p20 electron track match study

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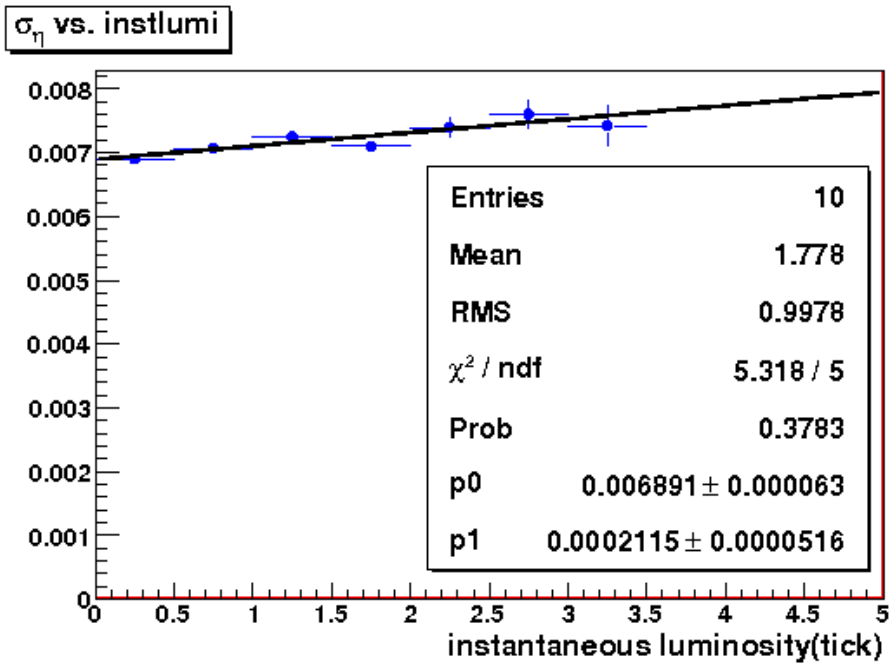
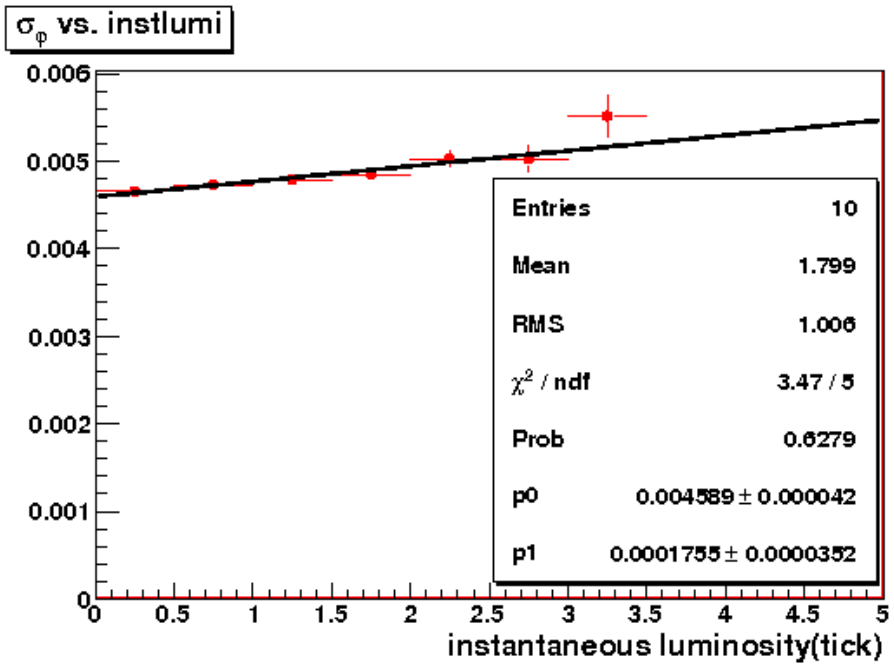
on behalf of the USTC group

- Data sample (thumbnail):
  - p17:CSskim-EMinclusive-PASS3-p17.09.03
  - p20:CSskim-2EMhighpt-PASS2-p21.03.00-summer2007
- Events selection:
  - 1.electrons selection:
    - (1)Two electrons: CC in fiducial, iso < 0.1 , pT>25 GeV ,emf >0.95 , Hmx7 < 12
    - (2)Mass window: 80 – 100 GeV
  - 2.matched track:(directly get from EMparticle with best Prob.)

update of p17 study

- 1. $\sigma\eta$ and $\sigma\varphi$ dependence with instantaneous luminosity.

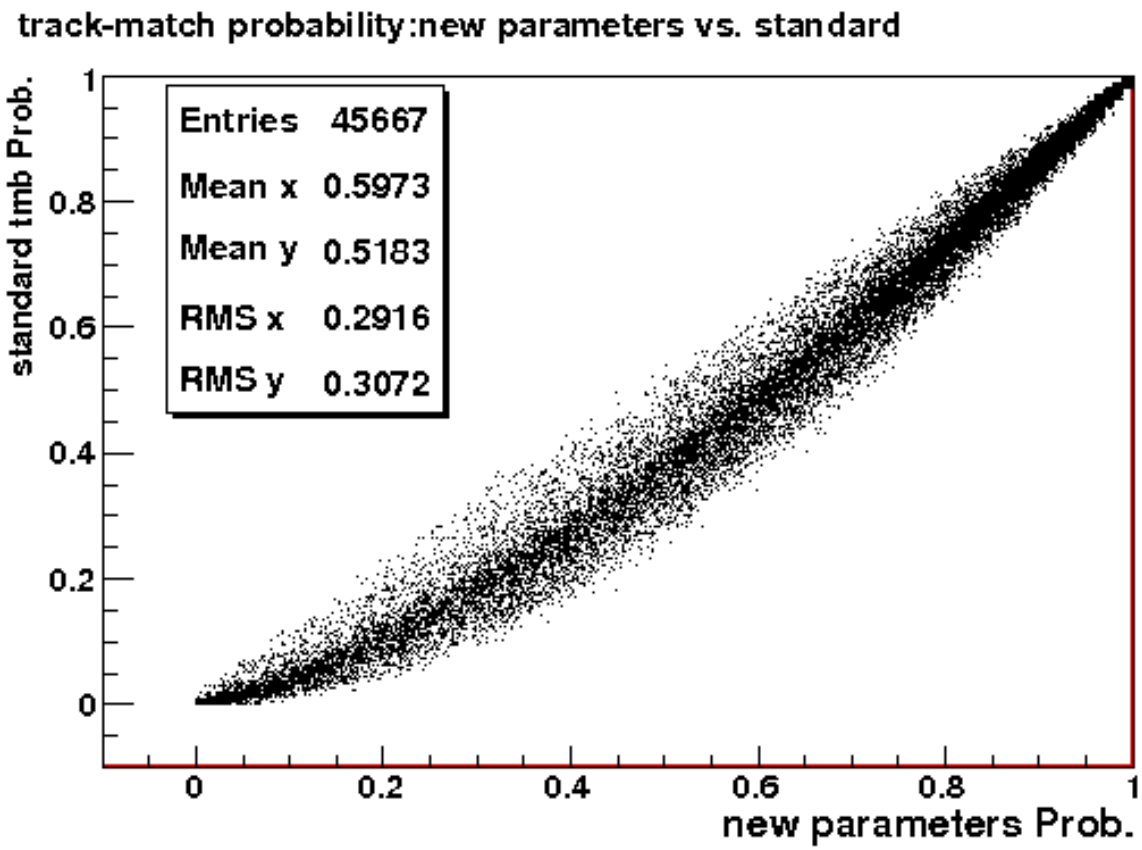




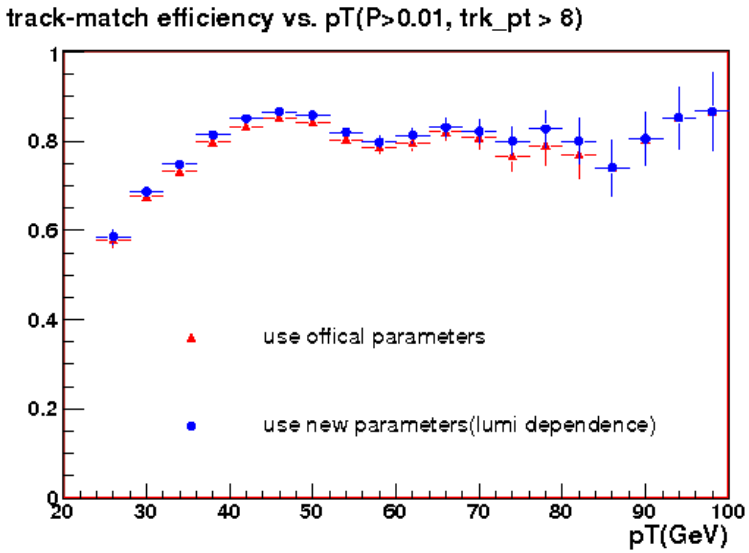
$$\sigma_\eta = a_1 + b_1 * instlum \; (a_1 = 0.006891 \, ; b_1 = 0.0002115)$$

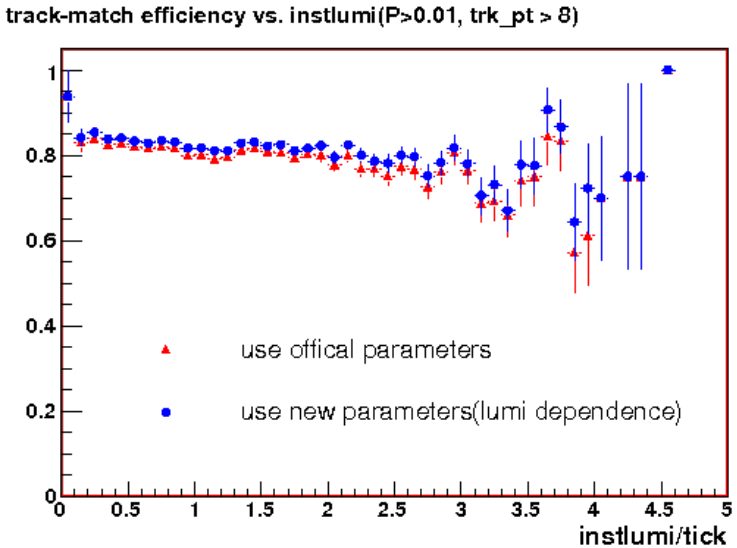
$$\sigma_\varphi = a_2 + b_2 * instlum \; (a_2 = 0.004589 \, ; b_2 = 0.0001755)$$

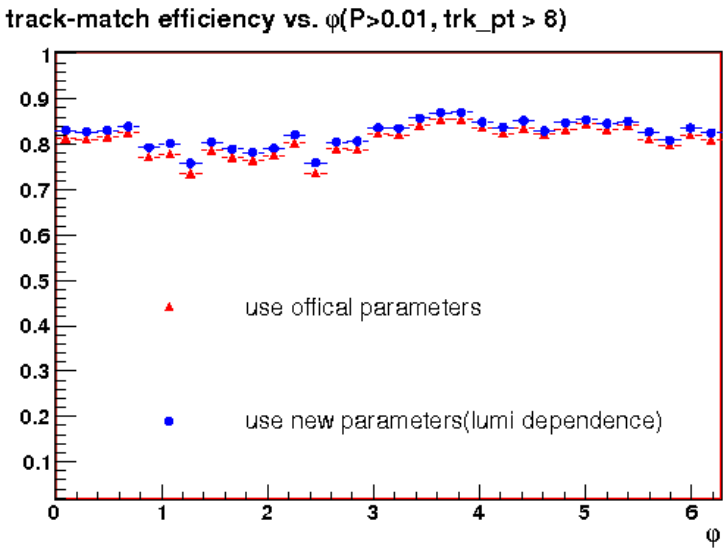
- 2.use the new value of $\sigma\eta$ and $\sigma\varphi$,calculate Prob.

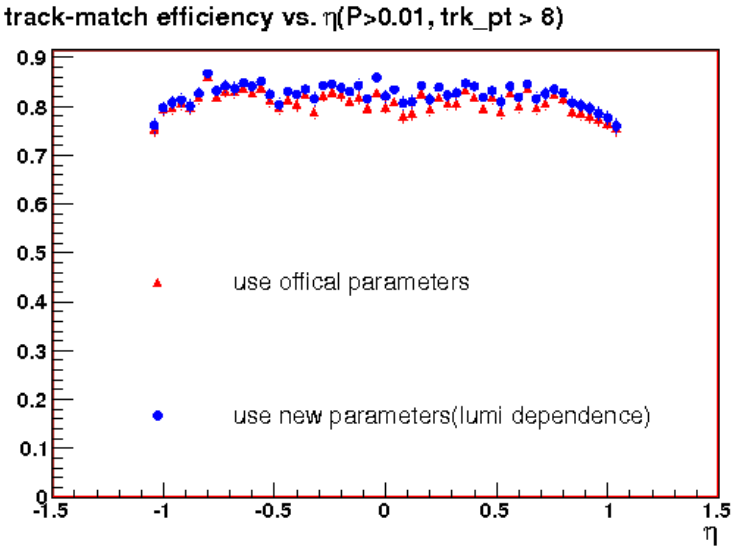


efficiencies vs. pt ,instlumi and CalDetector eta,phi,





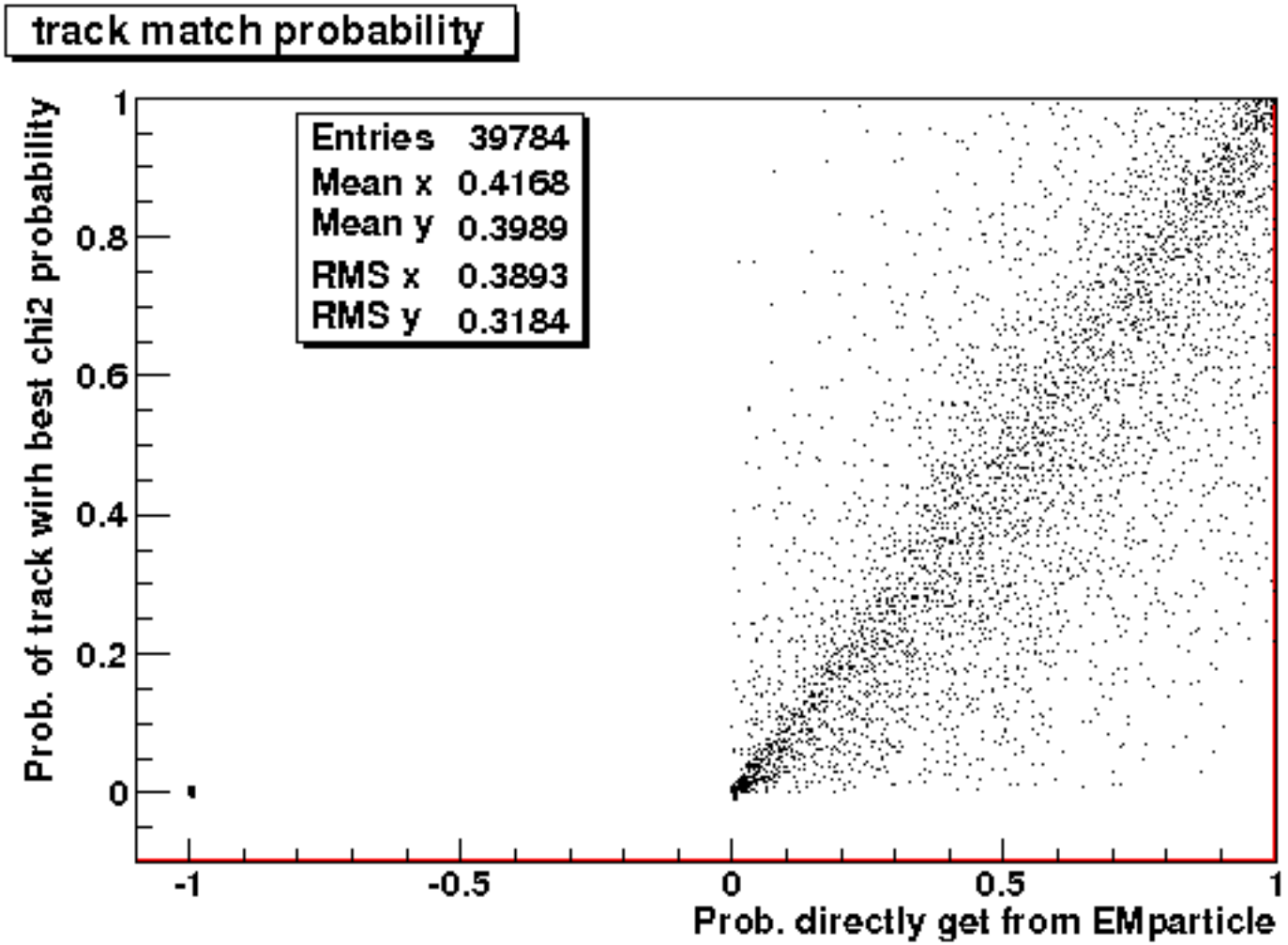




p20 study

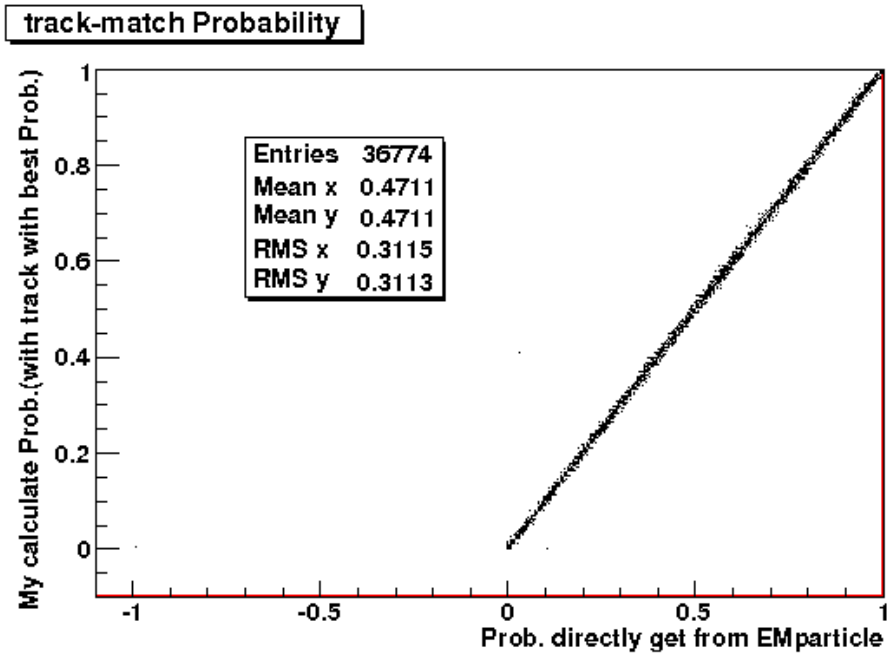
- 1.comparison between tmb_Prob and tmb_trk_Prob
  - tmb_Prob:
    - EMparticle->track_match_spatialchi2prob()
      //get Chi2 Probability for best track match
  - tmb_trk_Prob:
    - chptr=EMparticle->getPtrChp()
      //get charged particle with best chi2 probability
    - EMparticle->track_match_spatialchi2prob(*chptr)
      // get Chi2 Probability for charged particle

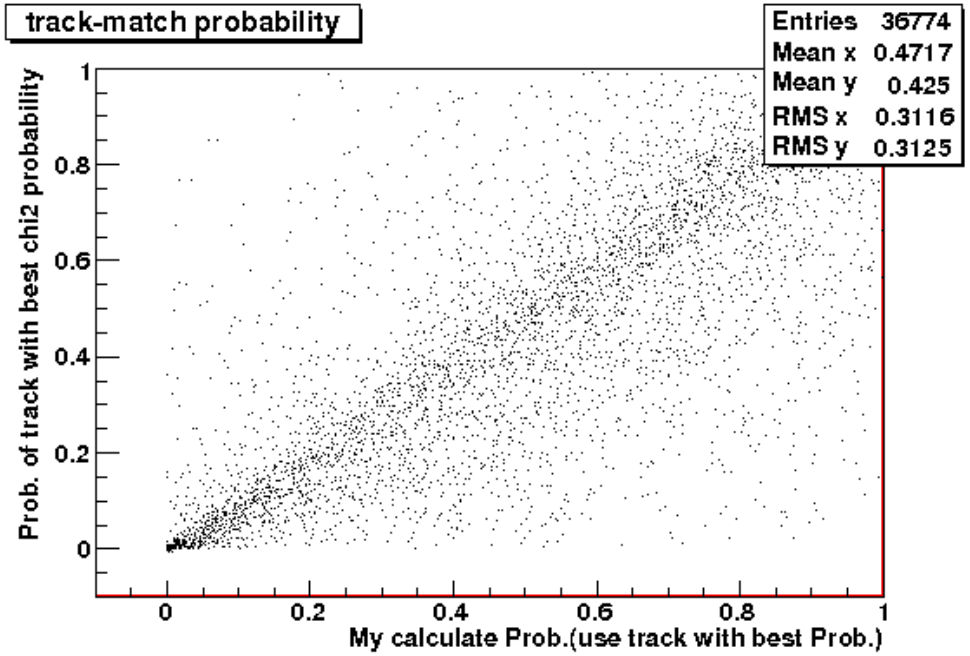
tmb_Prob **should** == tmb_trk_Prob


track match probability
Entries 39784
Mean x 0.4168
Mean y 0.3989
RMS x 0.3893
RMS y 0.3184
Prob. of track wirh best chi2 probability
Prob. directly get from EMparticle
1
0.8
0.6
0.4
0.2
0
-1
-0.5
0
0.5
1

- 2.If I use track match Probability calculation methods in em_util(/d0dist/dist/packages/em_util/devel/)

trk_pt > 8GeV





- tmb_Prob:
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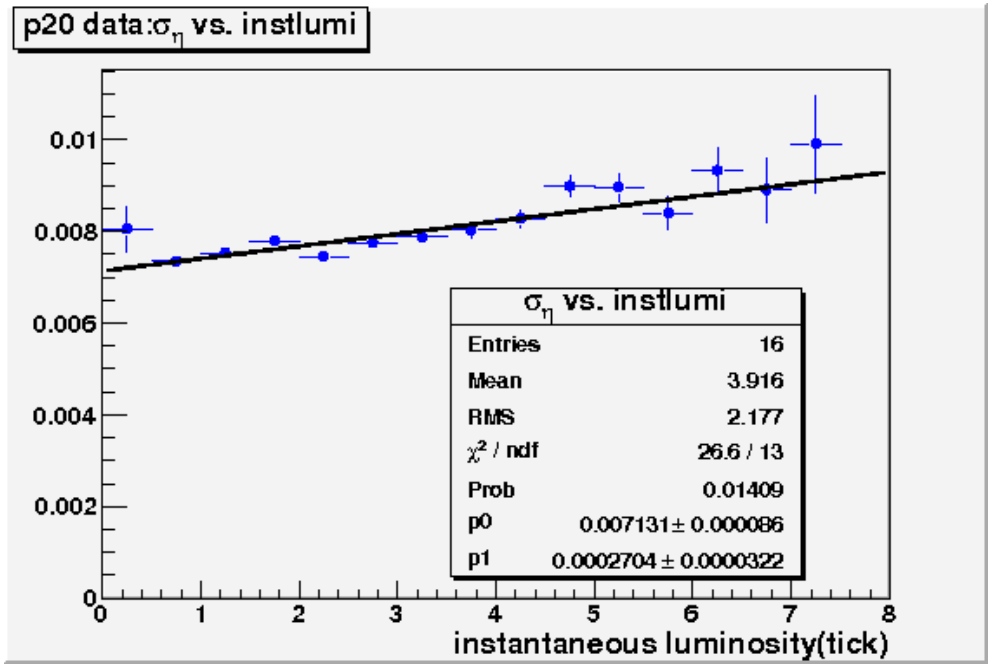
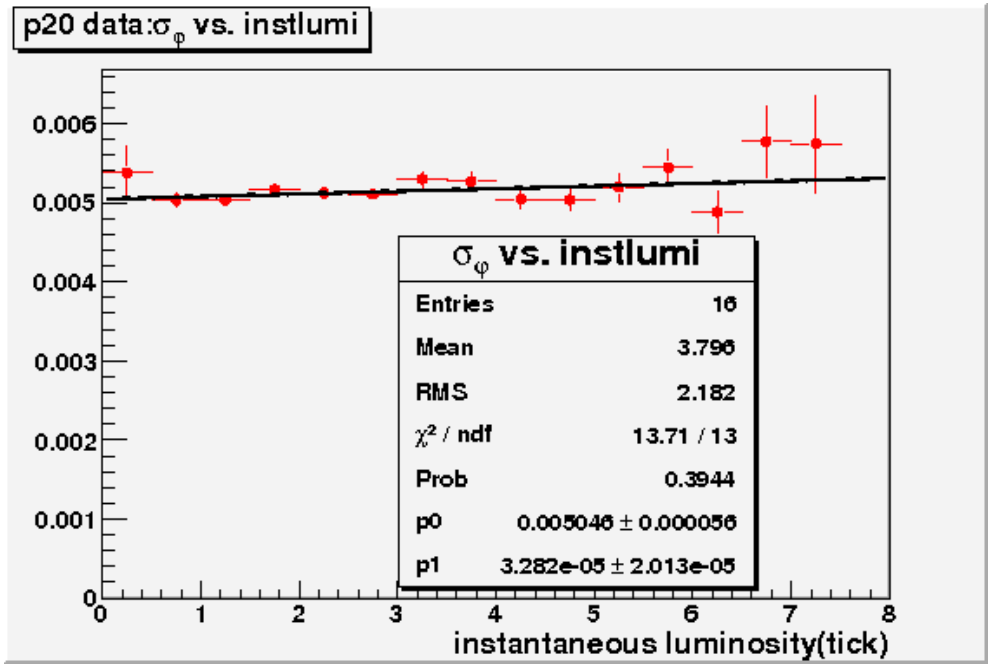
    //get Chi2 Probability for best track match
- tmb_trk_Prob:
  - chptr=EMparticle->getPtrChp()
    //get charged particle with best chi2 probability
  - EMparticle->track_match_spatialchi2prob(*chptr)
    // get Chi2 Probability for charged particle

What's happen here??

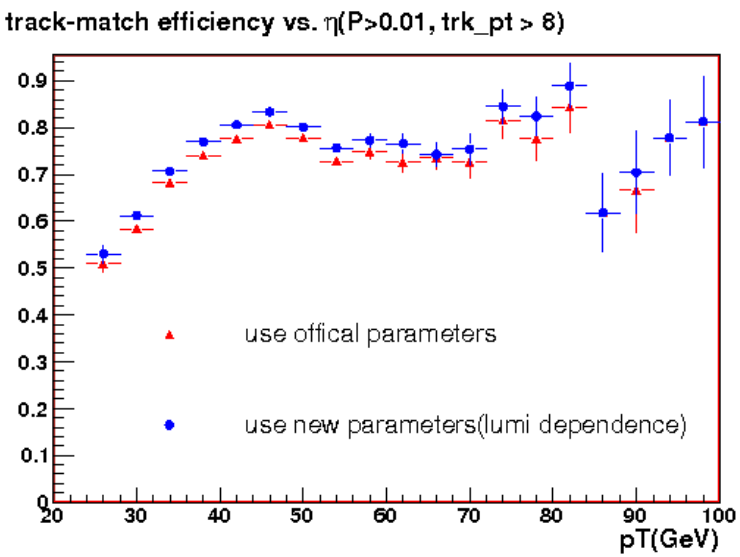
- 3. If we trust the Prob directly get from EMparticle

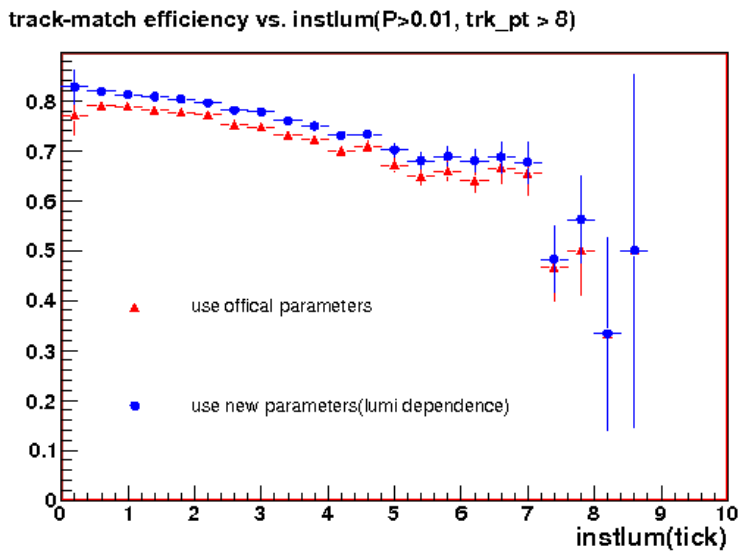


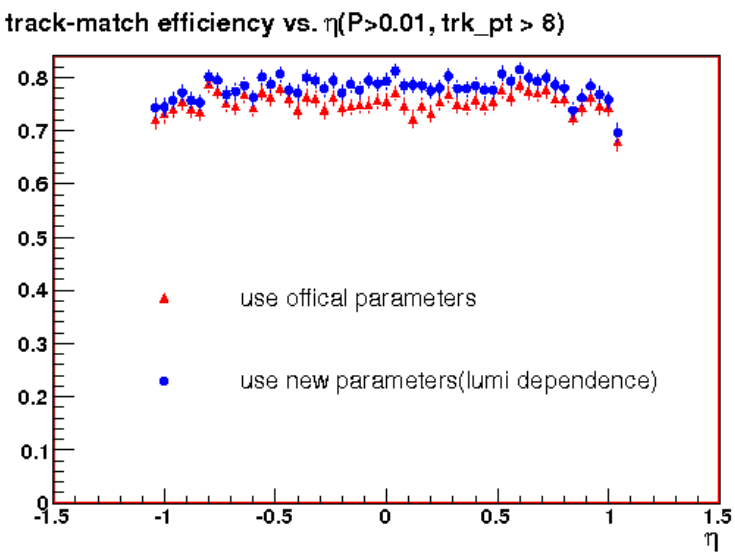


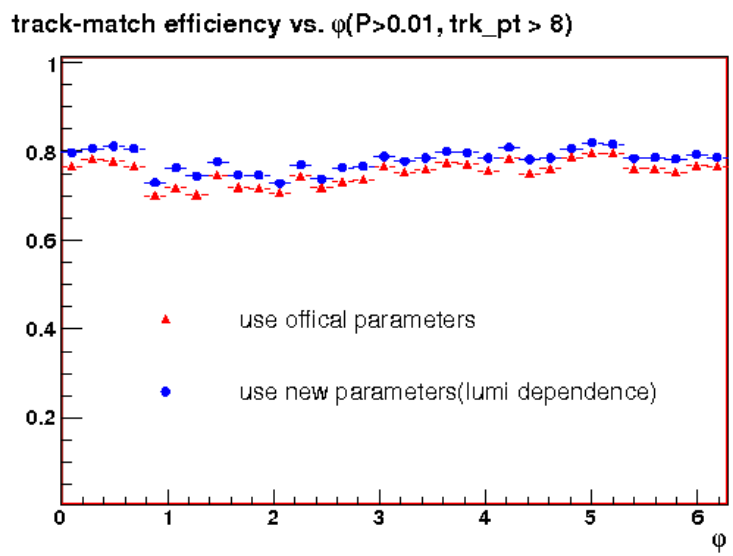
$$\sigma_\eta = a_1 + b_1 * instlum \ (a_1 = 0.007131 \, ; b_1 = 0.0002704)$$

$$\sigma_\varphi = a_2 + b_2 * instlum \ (a_2 = 0.005046 \, ; b_2 = 3.282\text{e-}05)$$


track-match efficiency vs. η(P>0.01, trk_pt > 8)
use offical parameters
use new parameters(lumi dependence)
pT(GeV)

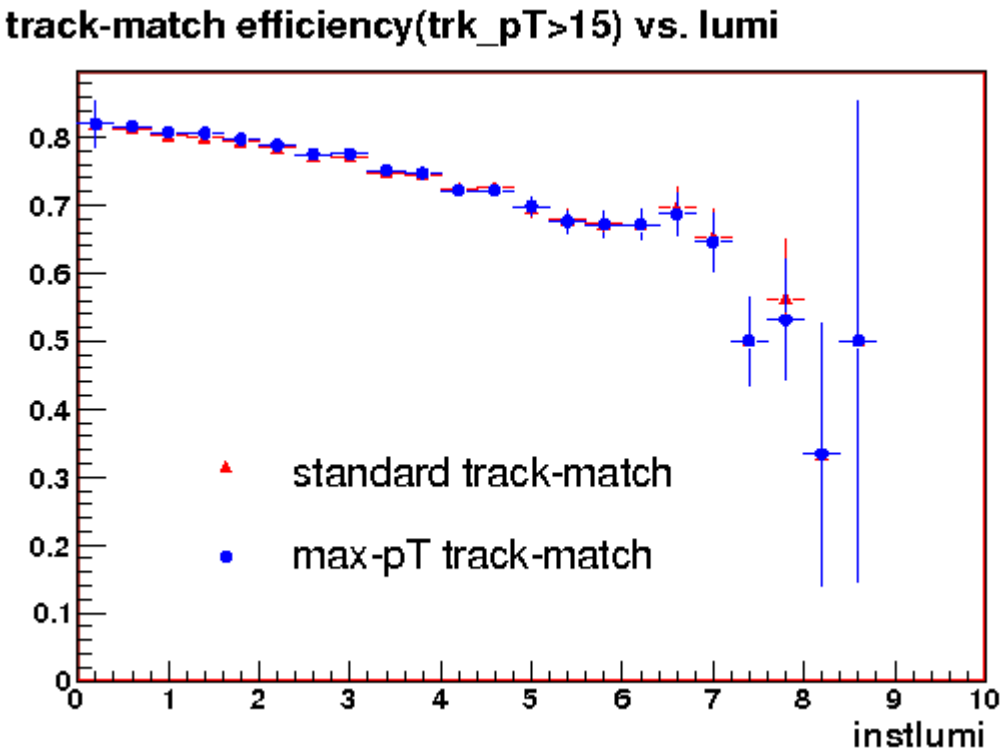

track-match efficiency vs. instlum(P>0.01, trk_pt > 8)
use offical parameters
use new parameters(lumi dependence)
instlum(tick)


track-match efficiency vs. η(P>0.01, trk_pt > 8)
use offical parameters
use new parameters(lumi dependence)
η


track-match efficiency vs. φ(P>0.01, trk_pt > 8)
use offical parameters
use new parameters(lumi dependence)
φ

New loop of tracks

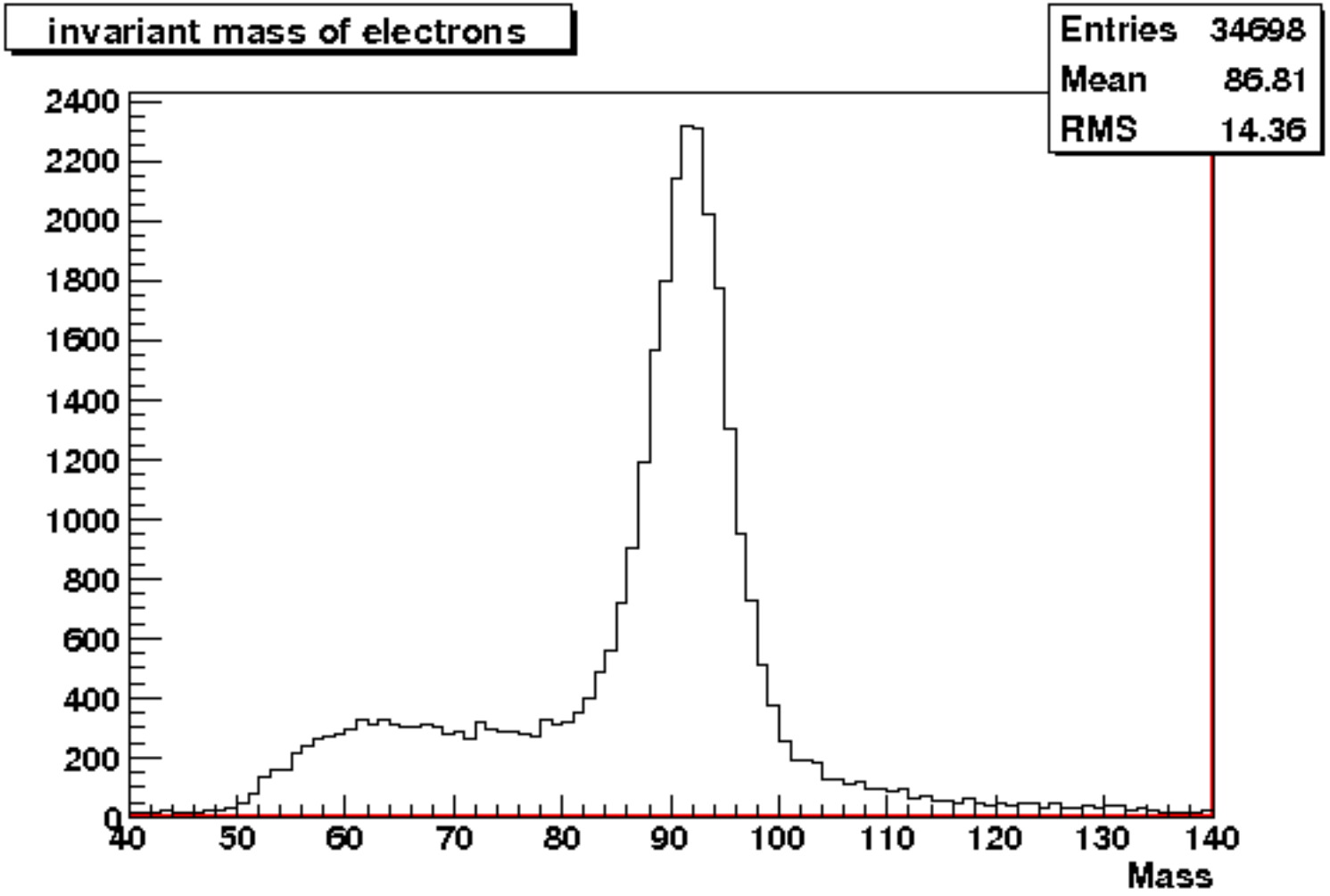
- loop all tracks ,and select a track with max pT(>15 GeV) in dR_trk_em<0.2 cone
- 1.My efficiency: dR<0.2; track with max track_pT(should > 15 GeV)(77.49%)
- 2. standard efficiency: P(spatial)>0.0; track_pT>15 GeV (77.19%)

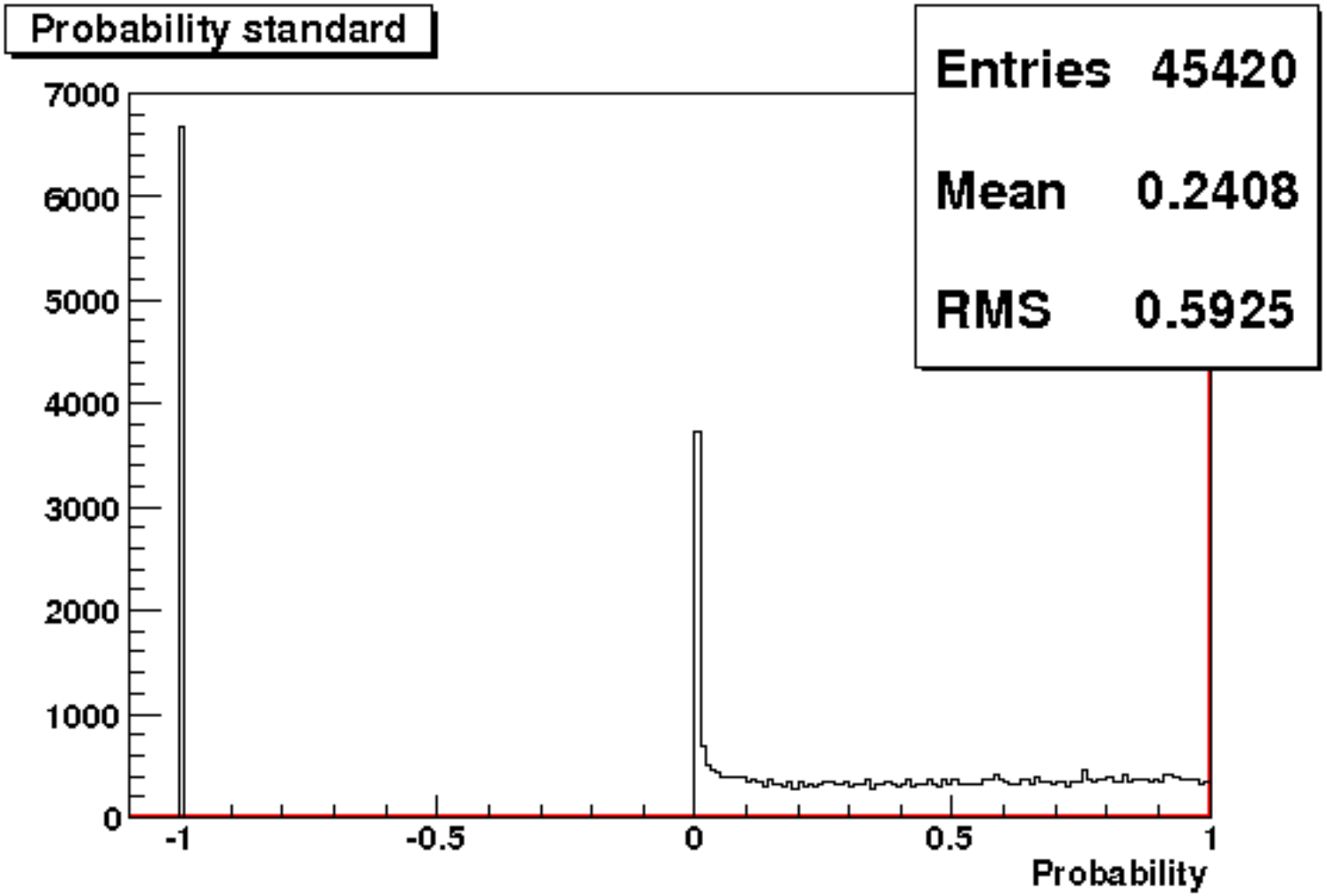


Summary

- 1.$\sigma\eta$ and $\sigma\varphi$ is dependence with instlum.
- 2.There are some problems in p20 electron track match . But the track finding is OK.

Backup


invariant mass of electrons
Entries 34698
Mean 86.81
RMS 14.36
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
40
50
60
70
80
90
100
110
120
130
140
Mass


Probability standard
Entries 45420
Mean 0.2408
RMS 0.5925
7000
6000
5000
4000
3000
2000
1000
0
-1
-0.5
0
0.5
1
Probability