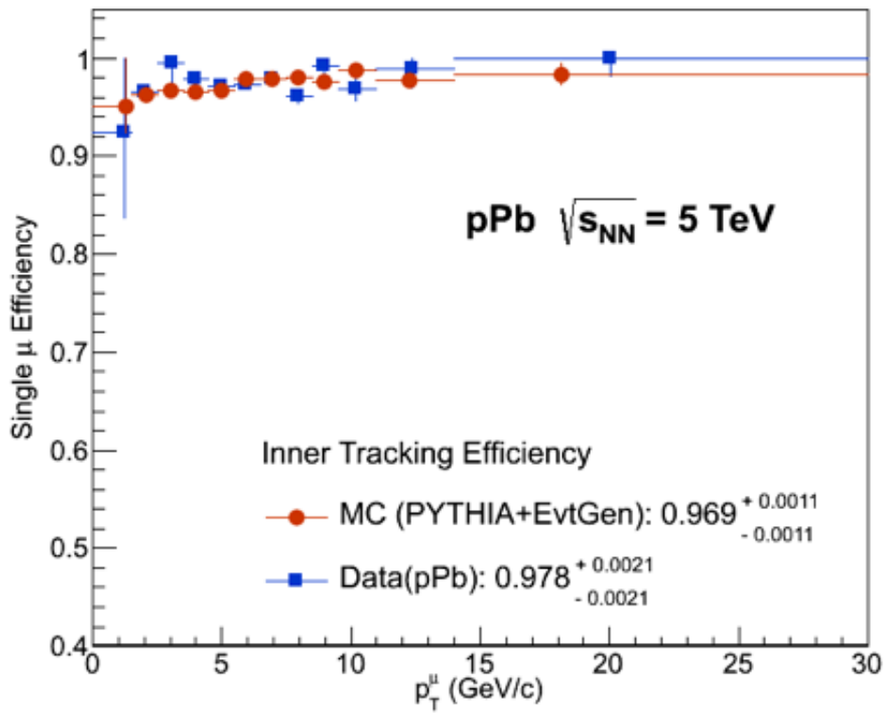
QM





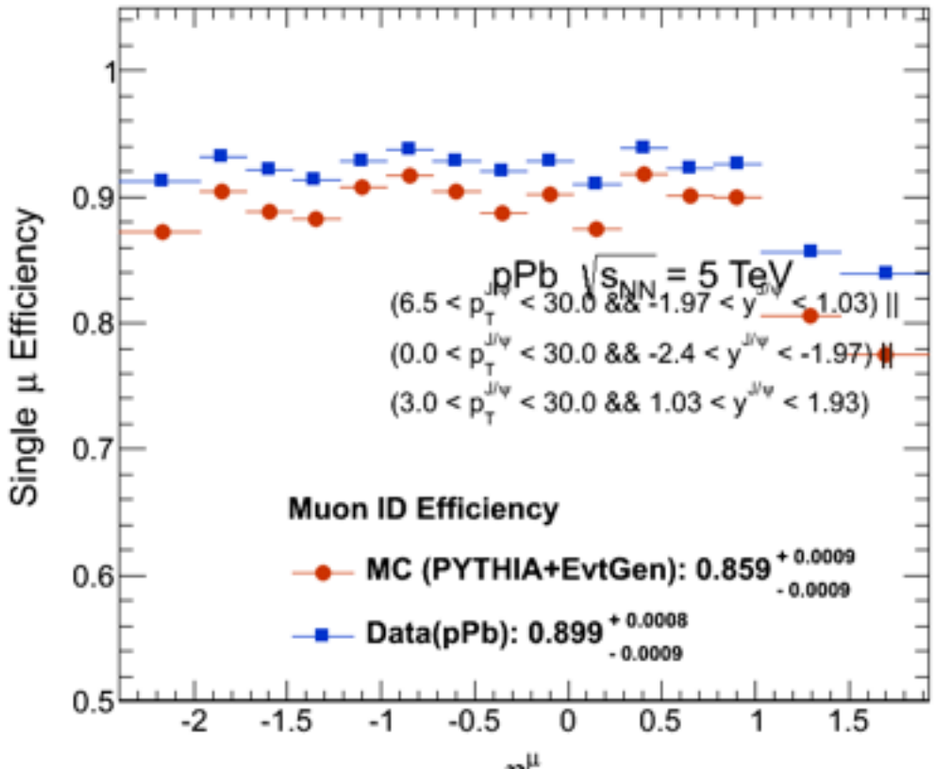
now

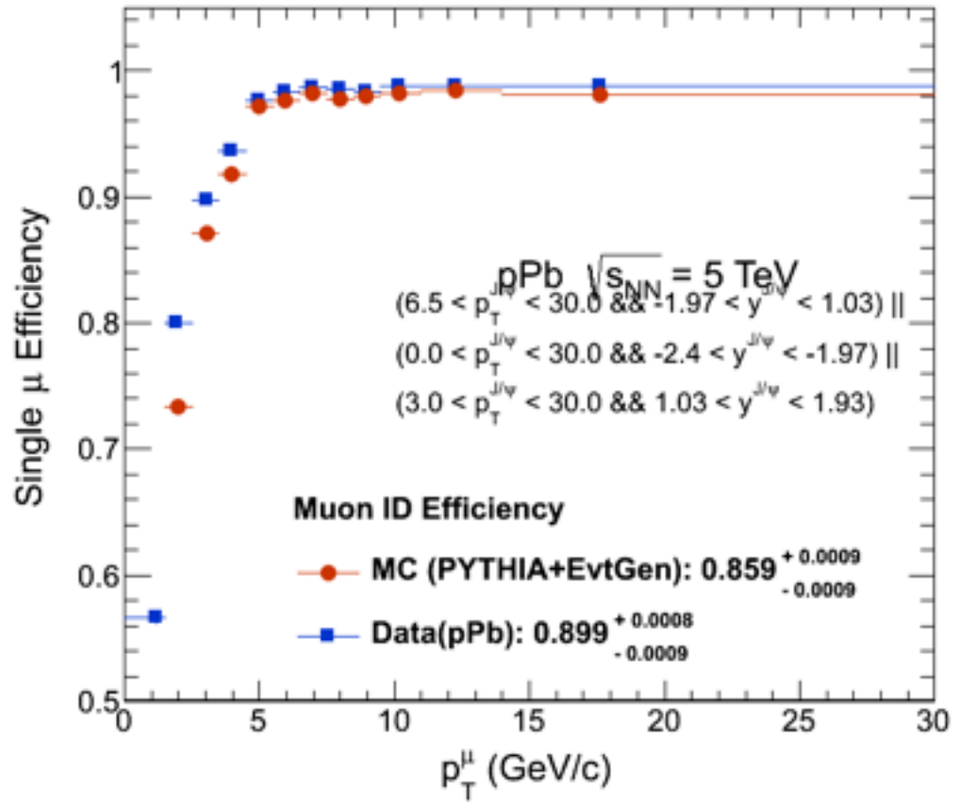




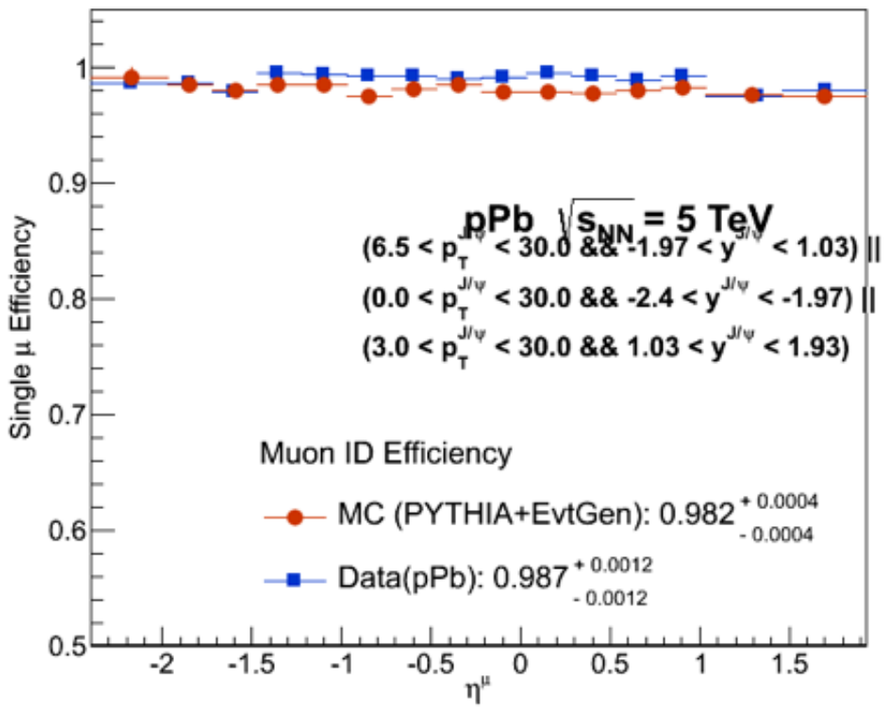
comparison with QM result(MuonID)

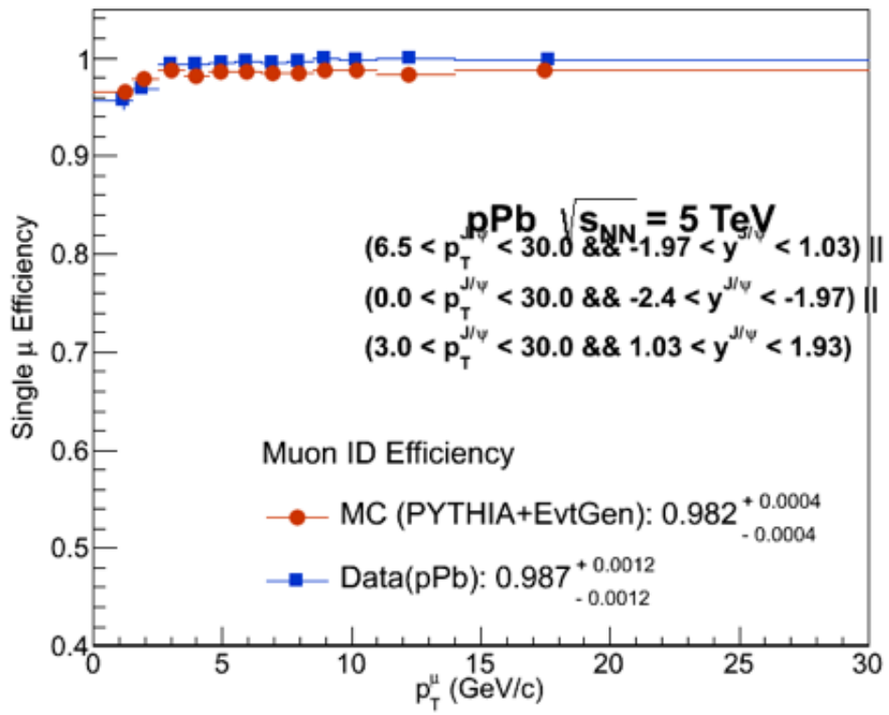
QM





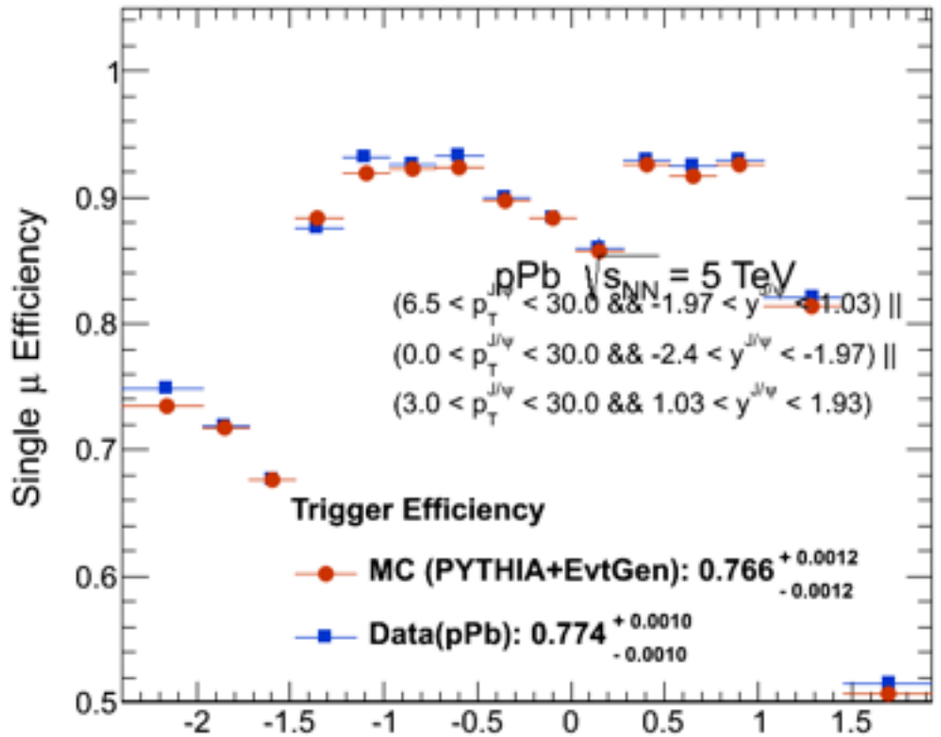
now

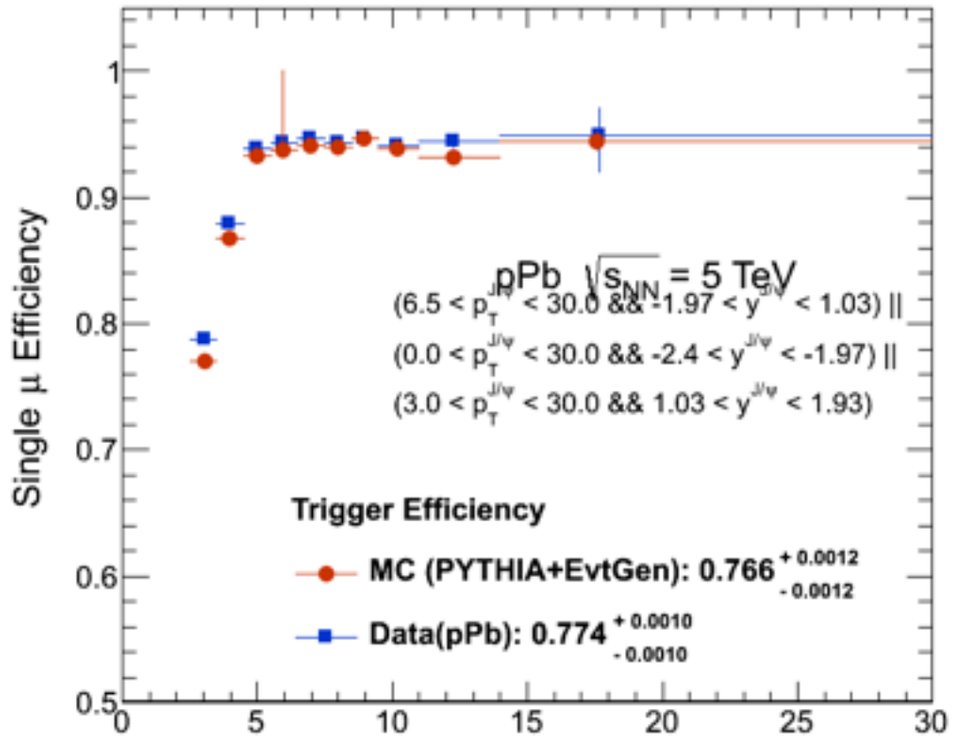




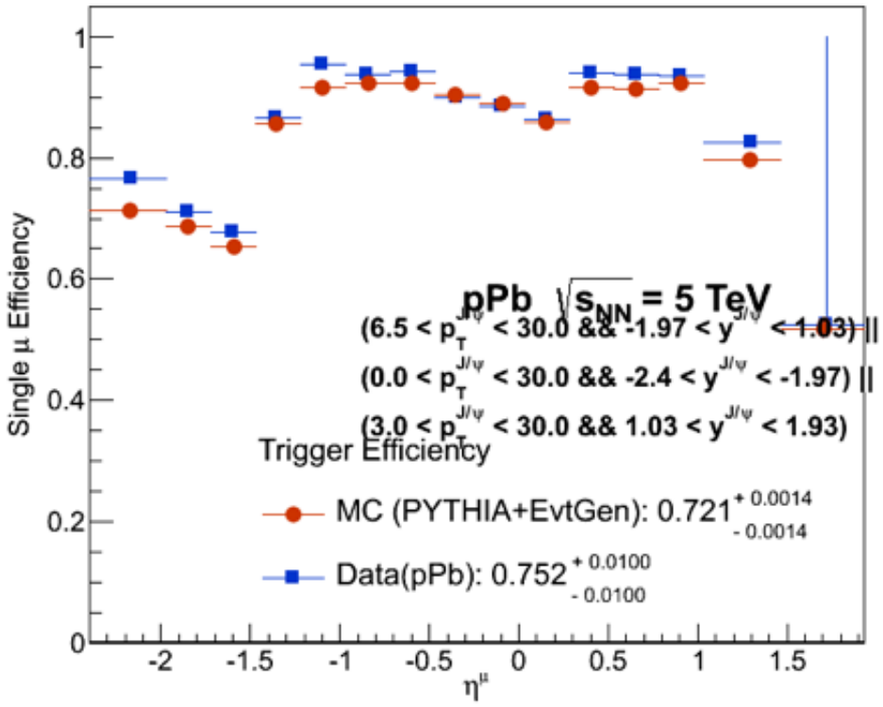
comparison with QM result(trigger)

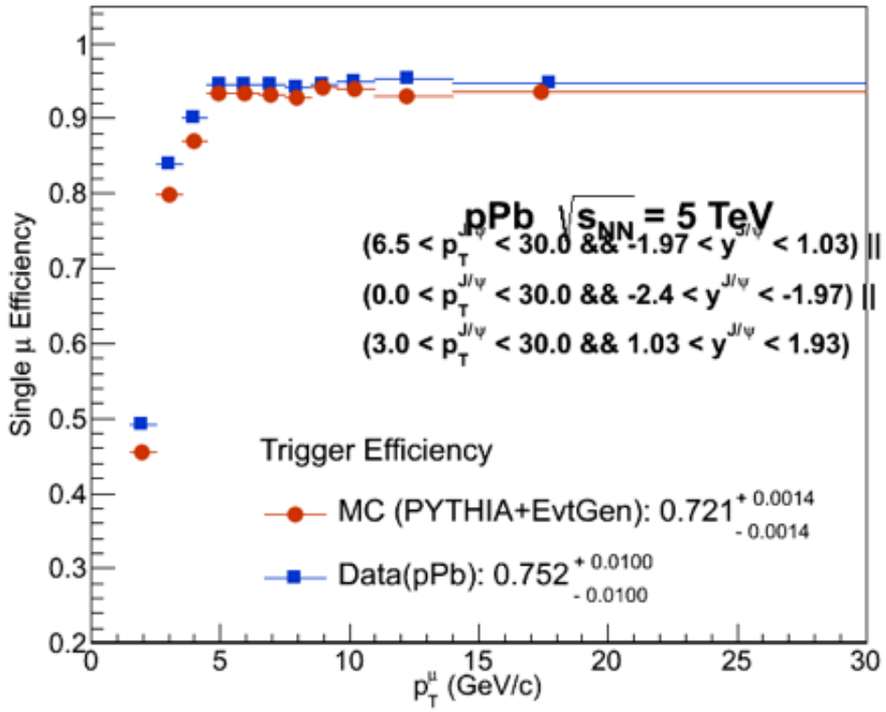
QM





now





next step

- suggestion from muon POG
- exclude isTrackerMuon cut from tracking efficiency and all probe of muon ID efficiency
- exclude isCaloMuon from muon ID efficiency
- debug slc6 code

B TnP condition

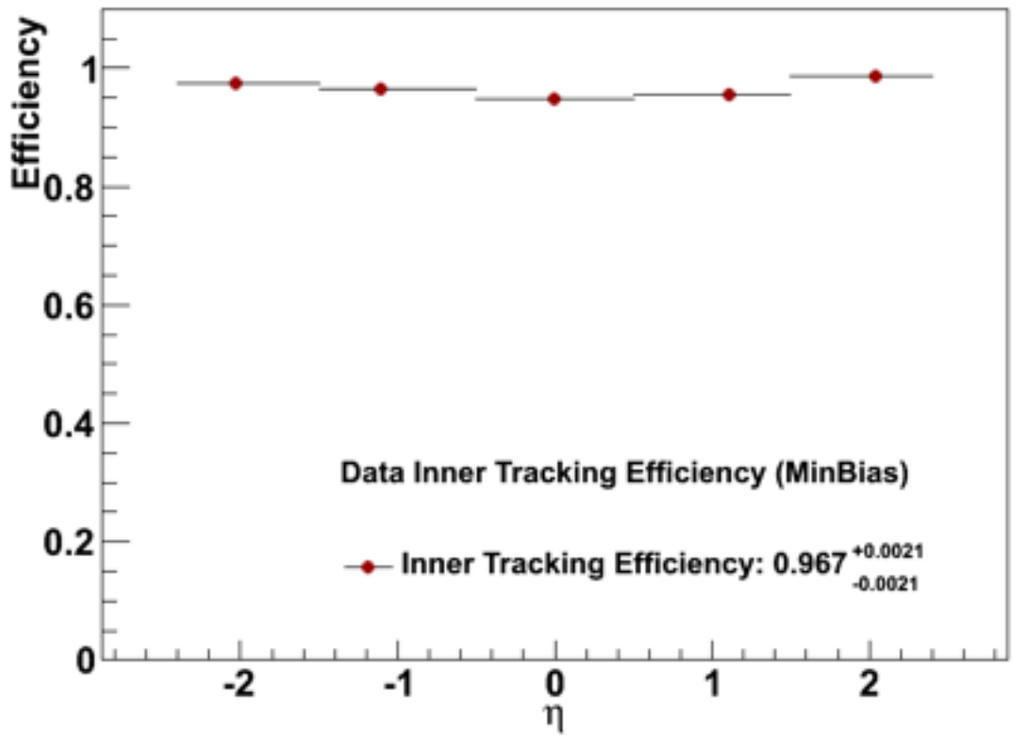
- acceptance
  - if $|\eta| \leqq 1.3$, pt > 3.3
  - if $1.3 < |\eta| \leqq 2.2$, p > 2.9
  - if $2.2 < |\eta| \leqq 2.4$, pt > 0.8

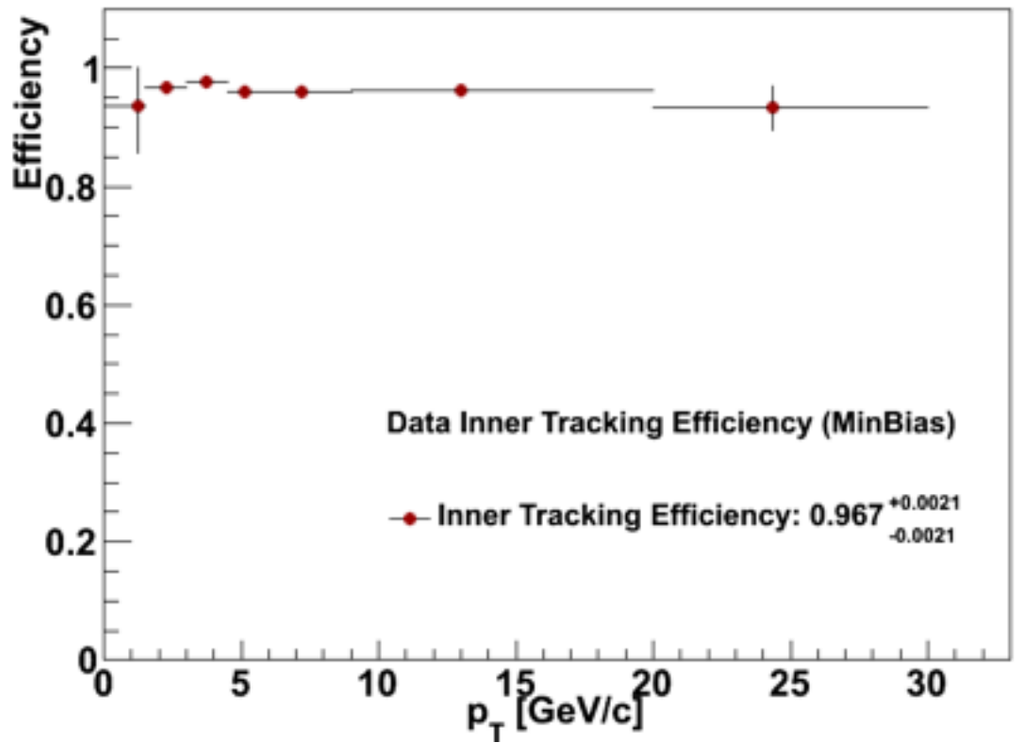
- muon chamber cut
  - isTrackerMuon
  - muonID('TrackerMuonArbitrated')
  - muonID('TMOneStationTight')

- track cut
  - track.hitPattern.trackerLayersWithMeasurement > 5
  - track.normalizedChi2 < 1.8
  - track.hitPattern.pixelLayersWithMeasurement > 0
  - abs(dB) < 3
  - abs(track.dz) < 30

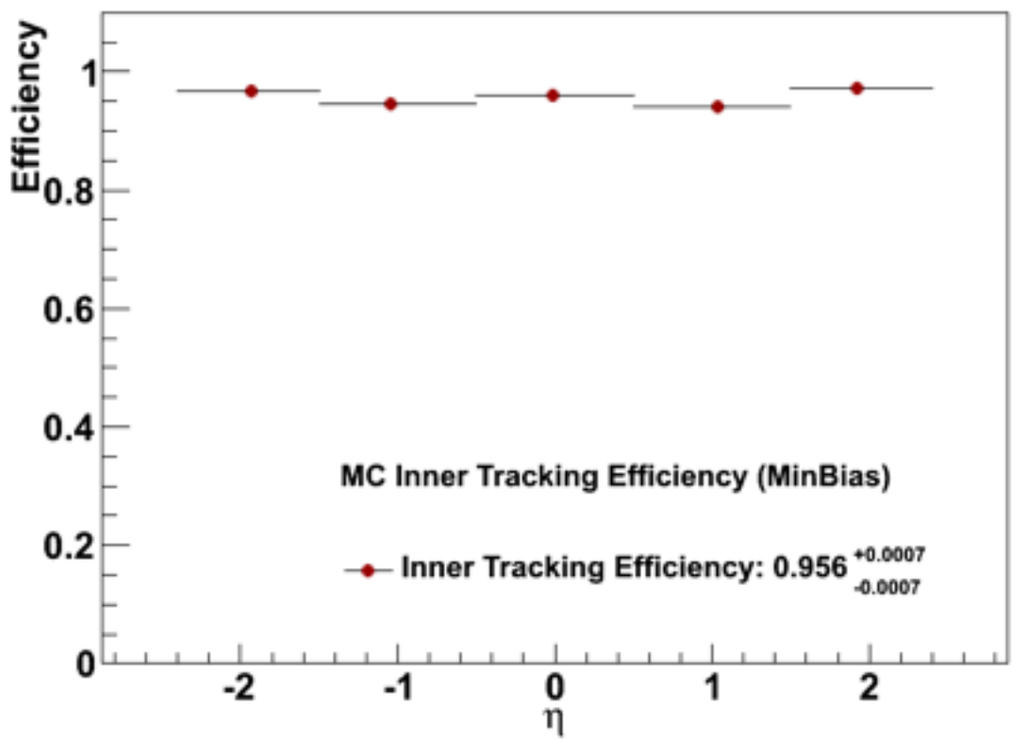
tracking efficiency

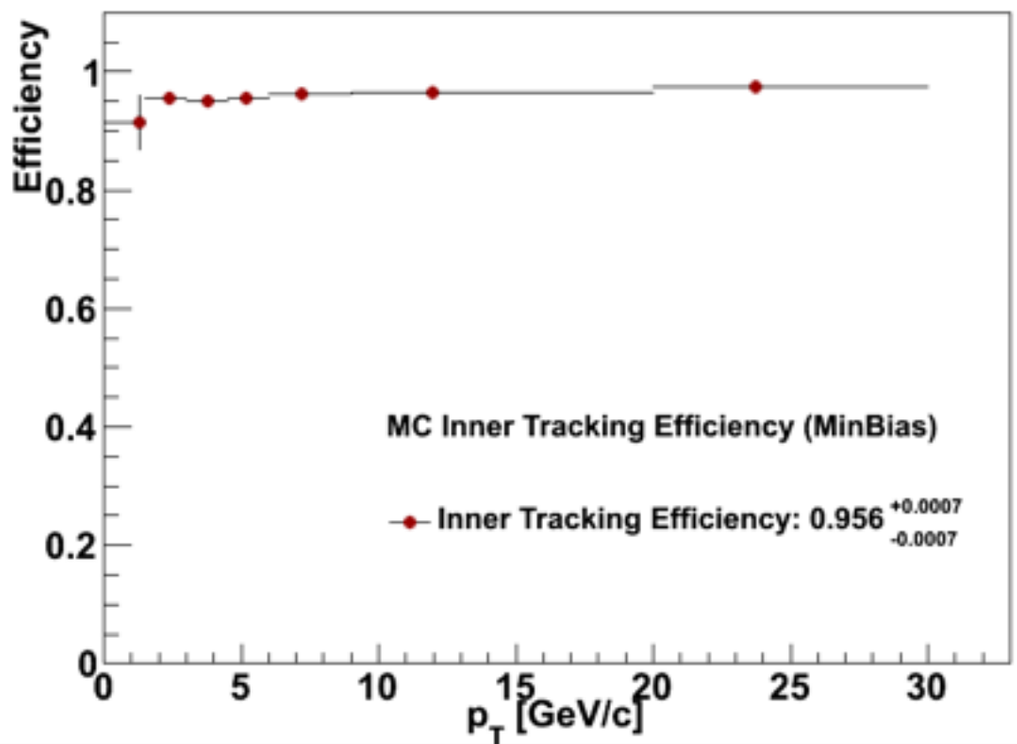
data





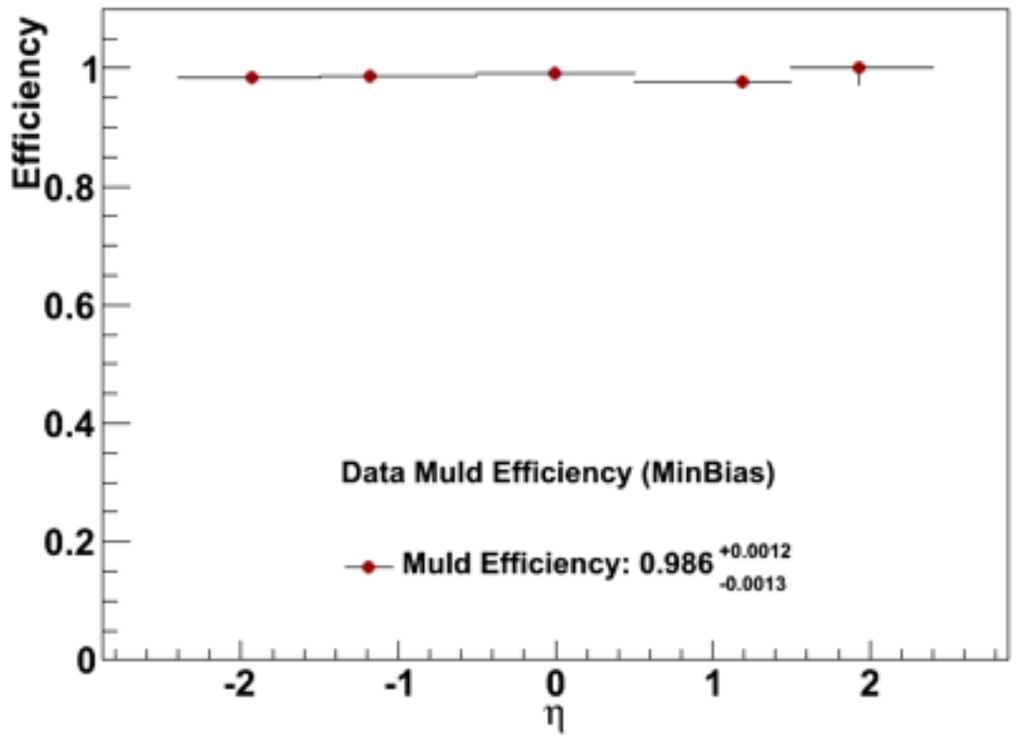
MC

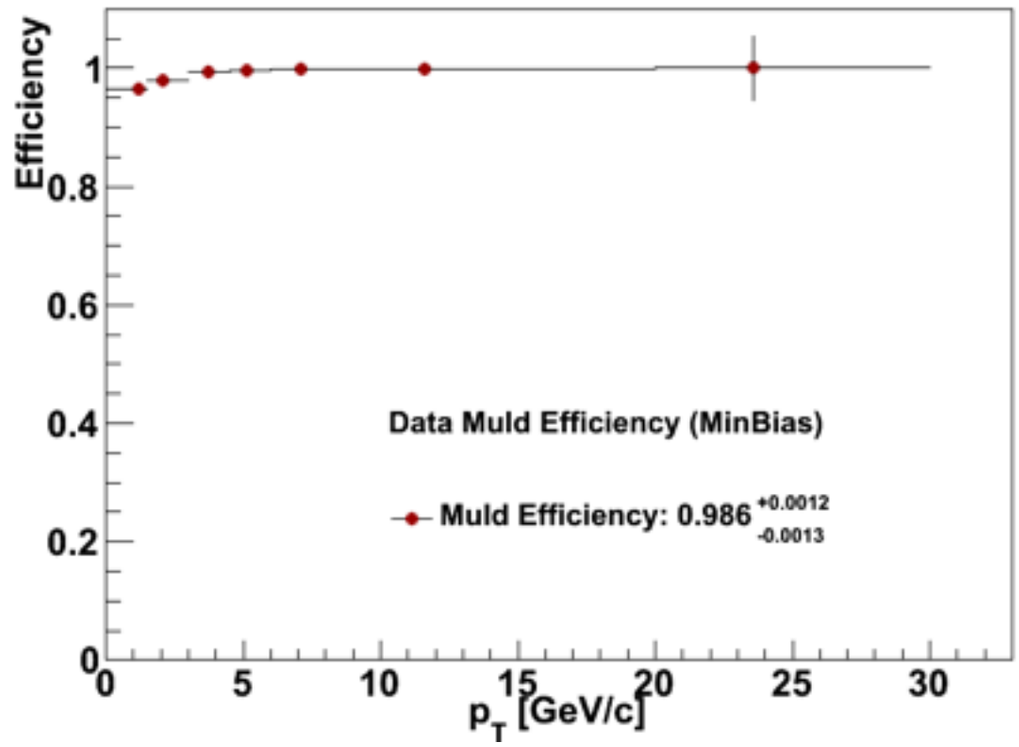




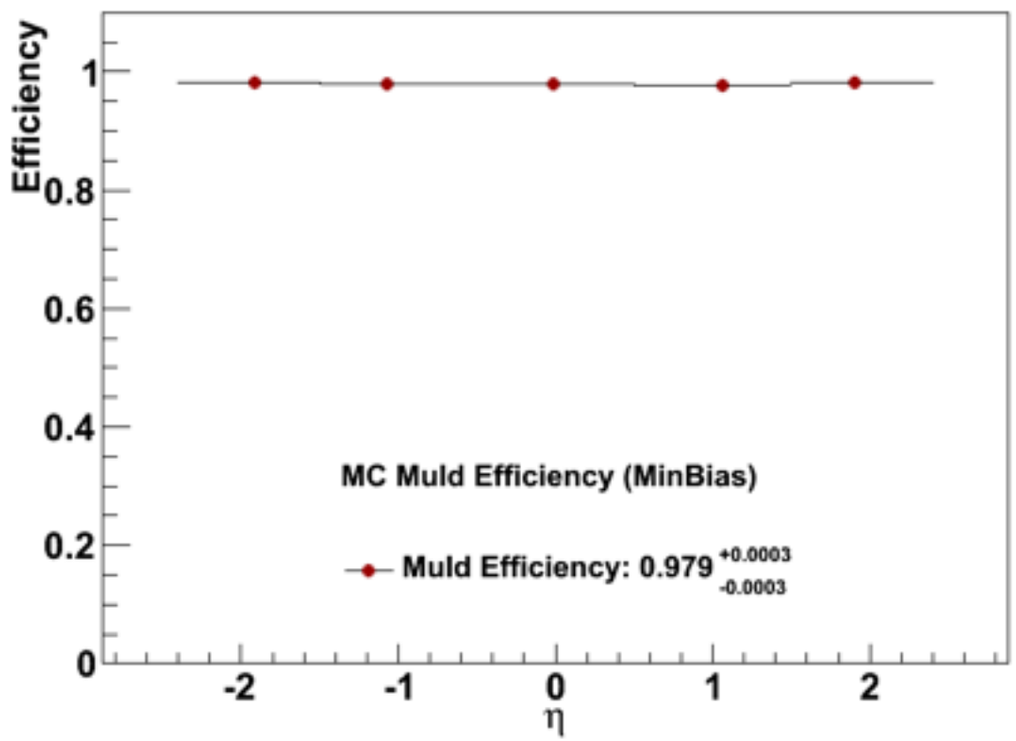
Muon ID efficiency

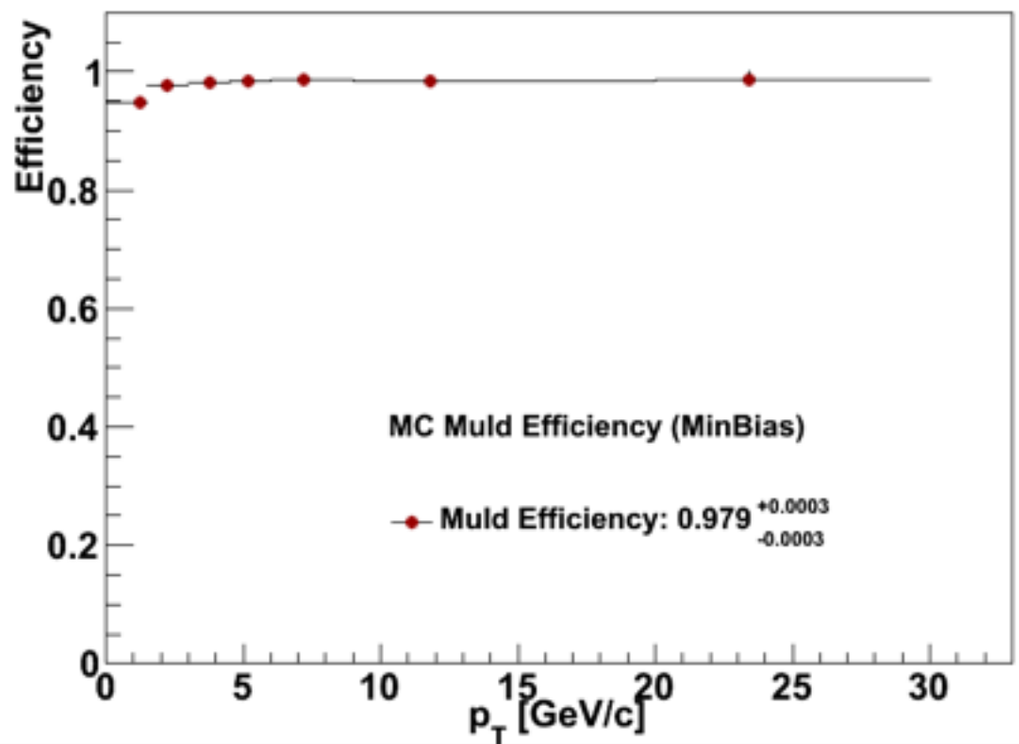
data





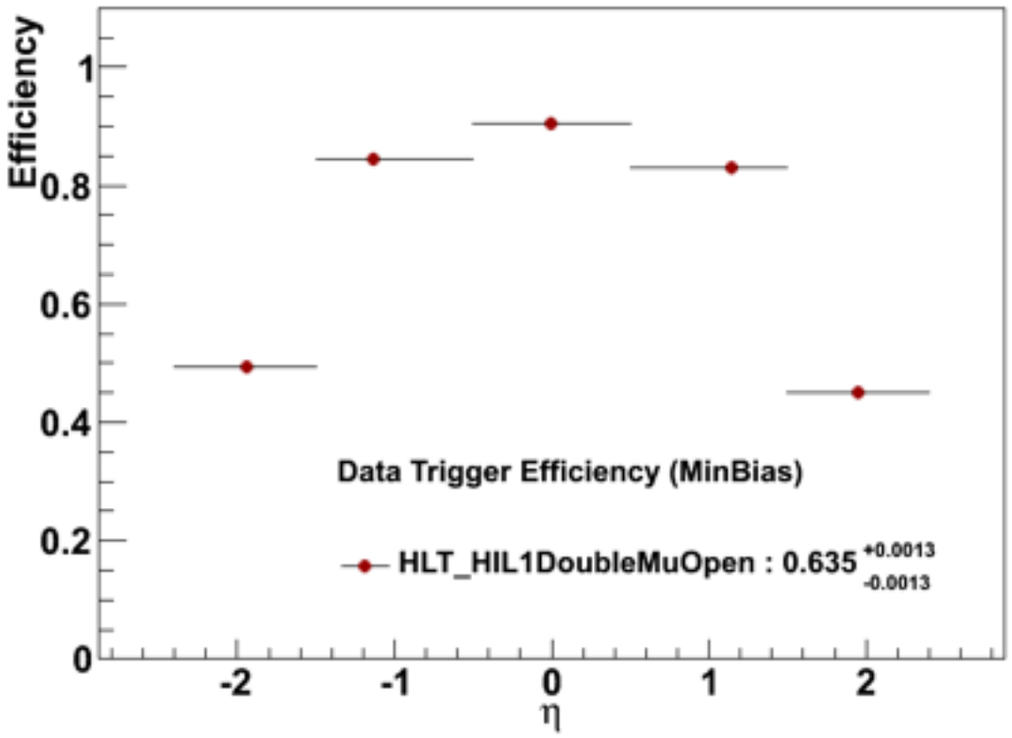
MC

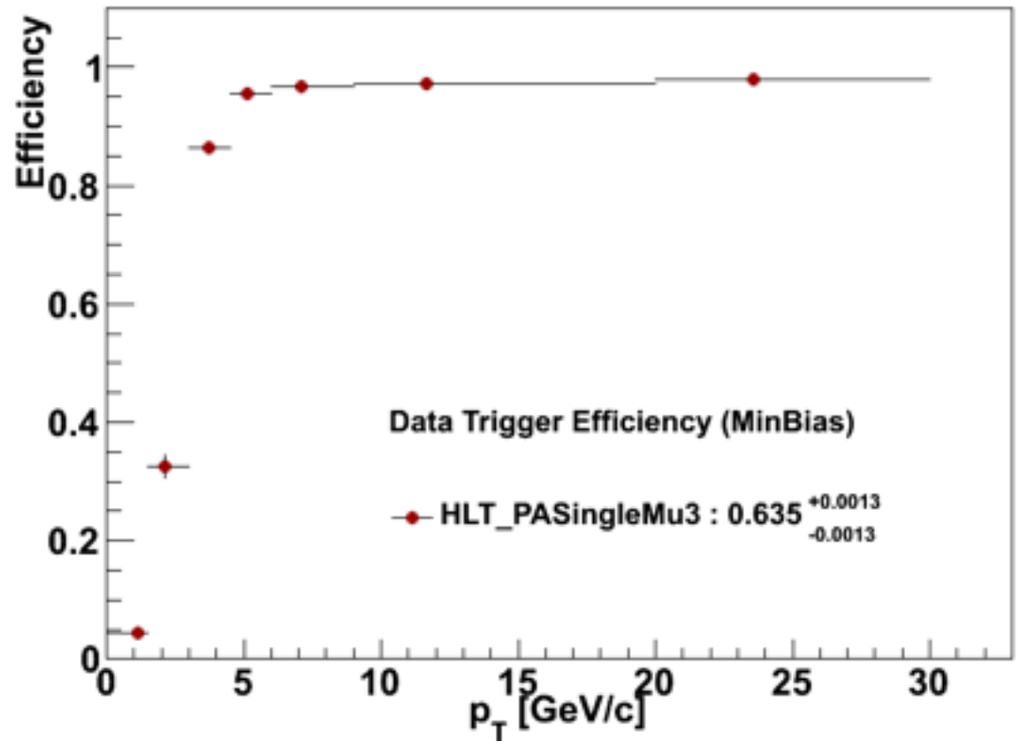




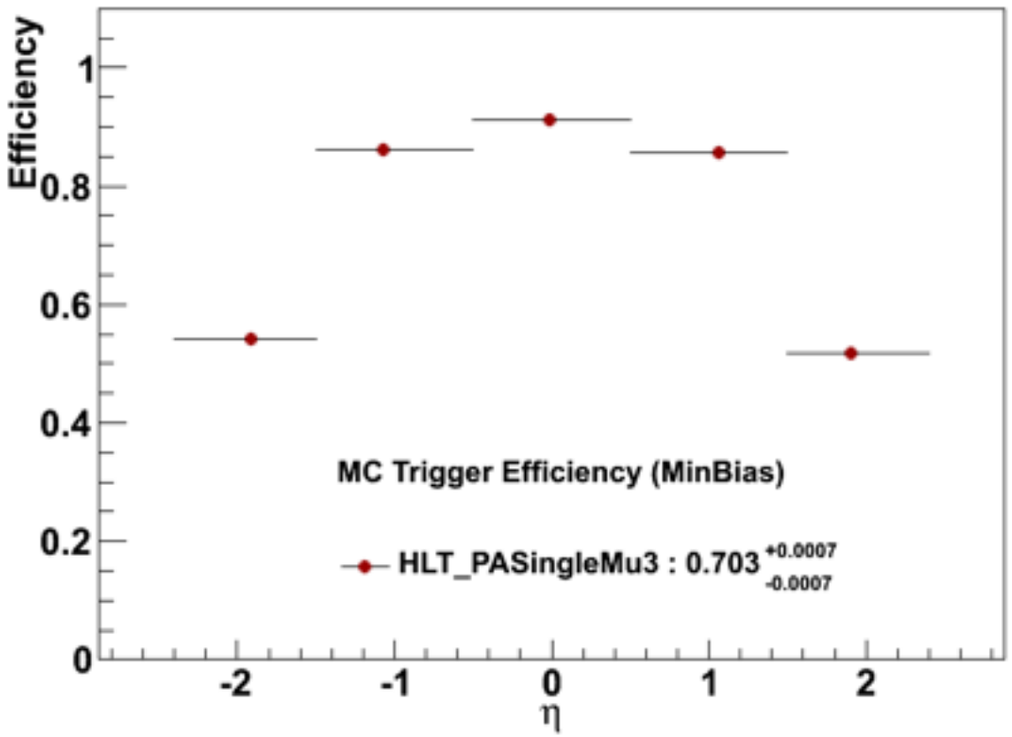
trigger efficiency

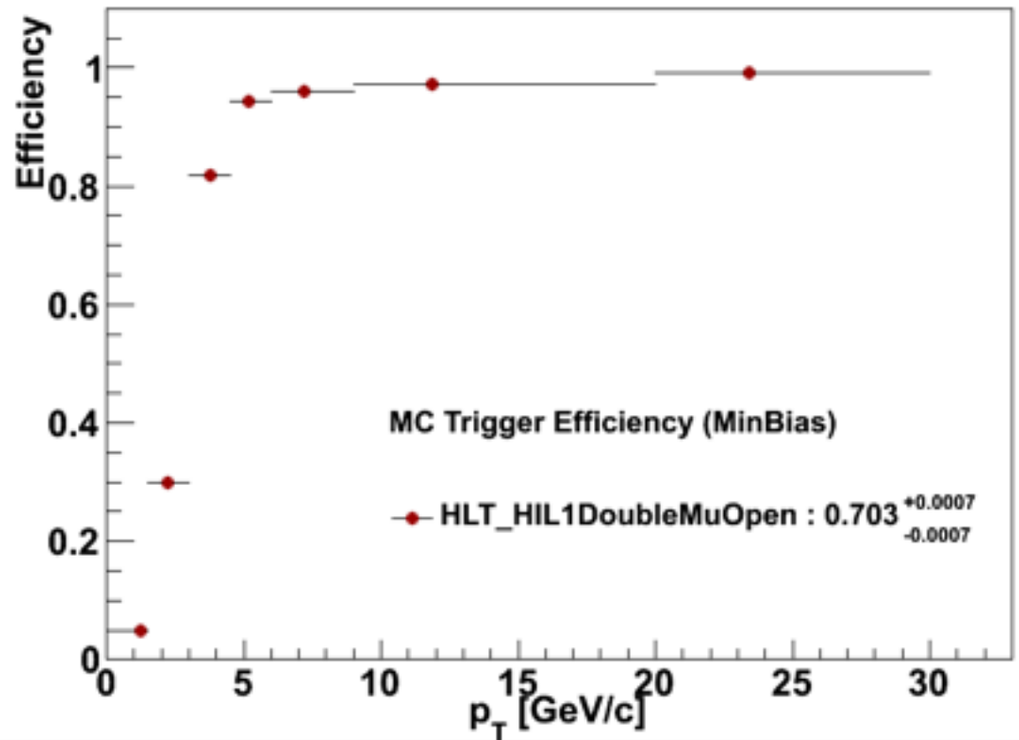
data





MC





next step

- keep cross check with Ta-Wei
- debug
- follow Muon POG suggestion

back up