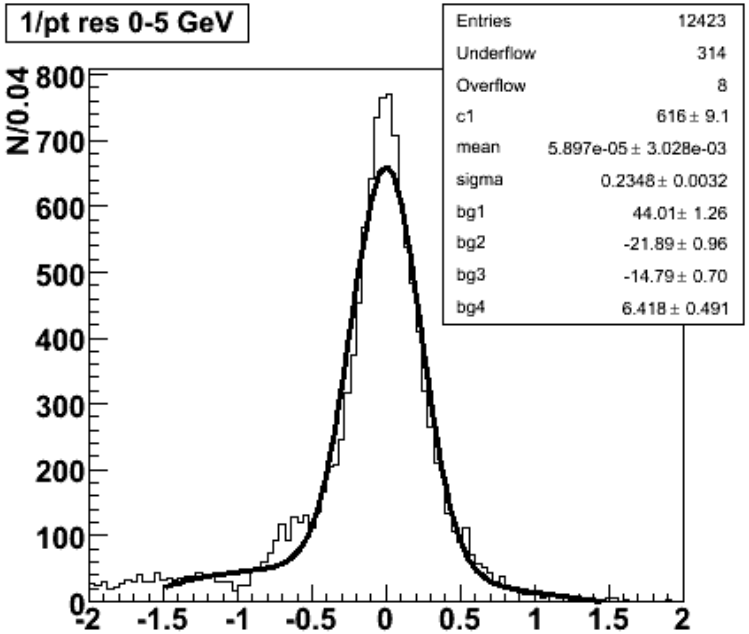
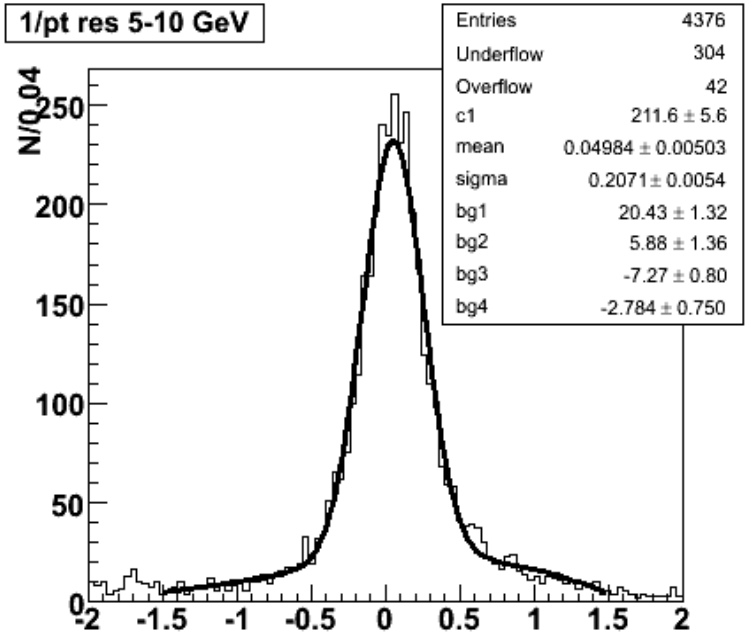
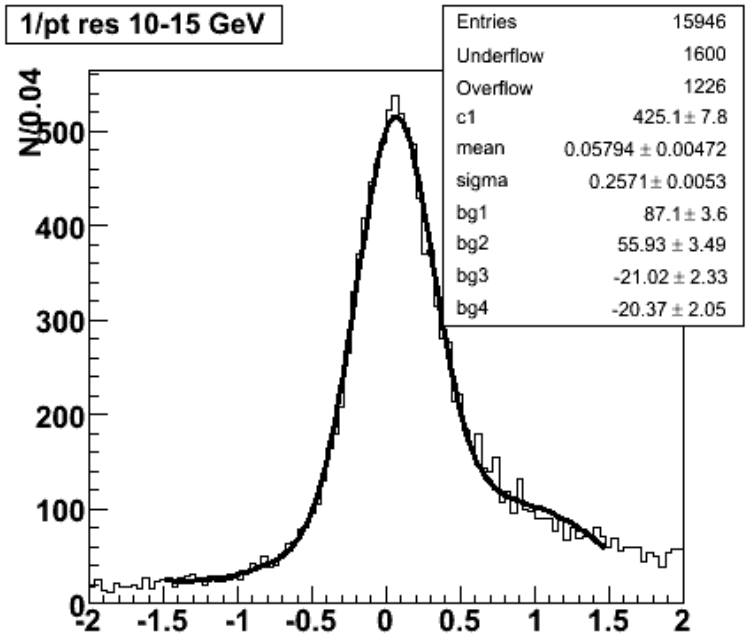
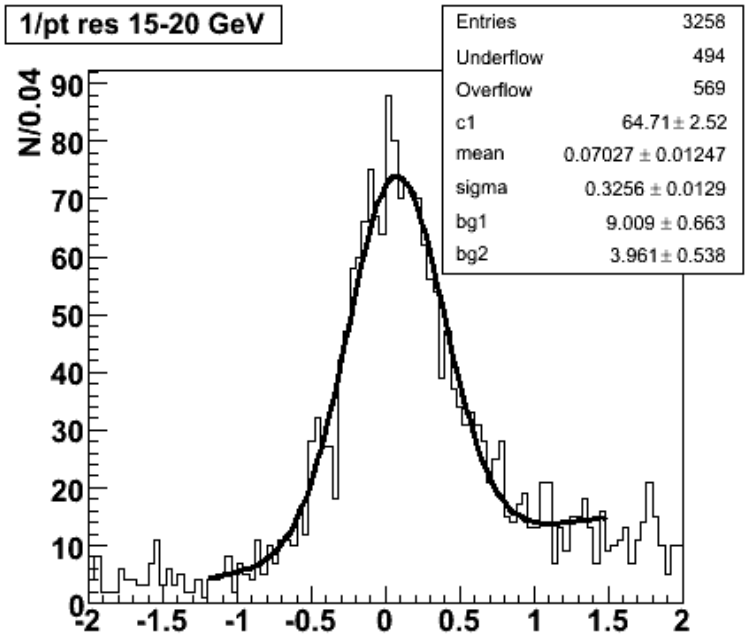
p19.L3.03 Muons: Local pT resolution (data)



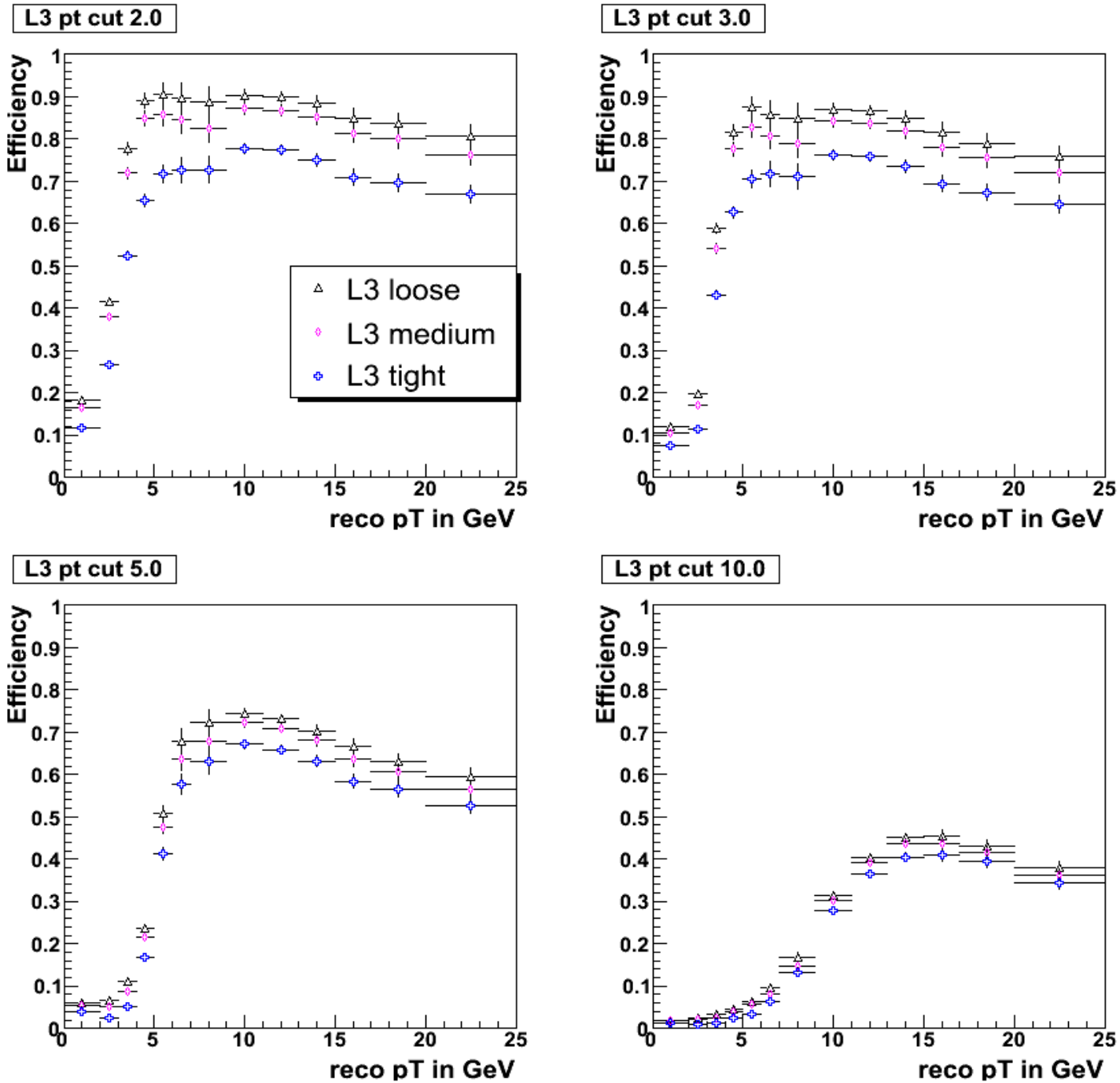


$$(q_{L3}/pT_{L3} - q_{reco}/pT_{reco})/q/pT_{reco}$$





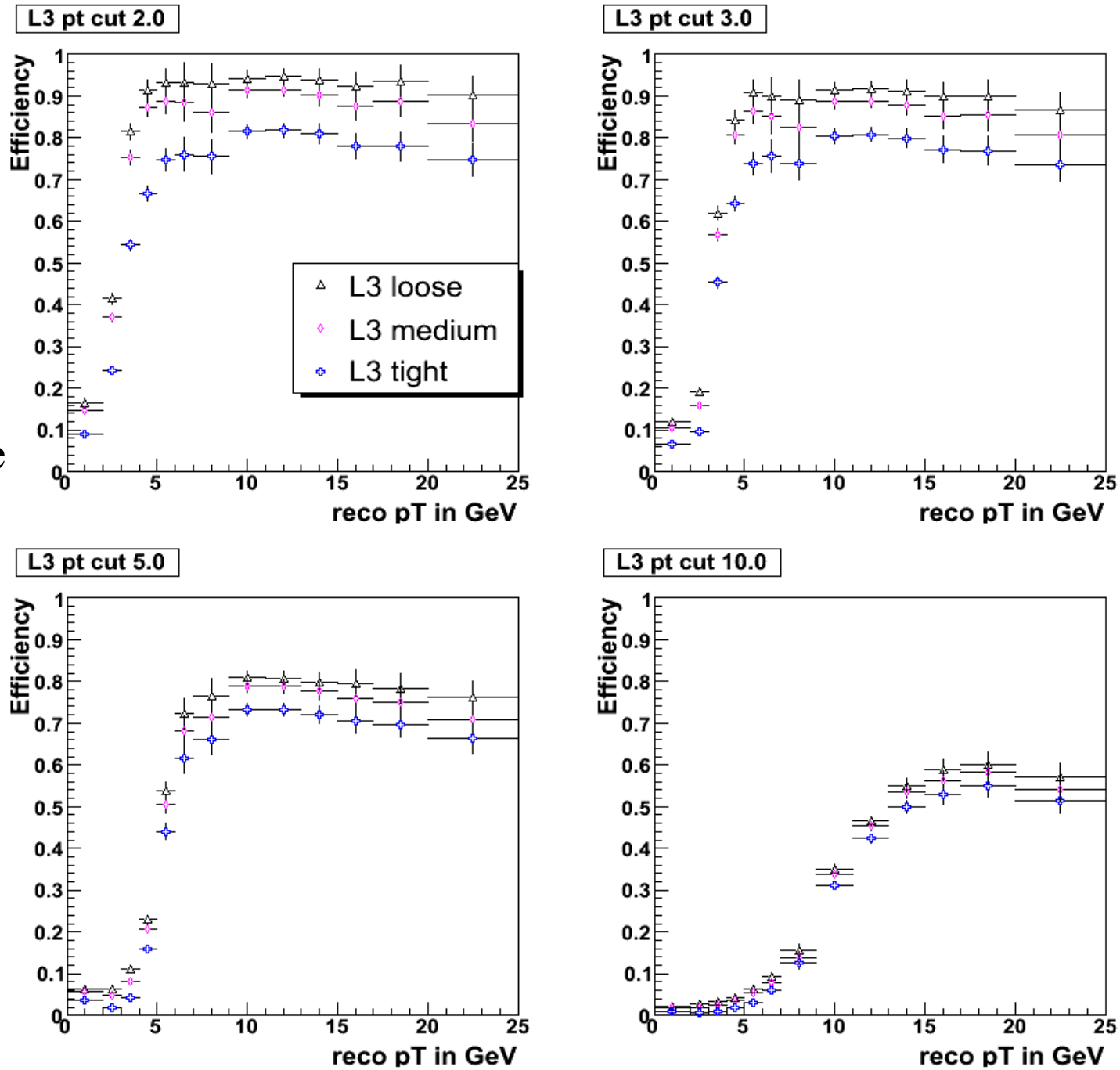
p19.L3.03 Local muons turn-on curves wrt to all track-matched medium reco muons (no trigger corrections applied)



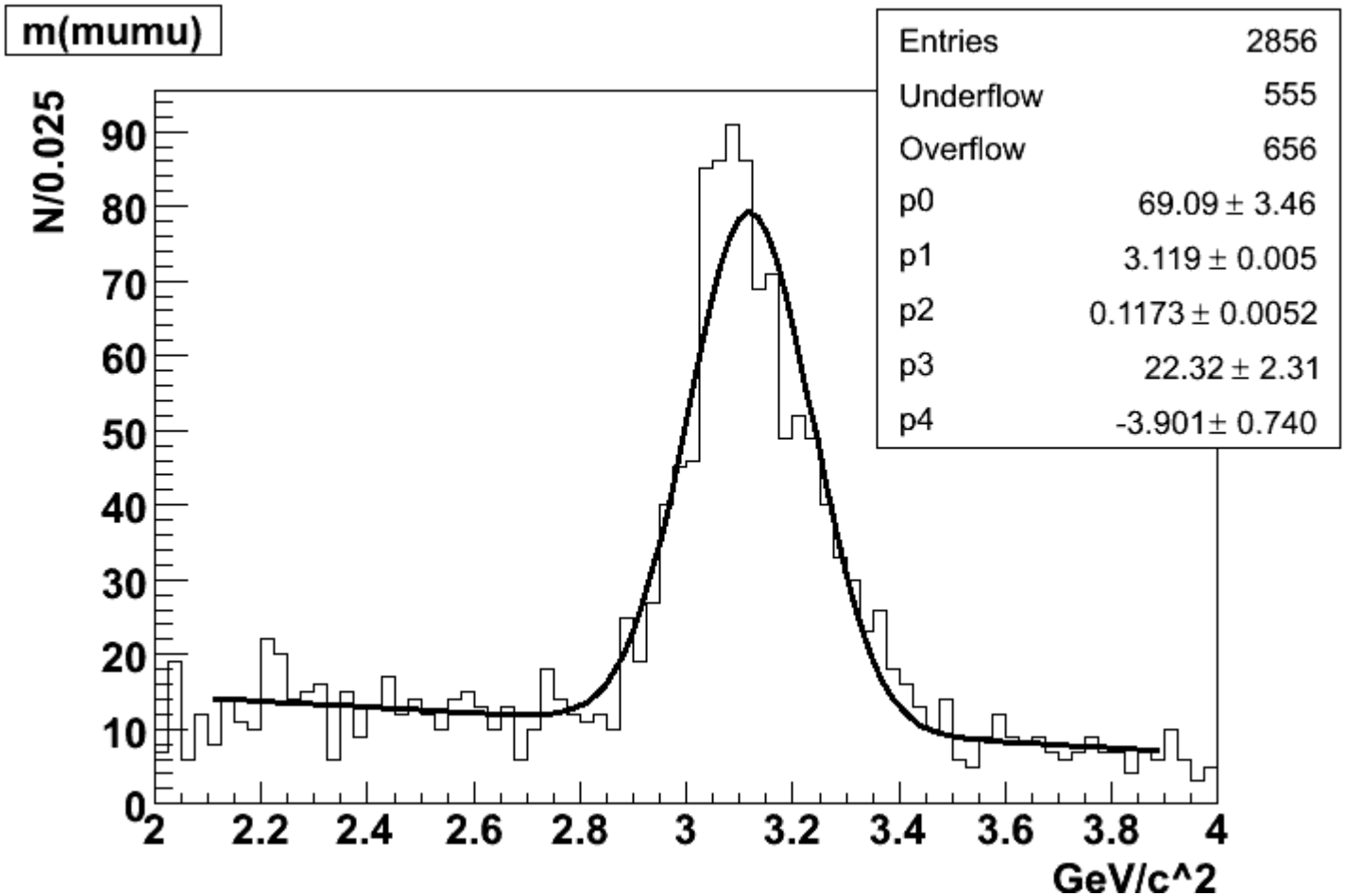
p19.L3.03 Local muons wrt to track matched medium reco muons with at least 10 axial hits.

Inspired by the default L3 cut for track matched muons.

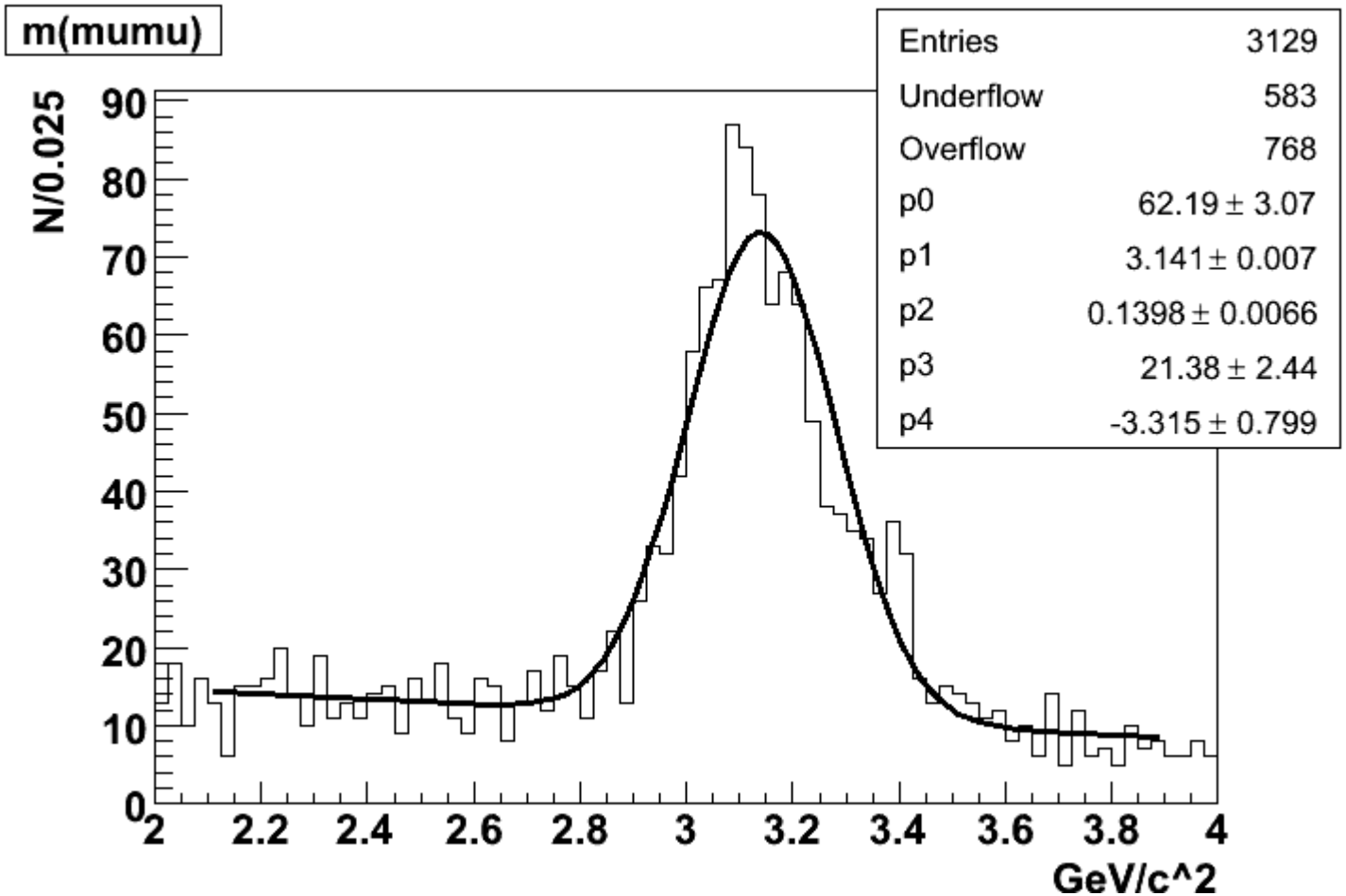
This looks somewhat prettier, but how often do offline analyses use a cut like this ?



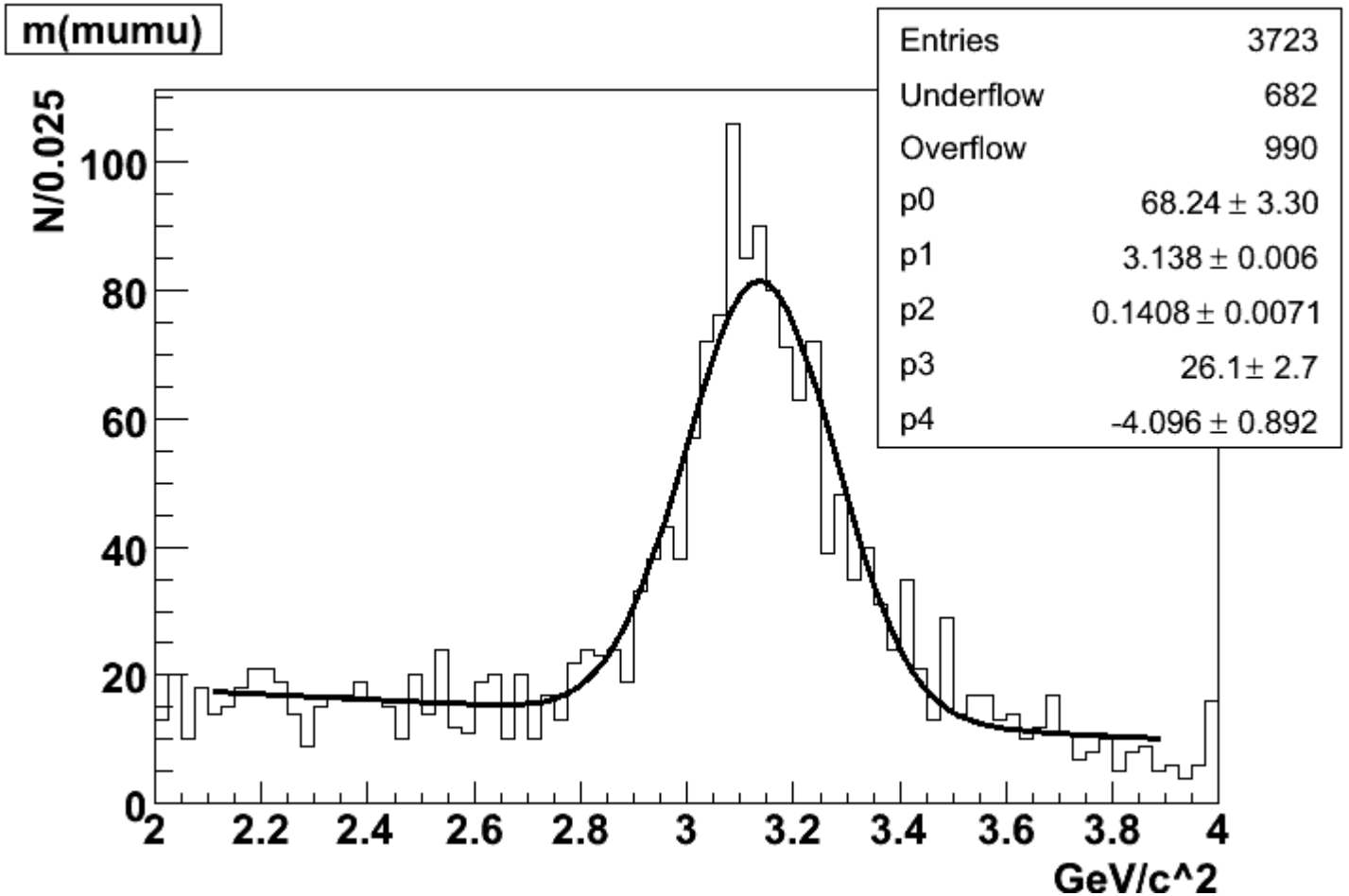
p19.L3.03 J/Psi signal from central matched matched muons



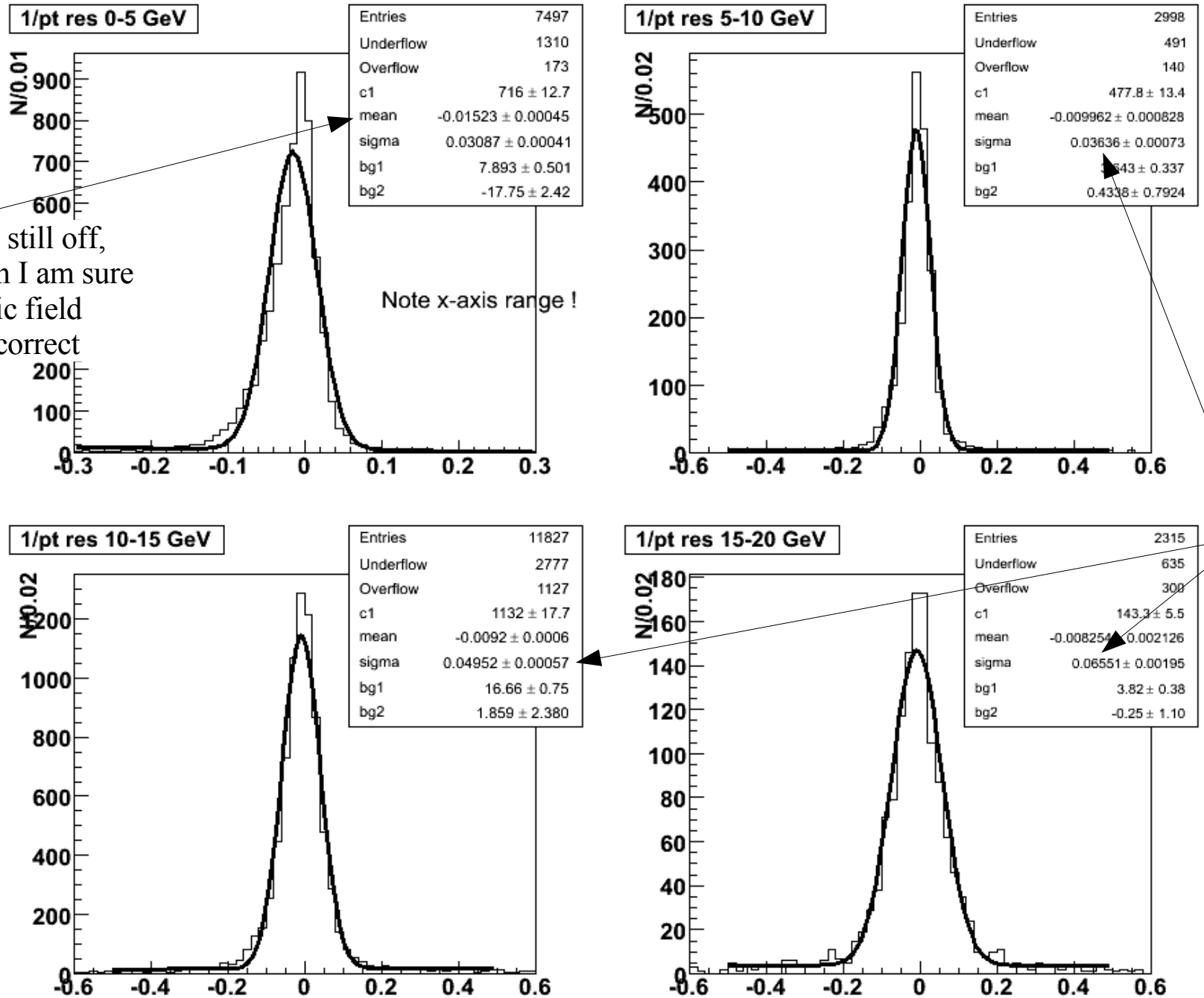
same plot for p19.L3.02 (no L0)



p19.L3.02 with L0



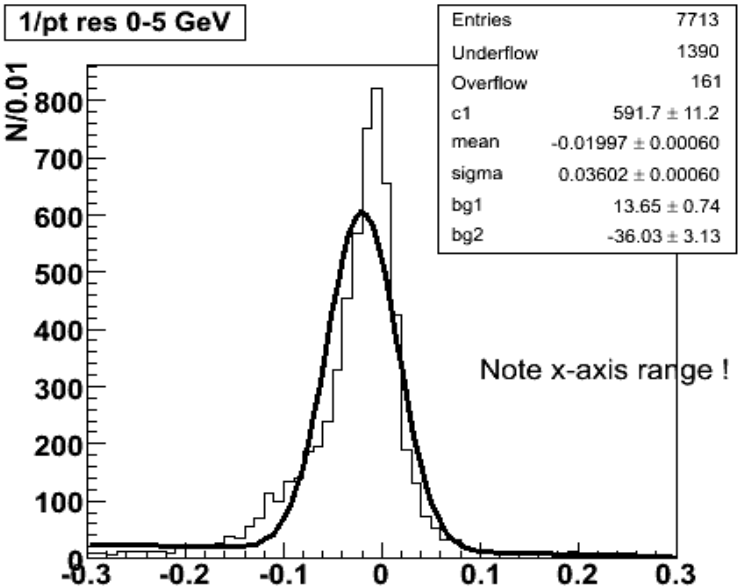
p19.L3.03 pT resolution for central matched muons (10 axial hits at L3)

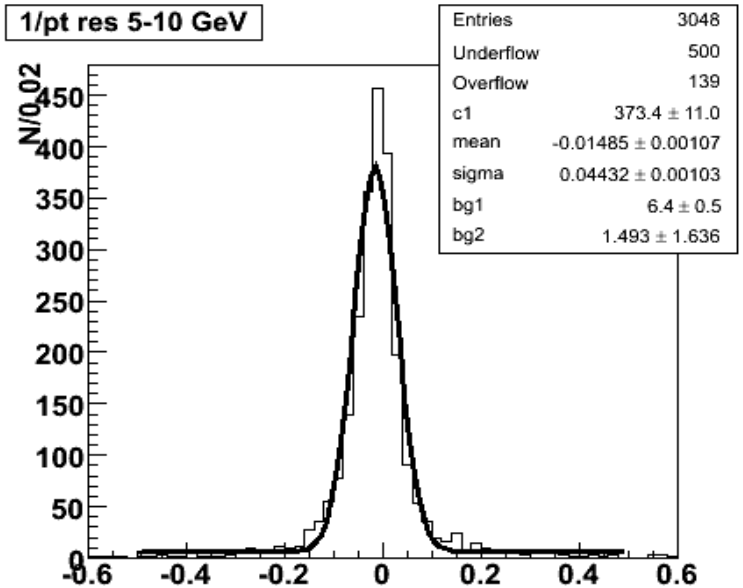


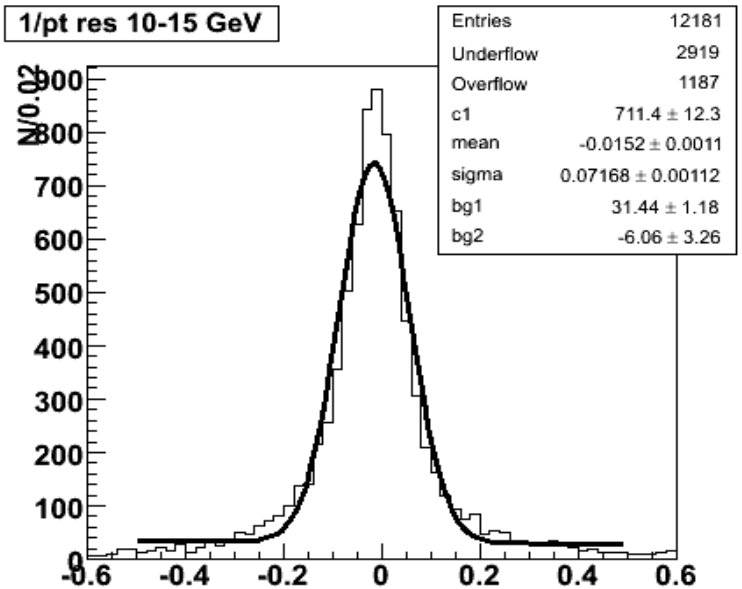
the mean is still off, even though I am sure the magnetic field strength is correct

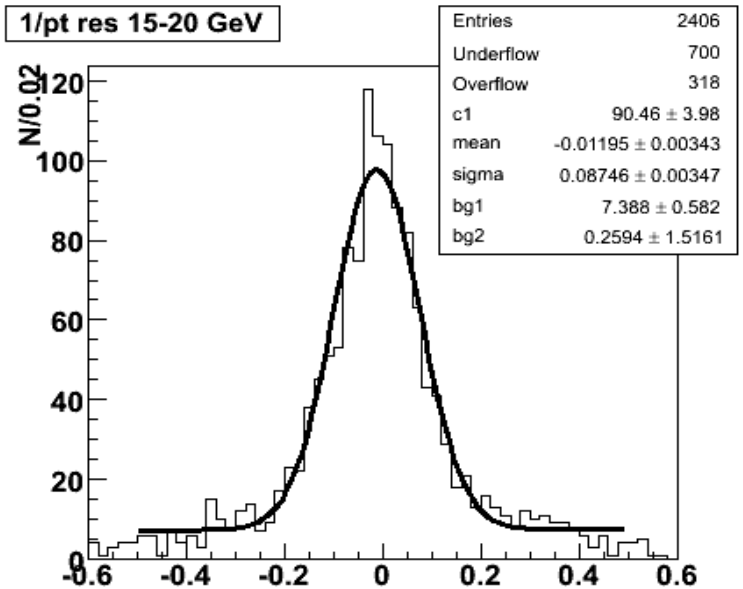
the pT resolution seems to have improved somewhat wrt to p19.L3.02 (see next page)

same plot for p19.L3.02 (no L0)

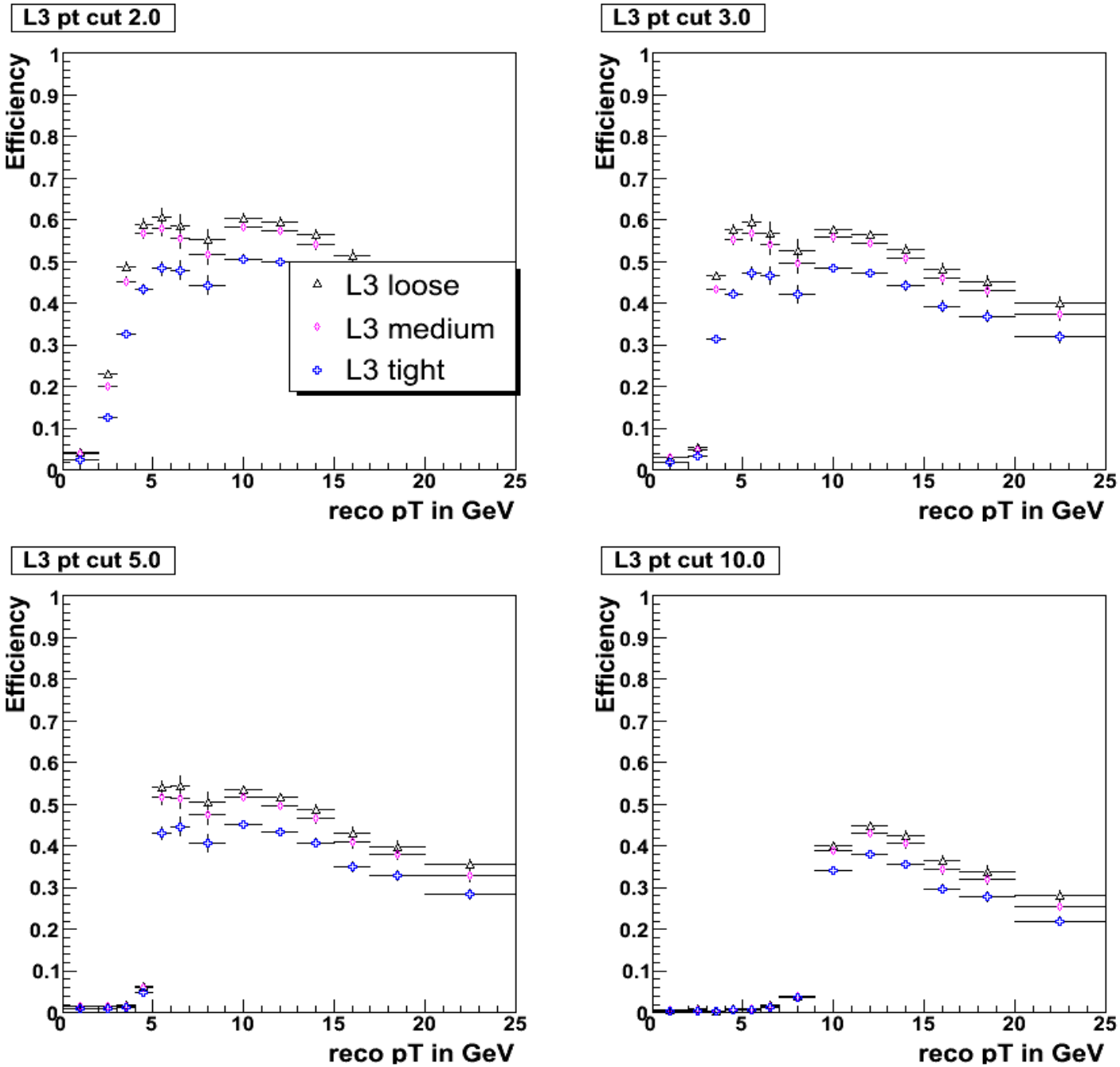




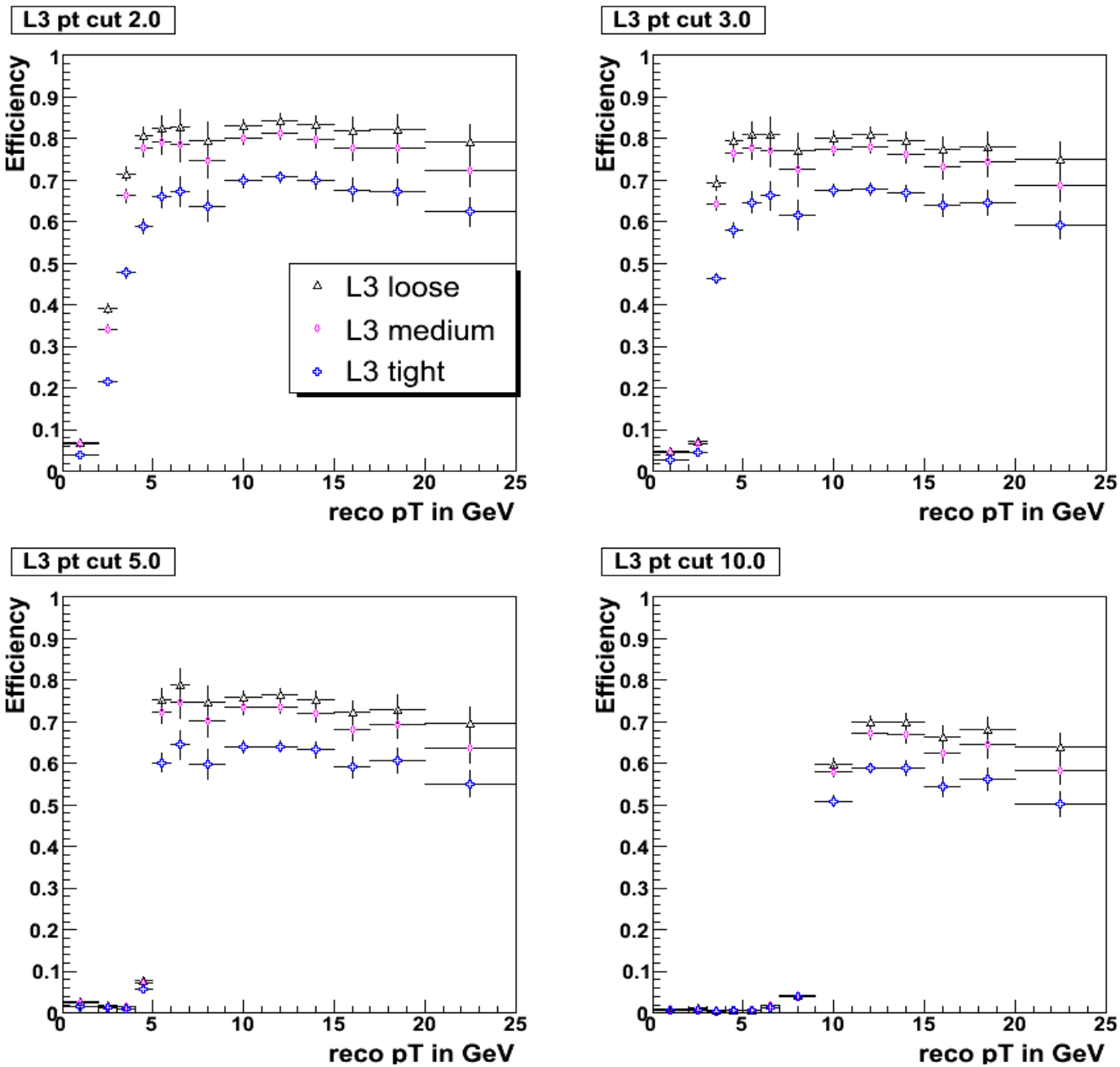




p19.L3.03 central matched muons turn on curves wrt to medium track matched reco muons

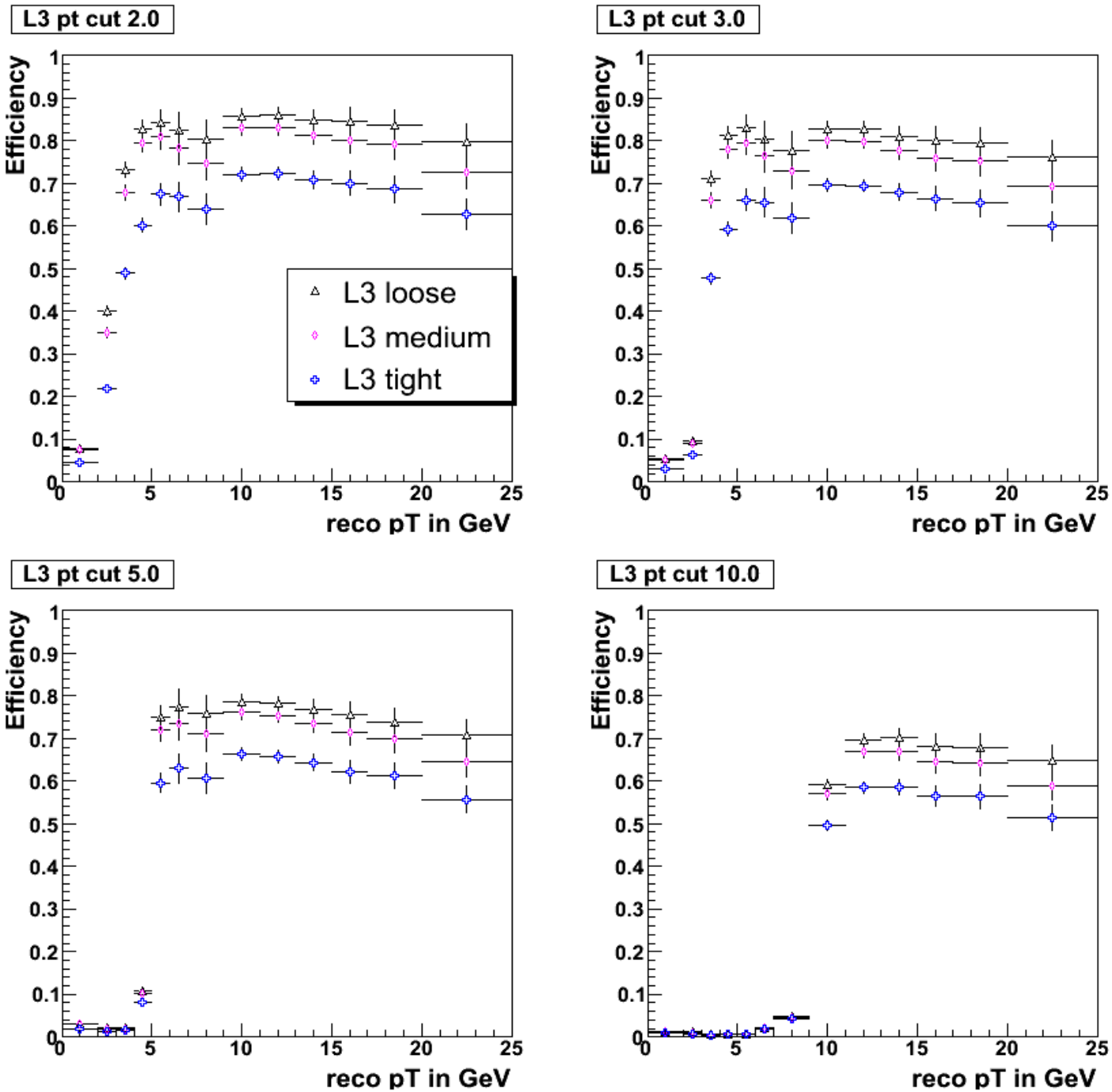


p19.L3.03 turn on curves wrt to medium track matched reco muons with 10 axial hits



Quite a difference, no ?

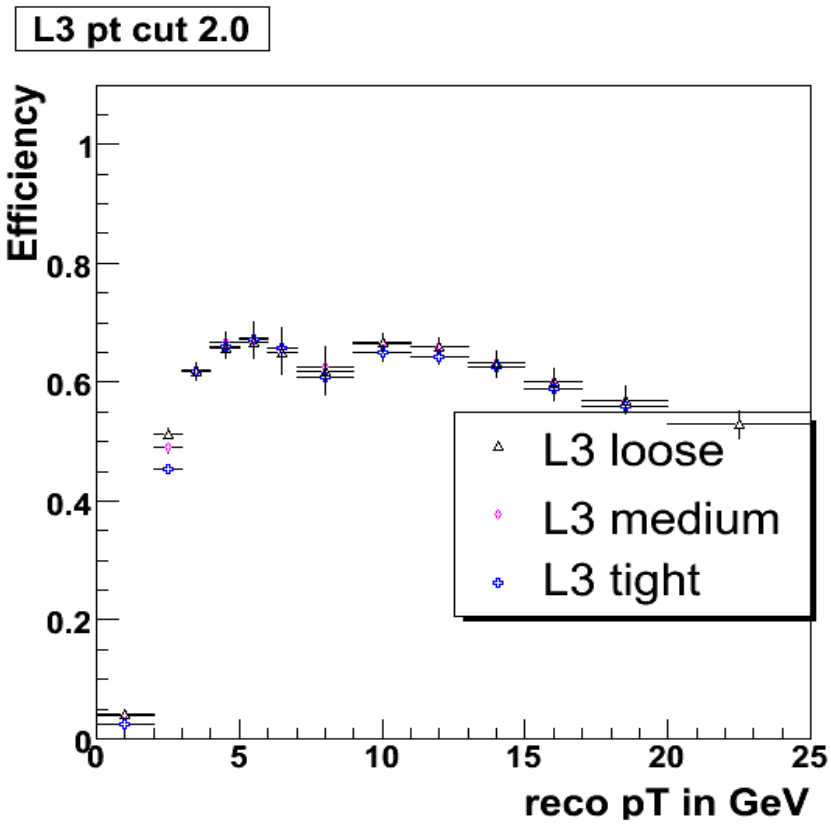
same plot for p19.L3.02

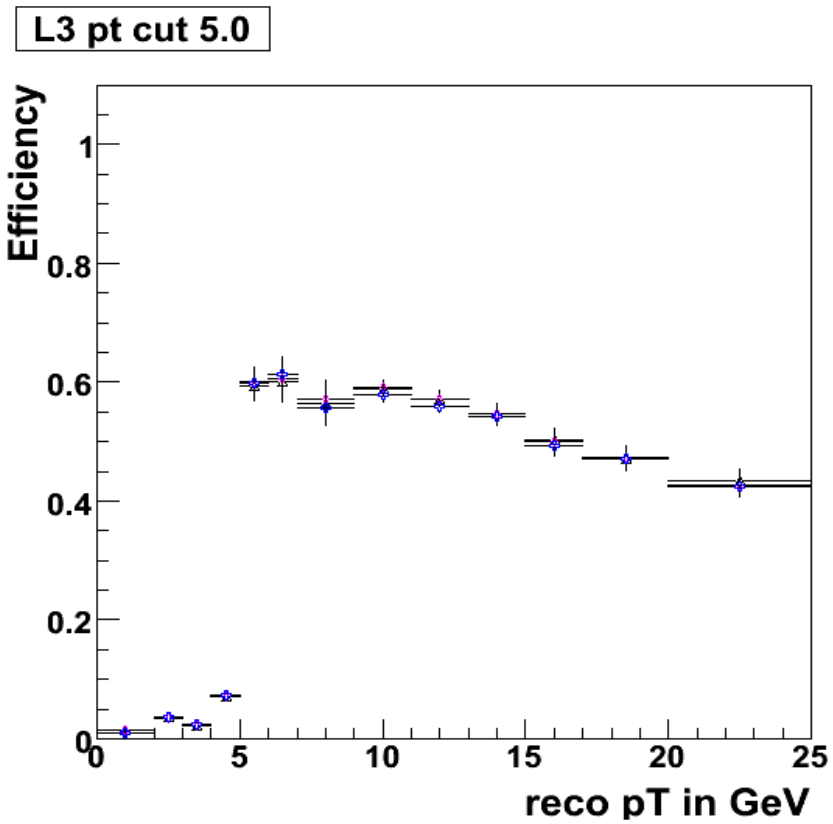


eerily similar...
but not the same.

p19.L3.03 tracking only

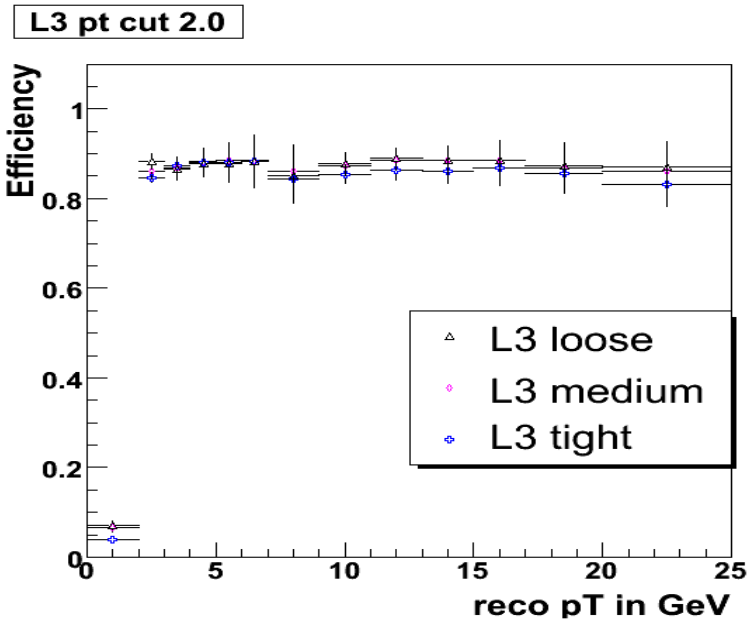
To facilitate comparison for old and new version of Ray's tracker: Turn-on curve for central matched muons divided by turn-on curve for local muons → to first order a measure of the tracking efficiency.

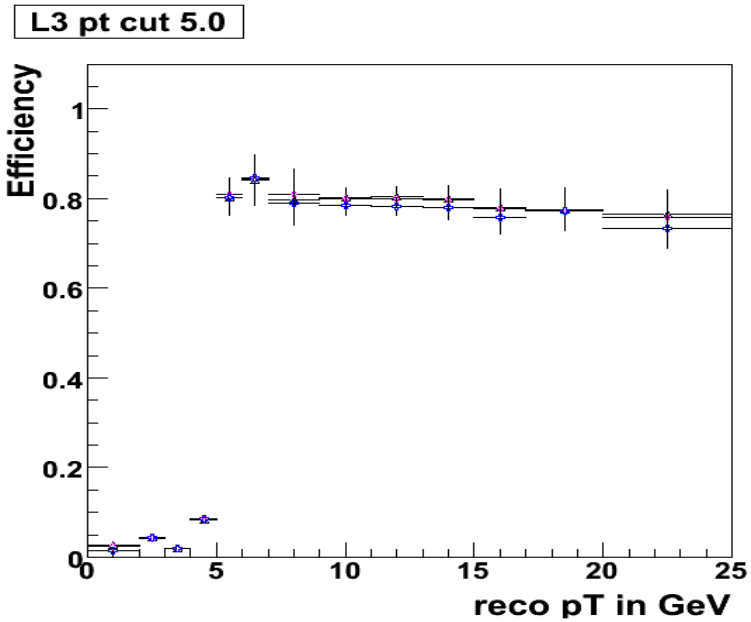




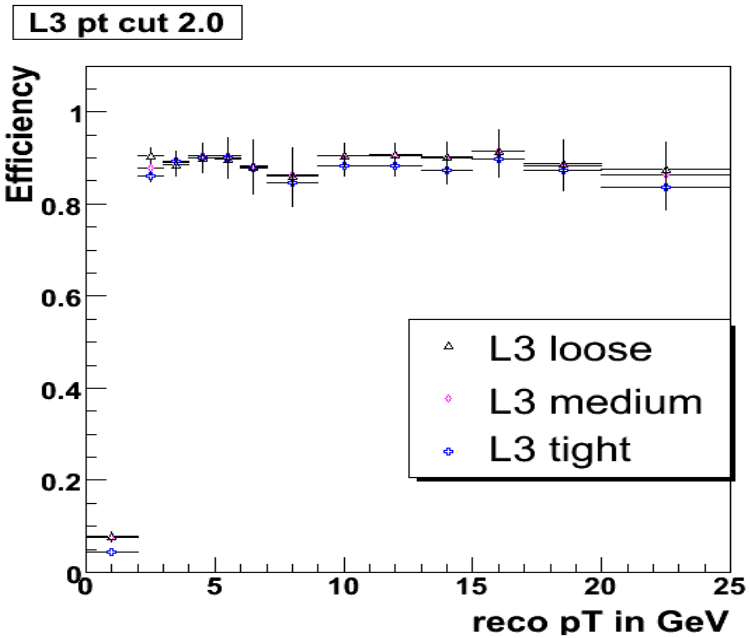
wrt to all medium track matched reco muons, first bin (pT < 2.0) ignored

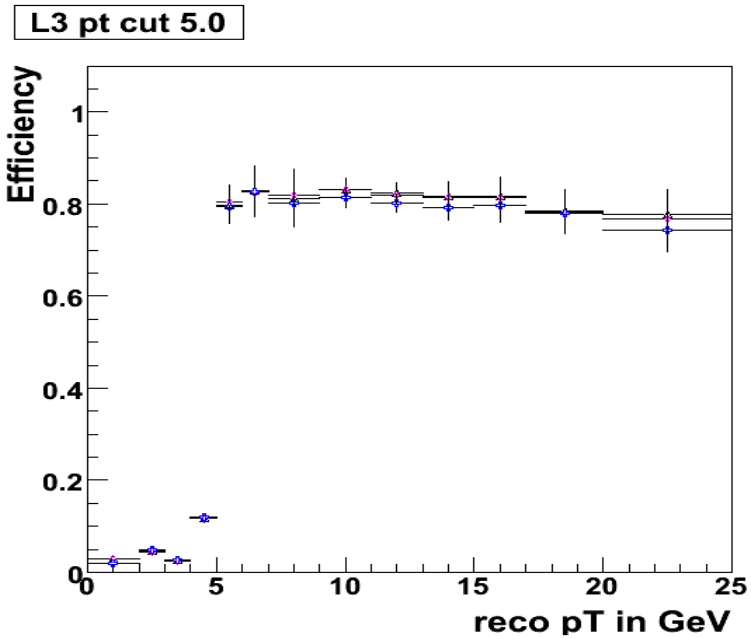
p19.L3.03 tracking turn on curve for medium reco muons with 10 axial hits





same for p19.L3.02





Conclusions

For muons with pT > 2.0 GeV (i.e. almost all of them), Ray's improved tracking improves the pT resolution without any loss in efficiency (for reco tracks with 10 axial hits). I.e. as soon as the IP tagger works, this should go online.

Given the huge difference in efficiency I see depending on whether I require 10 axial hits on the reco tracks, it might be worth studying (not by me!) if any of the L3 muon *track* qualities is better suited for the b-triggers than the default one (10 axial hits) we are using at the moment (use 'looseSMT' instead ?).

I made plots for p19.L3.02 including L0, but they have become obsolete, so except for a token plot, I left them out . Trying to run with L0 in a private release are is tedious and error-prone, we need to push p19.L3.04 as a Layer 0 release if we ever want to get the L0 code online.