B to D0 simulation for sPhenix

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OverView

- Technology
  — smear Mc k/pi position (Dca) and momentum
  — consider tpc tracking, hft matching, (tof matching),…

- Signal
  — D0 cross section is fixed from Run14 HFT
  — B to D0 ratio is fixed from Fonll

100M, 0-10% centrality

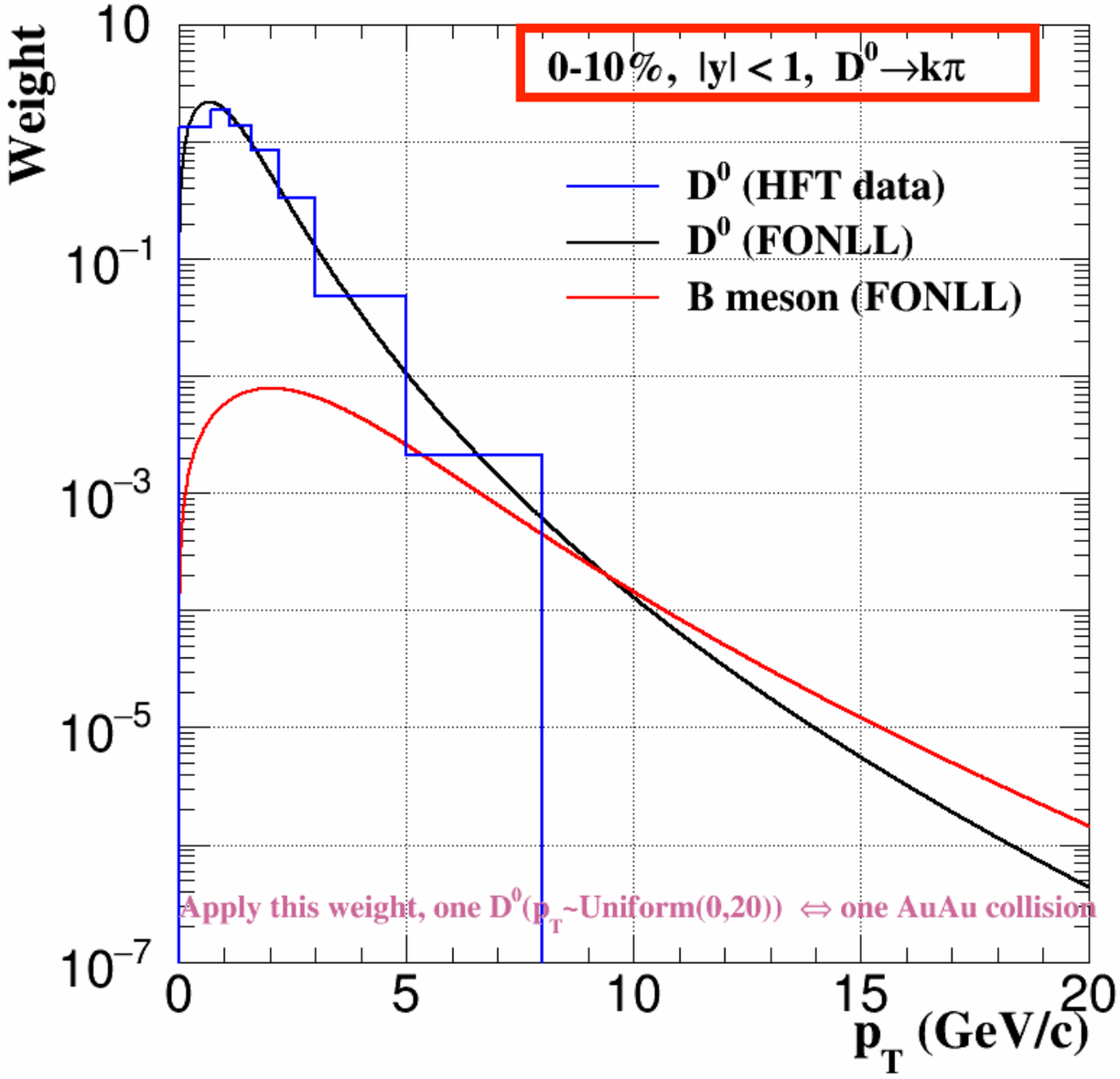
- Background
  — from Hijing
  — primary k/pi now, other particle can be included
  — now no correlated background
  — need scale 0.5 (++,- -, +-, -+)

- Reconstruction (S and B)
  — Clean pid: <1.6GeV use tof, >1.6GeV no pid
  — no pid

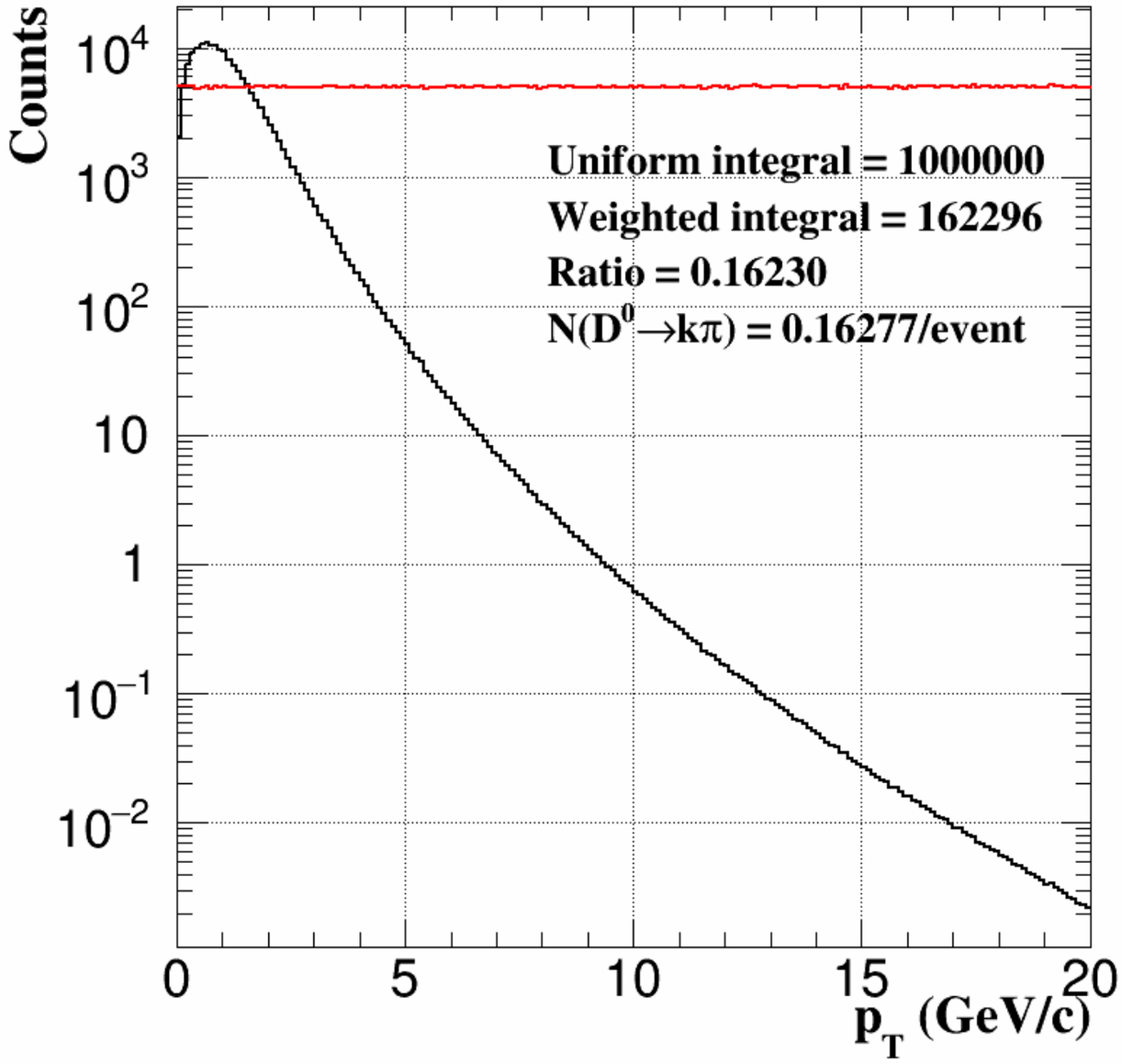
- Aim
  — efficiency estimation
  — prompt and non-prompt D0 significance
  — the error of B to D0 ratio

Signal pT weight

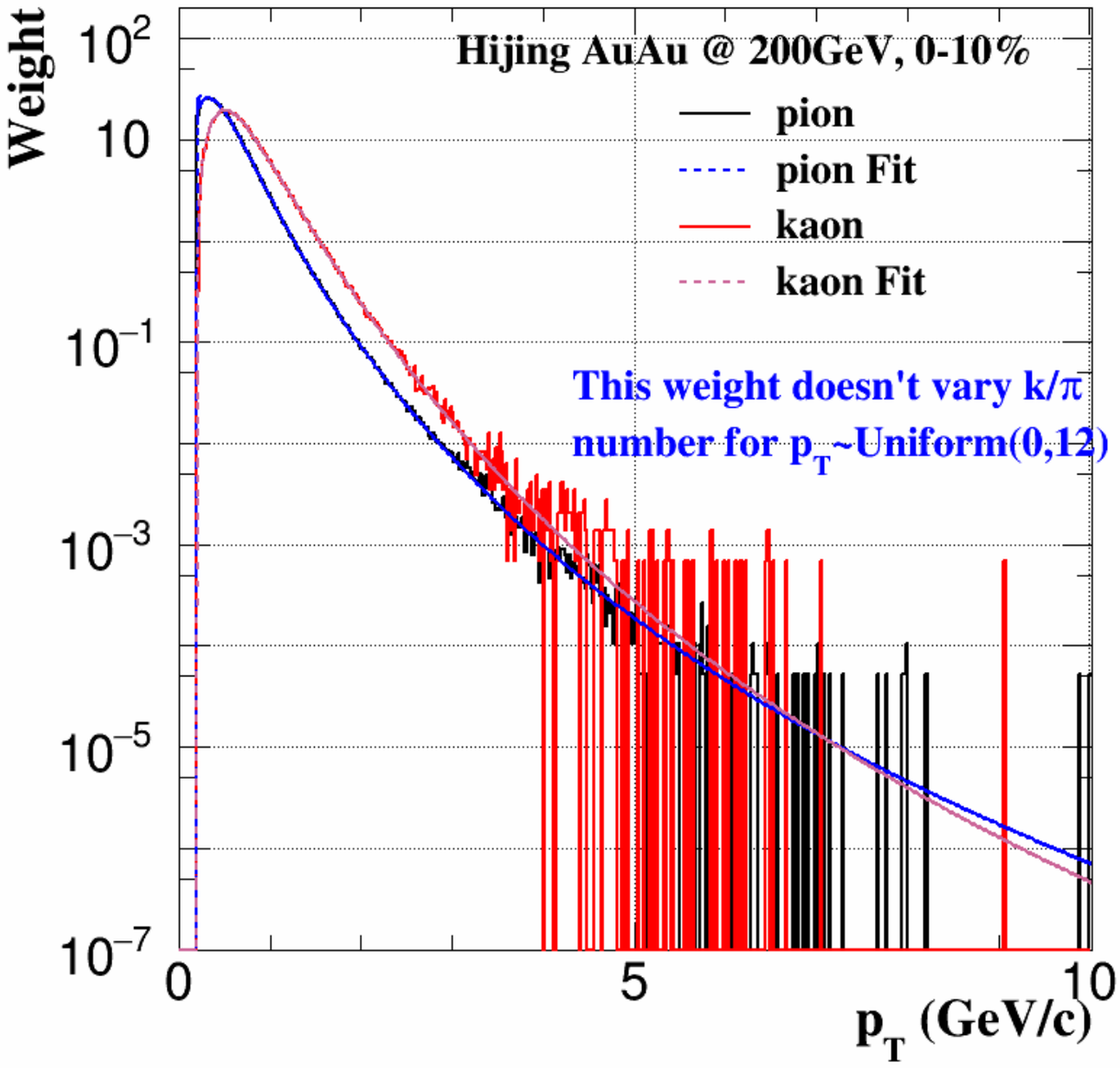
k/pi channel



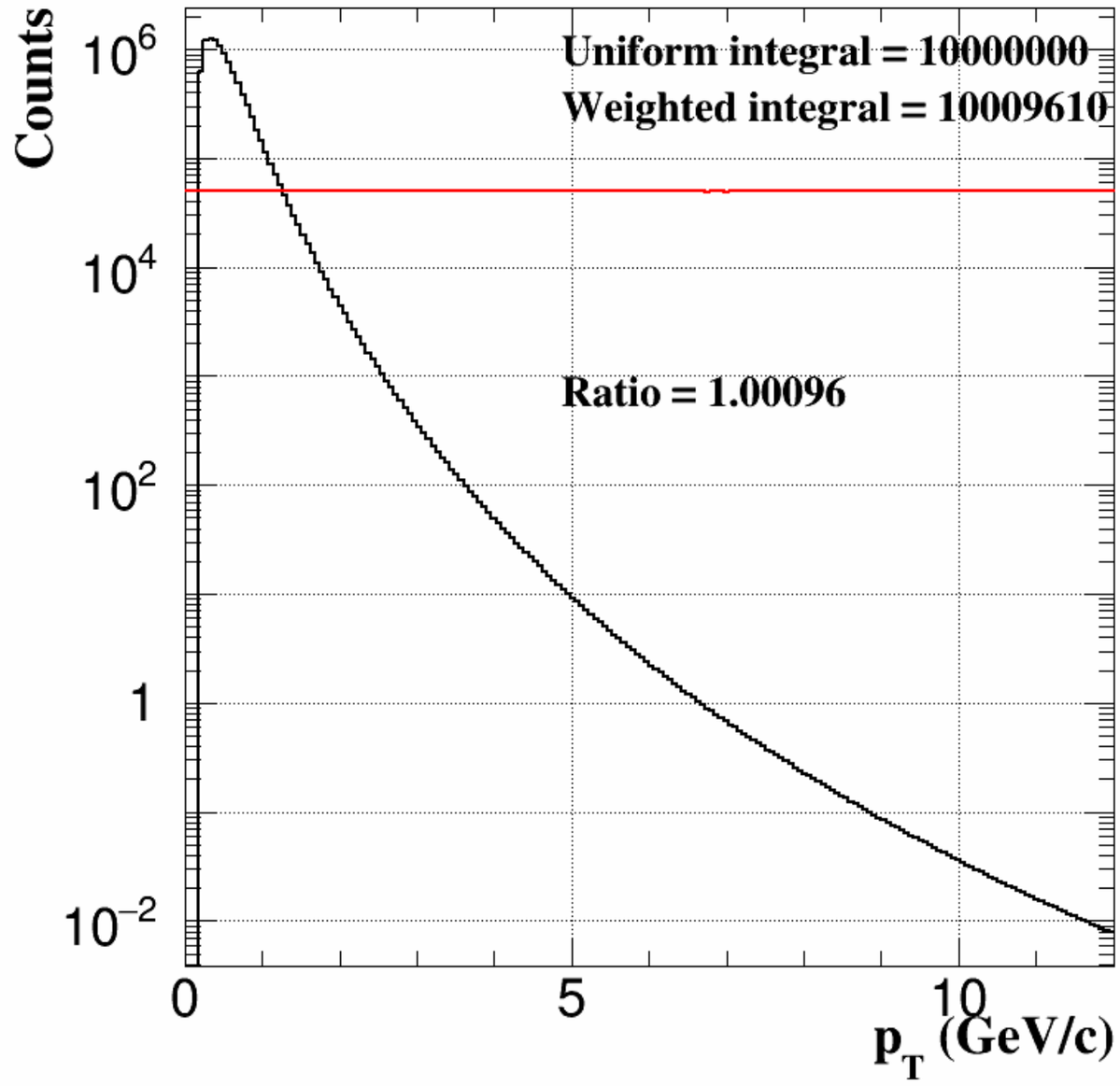
Test



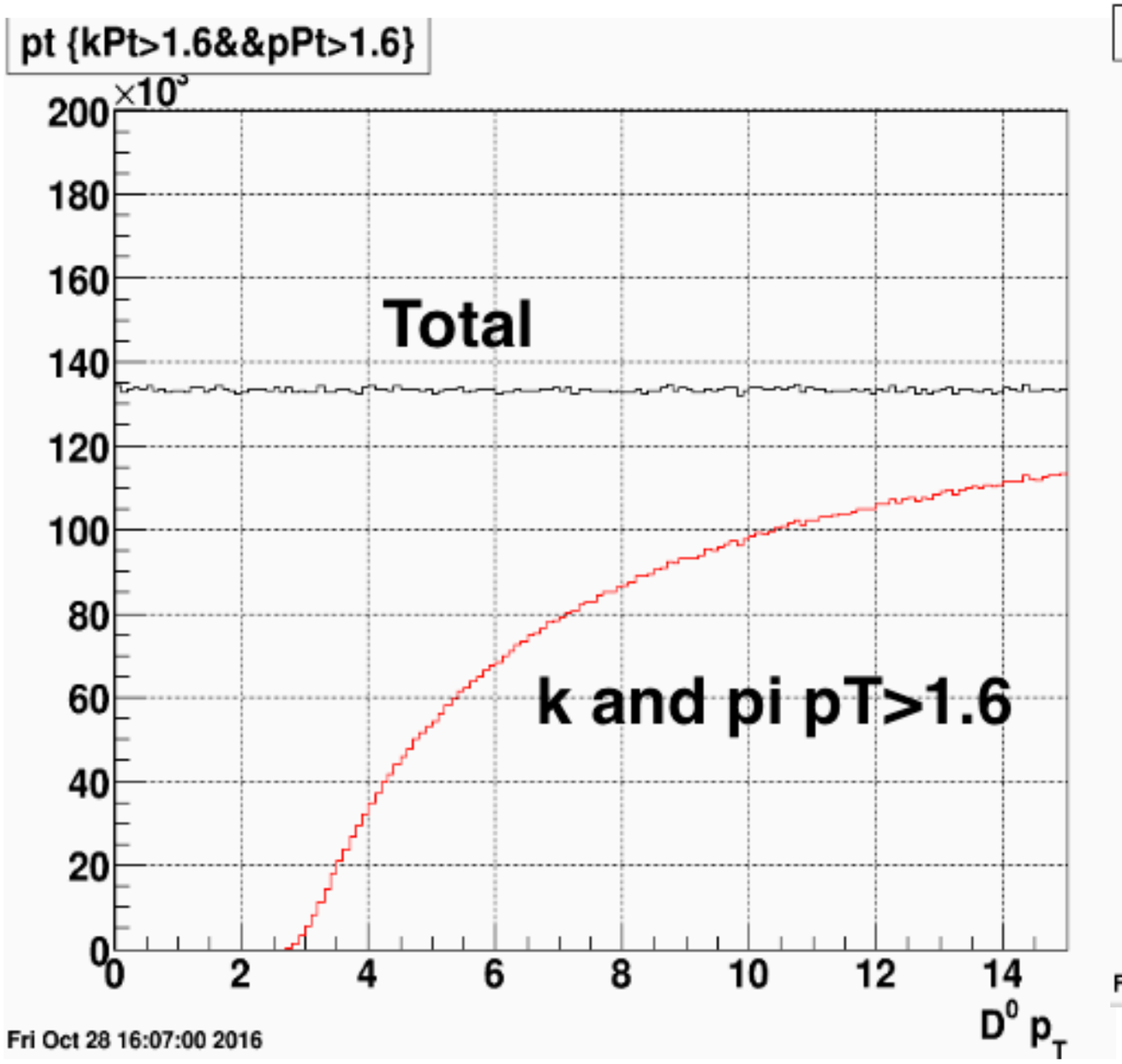
Background pT weight

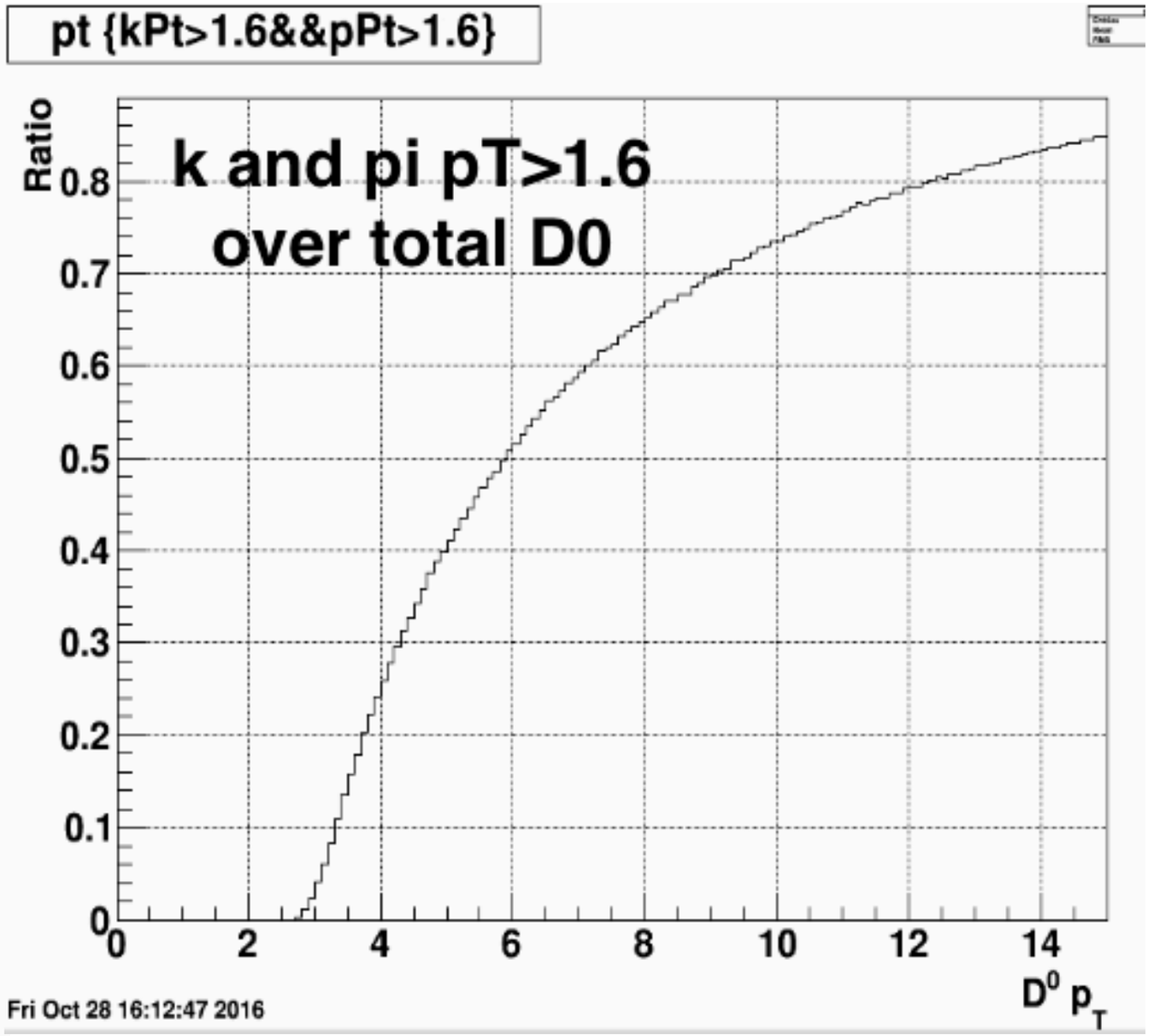


Test



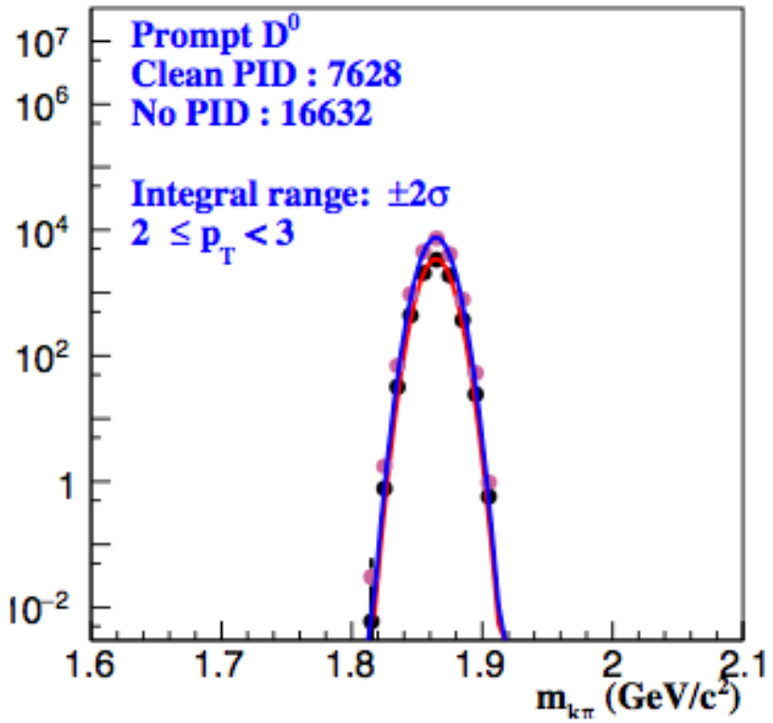
Double counting when using clean PID

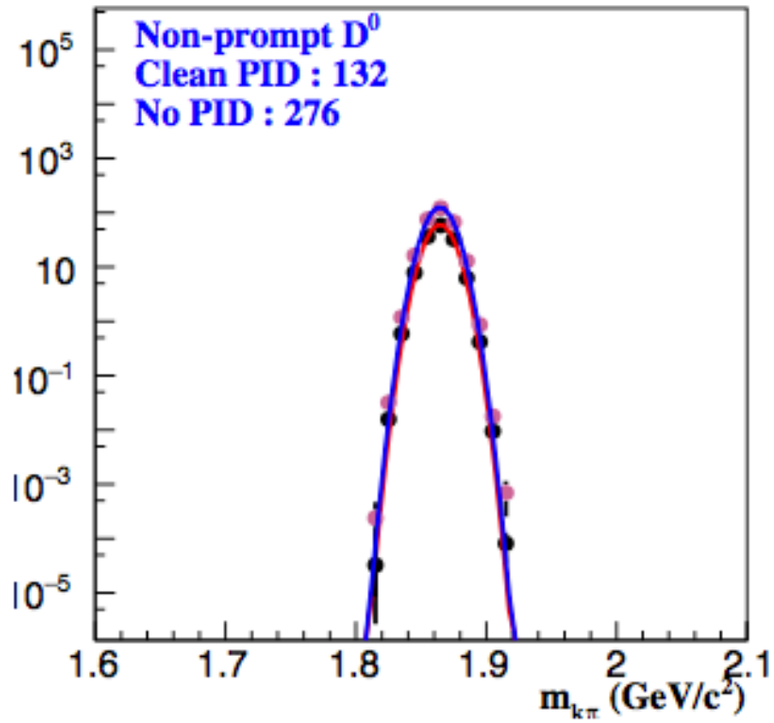


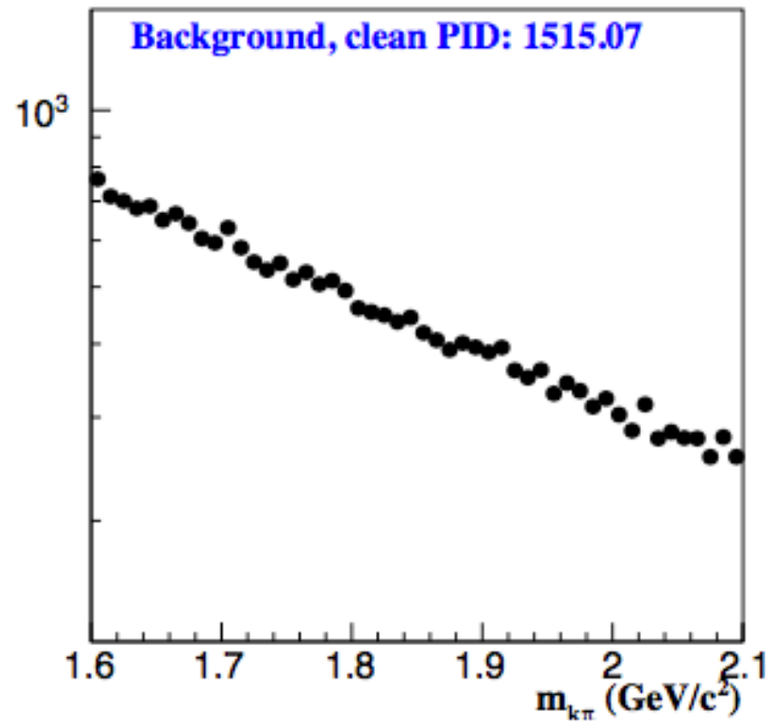


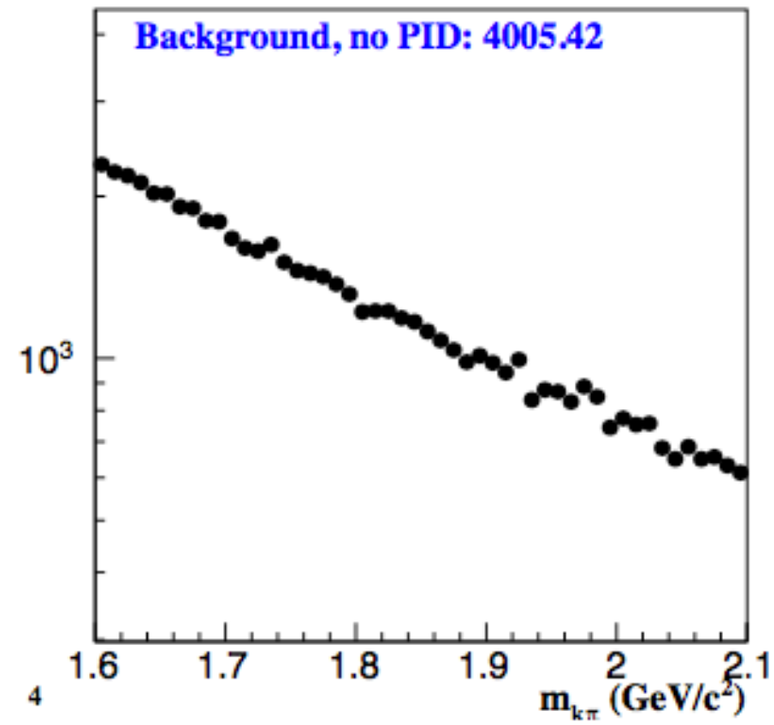
The following results: signal no double count, background include double count
I also stored the double count weighted signal
noPid use another loop method, no double count

Signal and background





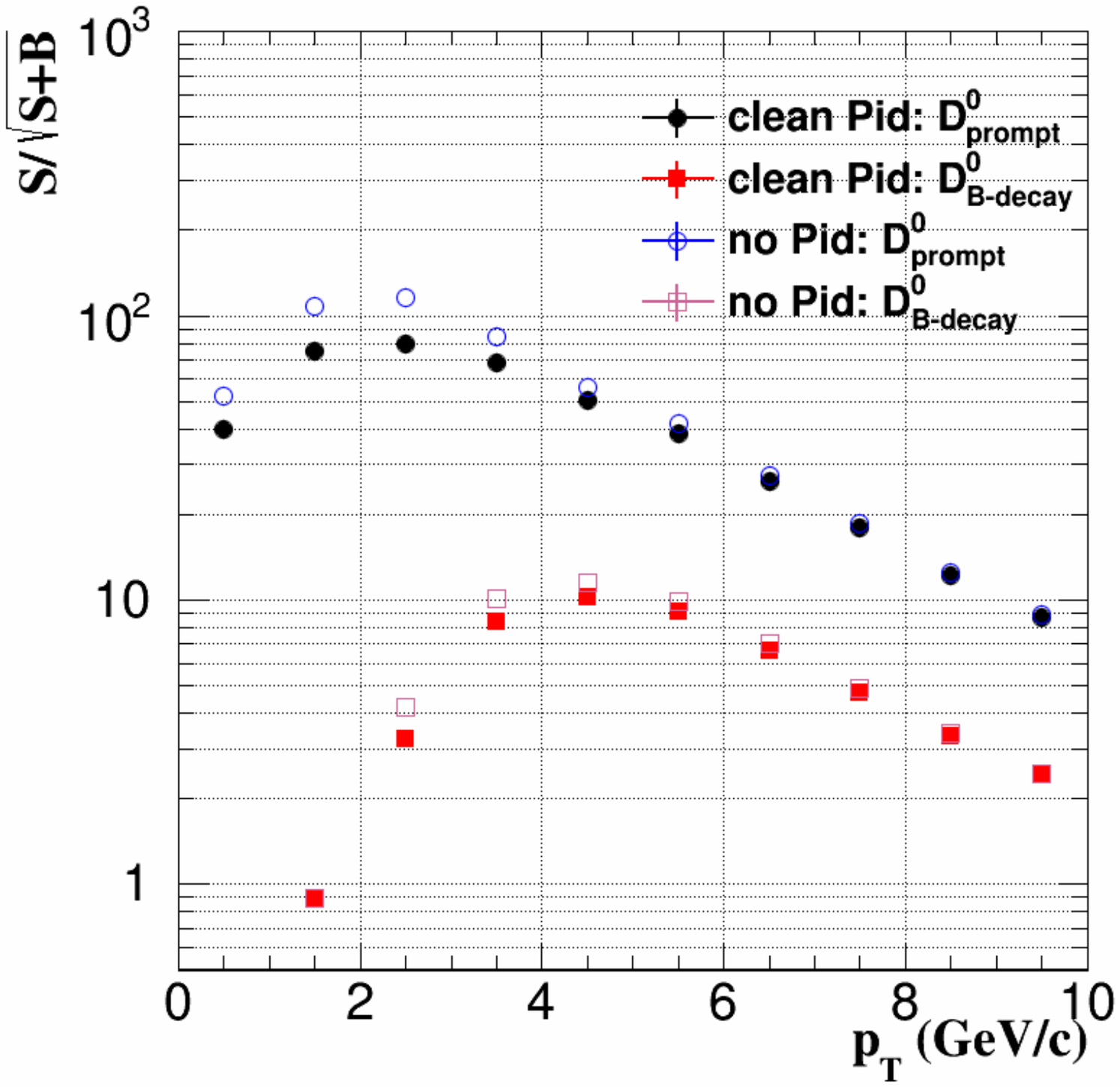




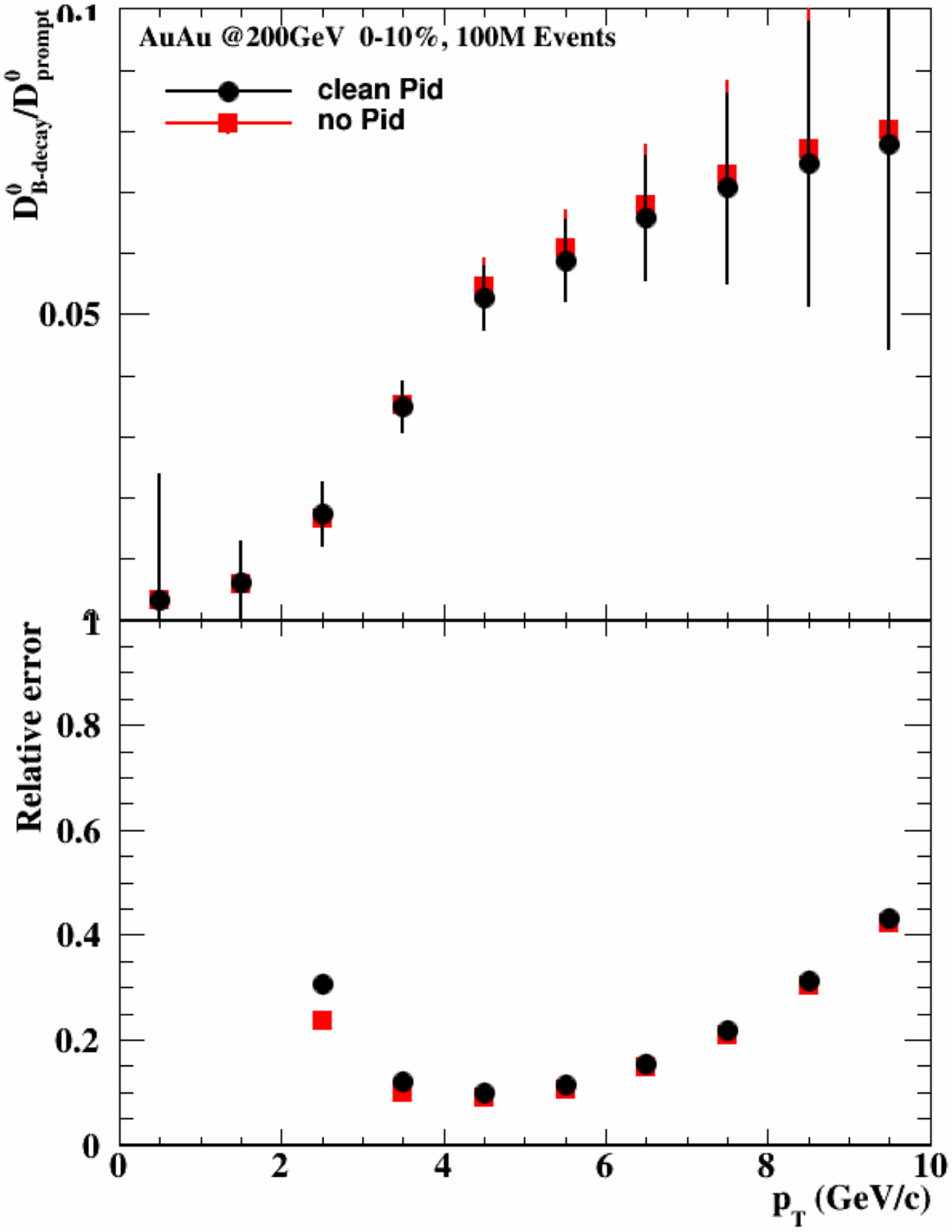
more see: https://drupal.star.bnl.gov/STAR/system/files/SignalAndBackground.pdf

Backup

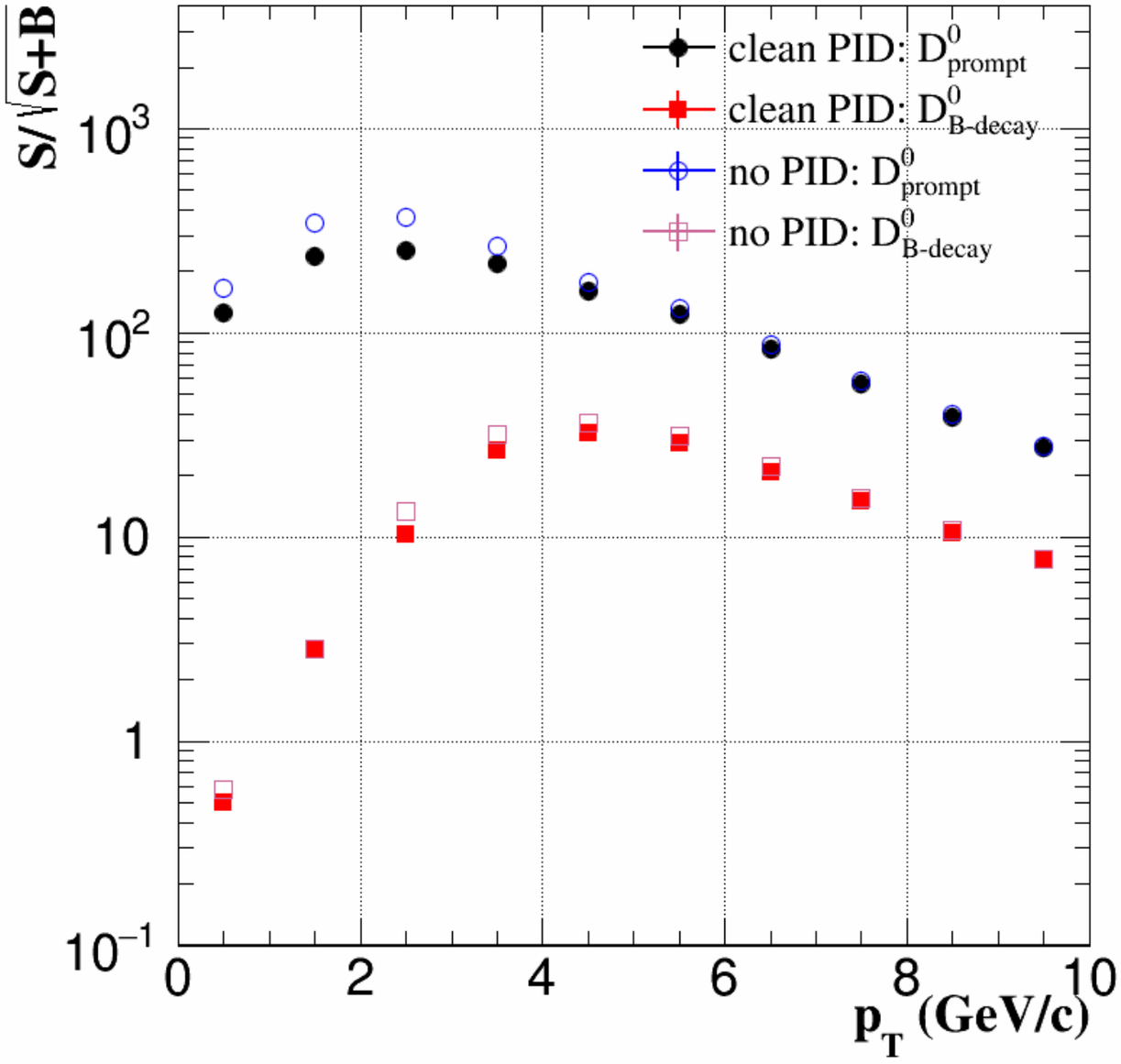
Significance

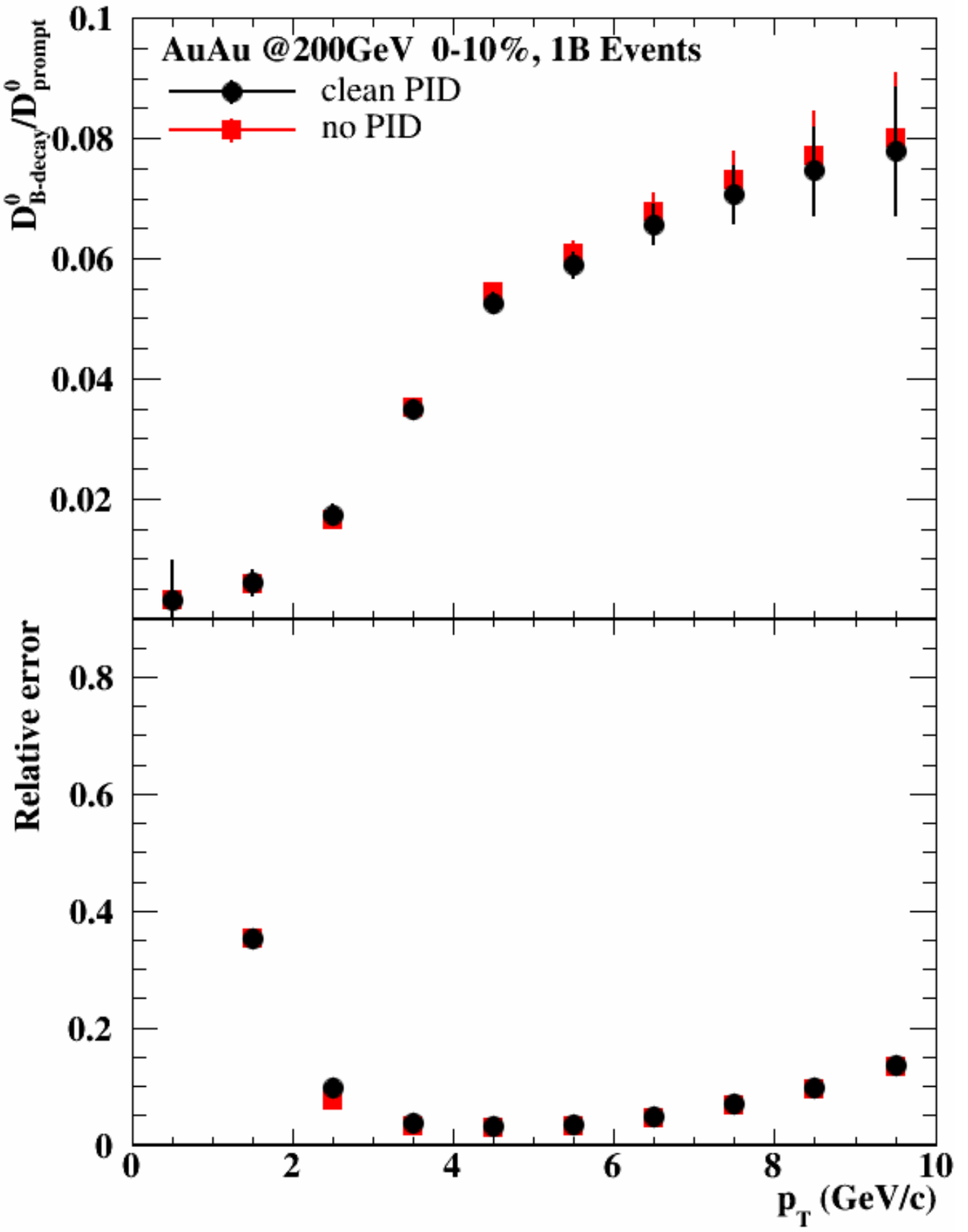


B to D0 ratio error estimate

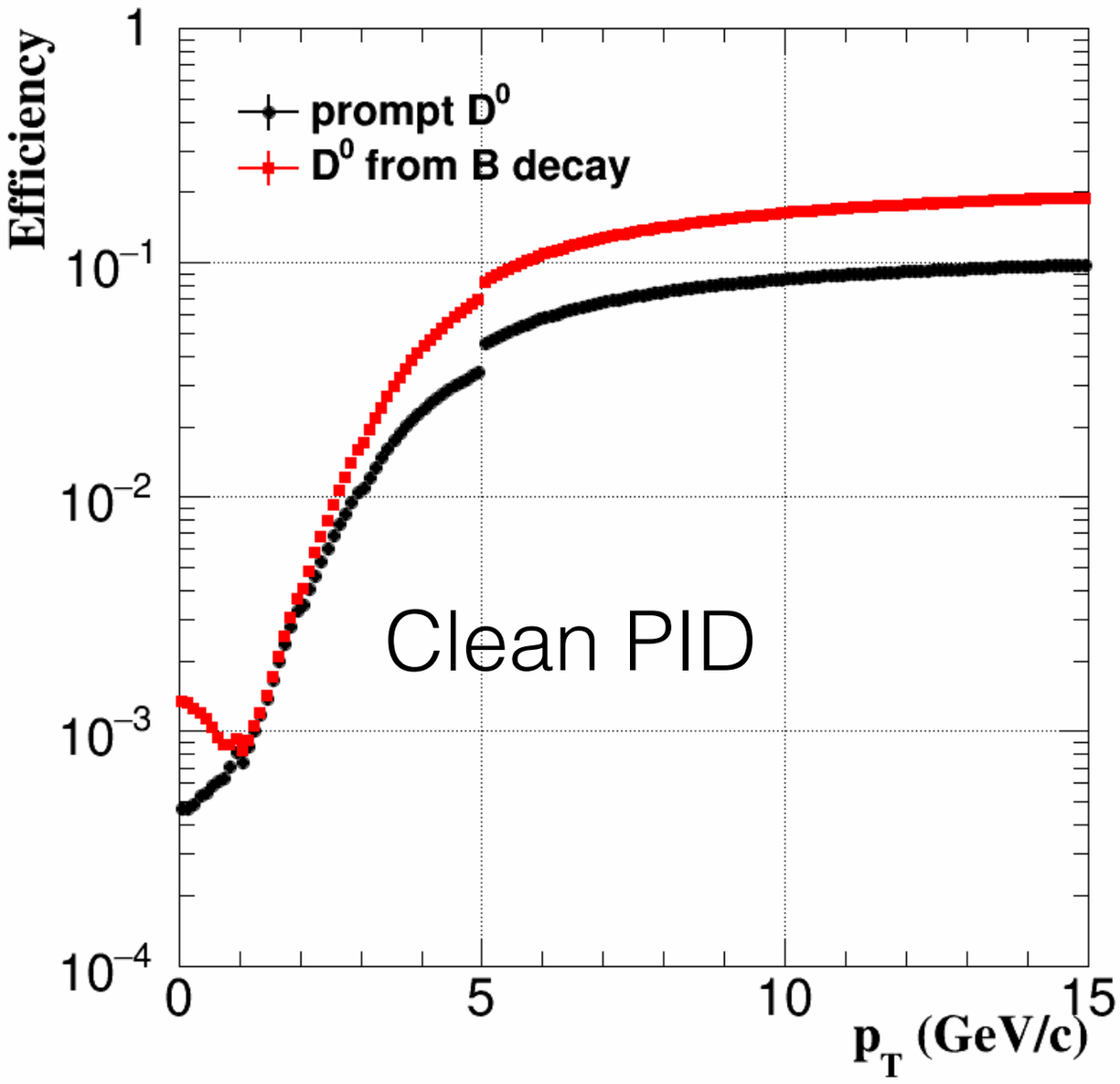


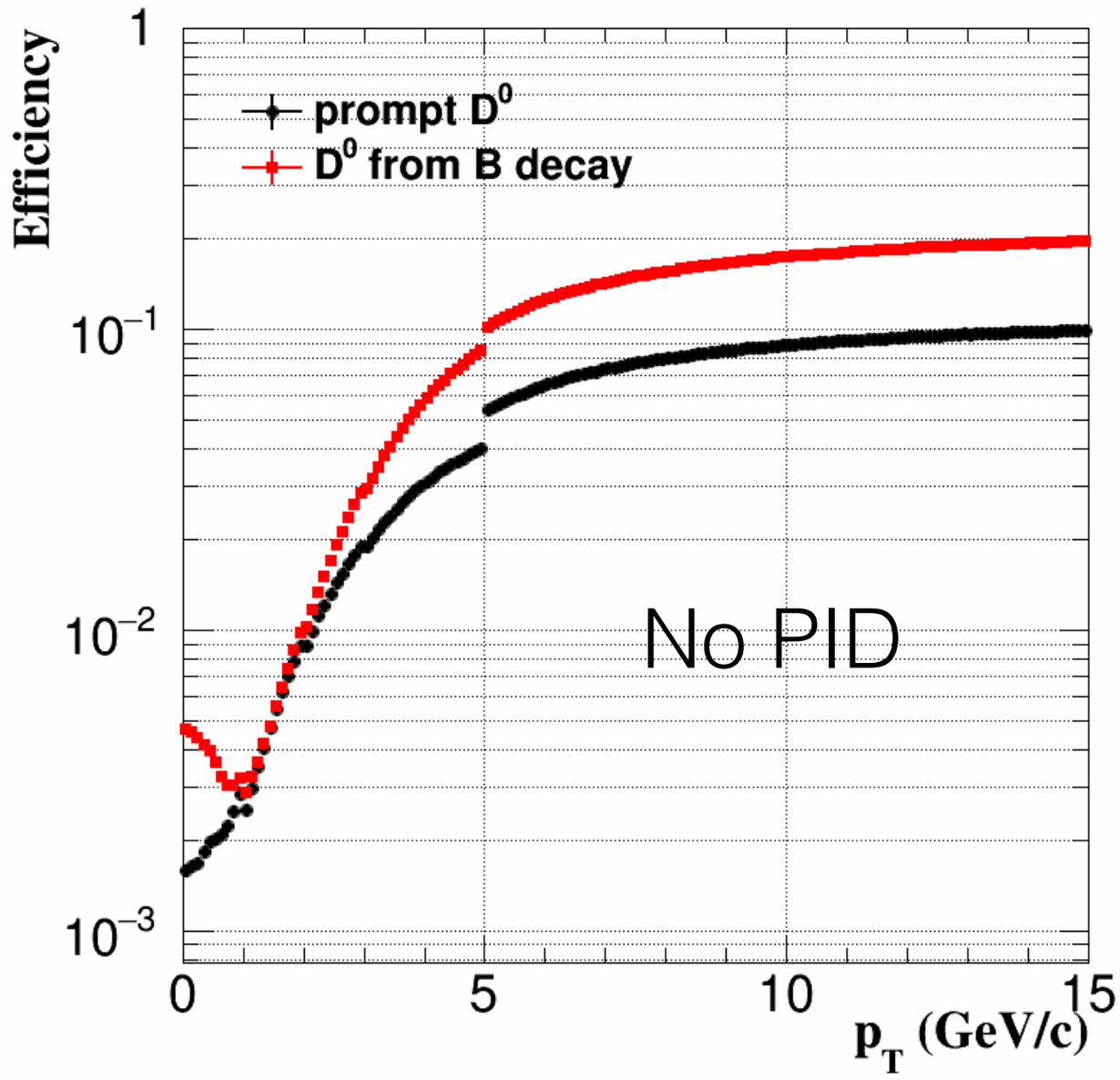
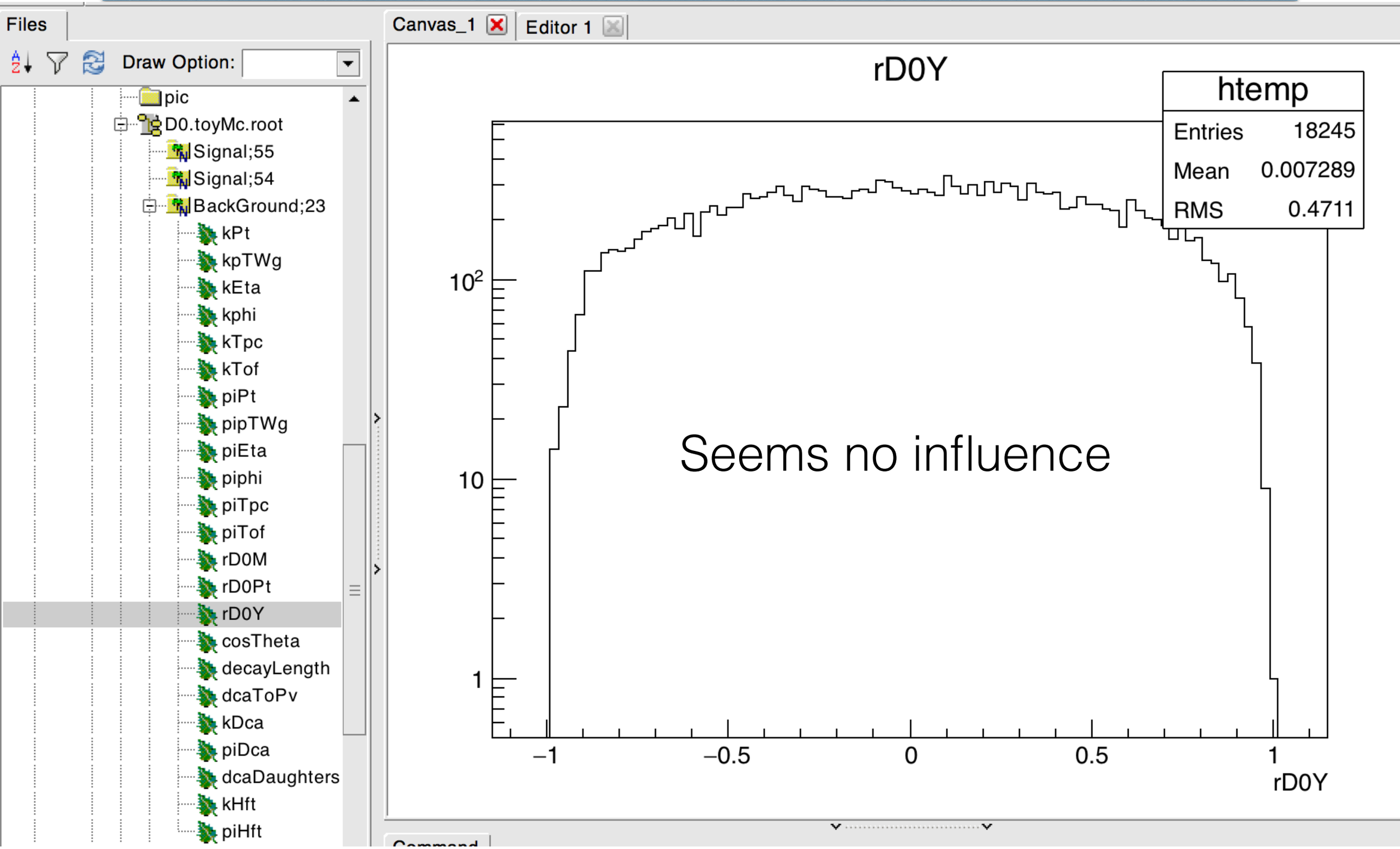
Scale to 1B events





Efficiency


Efficiency
1
10^{-1}
10^{-2}
10^{-3}
10^{-4}
prompt D^0
D^0 from B decay
Clean PID
0
5
10
15
p_T (GeV/c)


Efficiency
1
10^{-1}
10^{-2}
10^{-3}
prompt D^0
D^0 from B decay
No PID
0
5
10
15
p_T (GeV/c)

Backup—background forget to add D0 |y|<1 cut