p17 electron track match study

Hang Yin

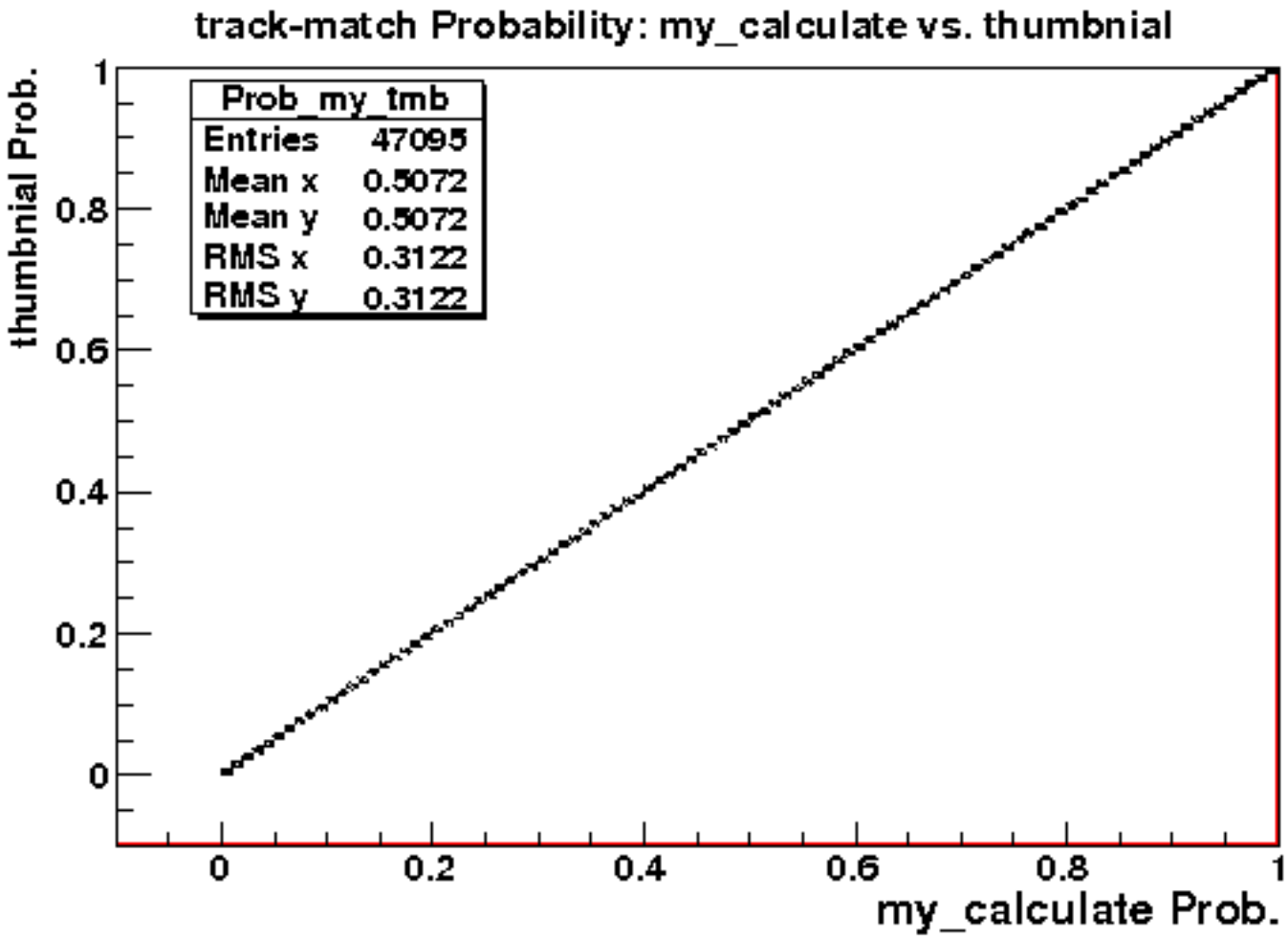
on behalf of USTC Group

- Data sample:CSskim-EMinclusive-PASS3-p17.09.03
- track match probability calculate in em_util
  - Prob = TMath(chi2,ndof);
  - $$\chi^2 = \left(\frac{\delta_{\eta_{trk-EM}}}{\sigma_\eta}\right)^2 + \left(\frac{\delta_{\varphi_{trk-EM}}}{\sigma_\varphi}\right)^2 + \left(\frac{\delta_{E/P_{trk-EM}}}{\sigma_{E/P}}\right)^2$$

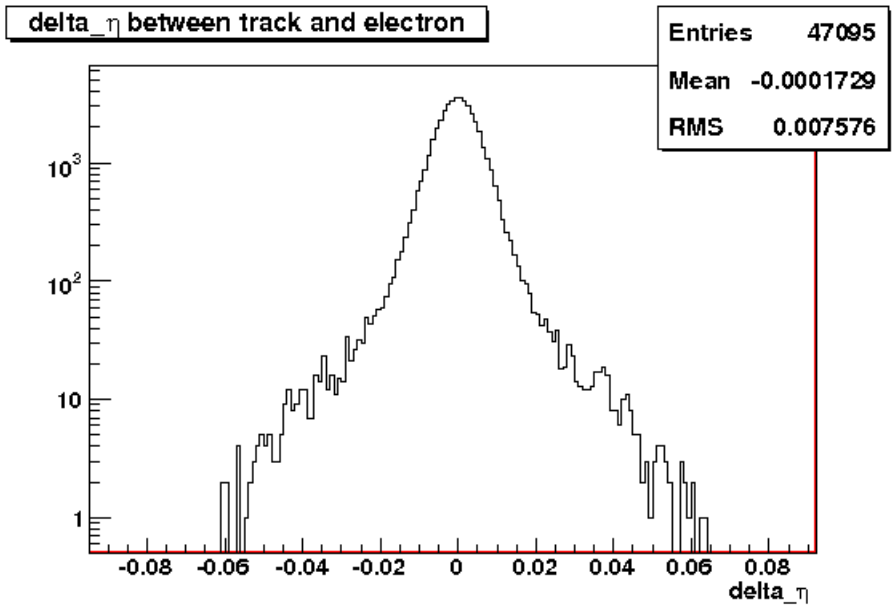
1. repeat p17 results

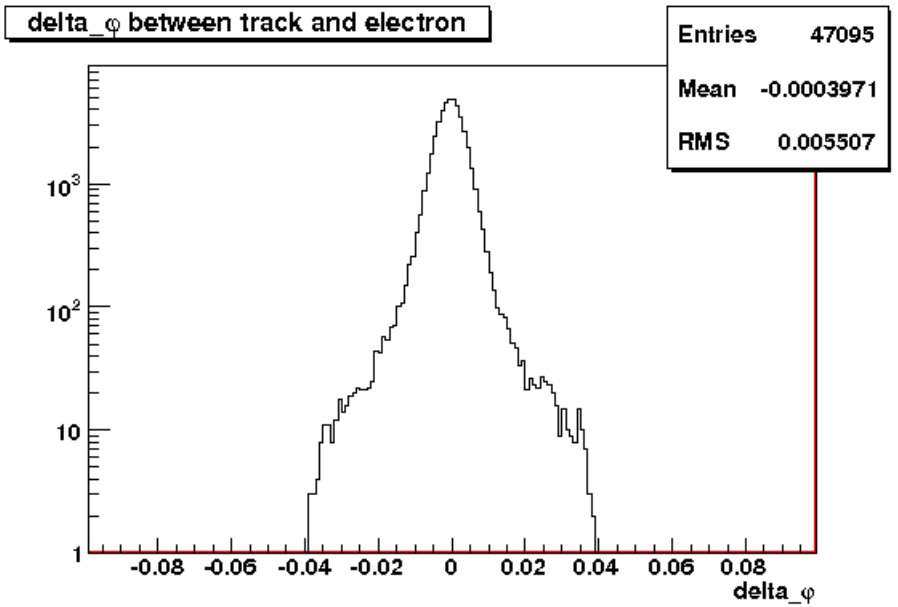
- 1.electrons selection:
  - (1)Two electrons: CC in fiducial, iso < 0.1 , pT>25 GeV ,emf >0.95 , Hmx7 < 12
  - (2)Mass window: 80 – 100 GeV
- 2.Probability:
  - use selected electrons, with methods got from em_util,we calculate track-match probability
- 3. re-loop all tracks to get best track match

Probability: my calculate vs. get from tmb

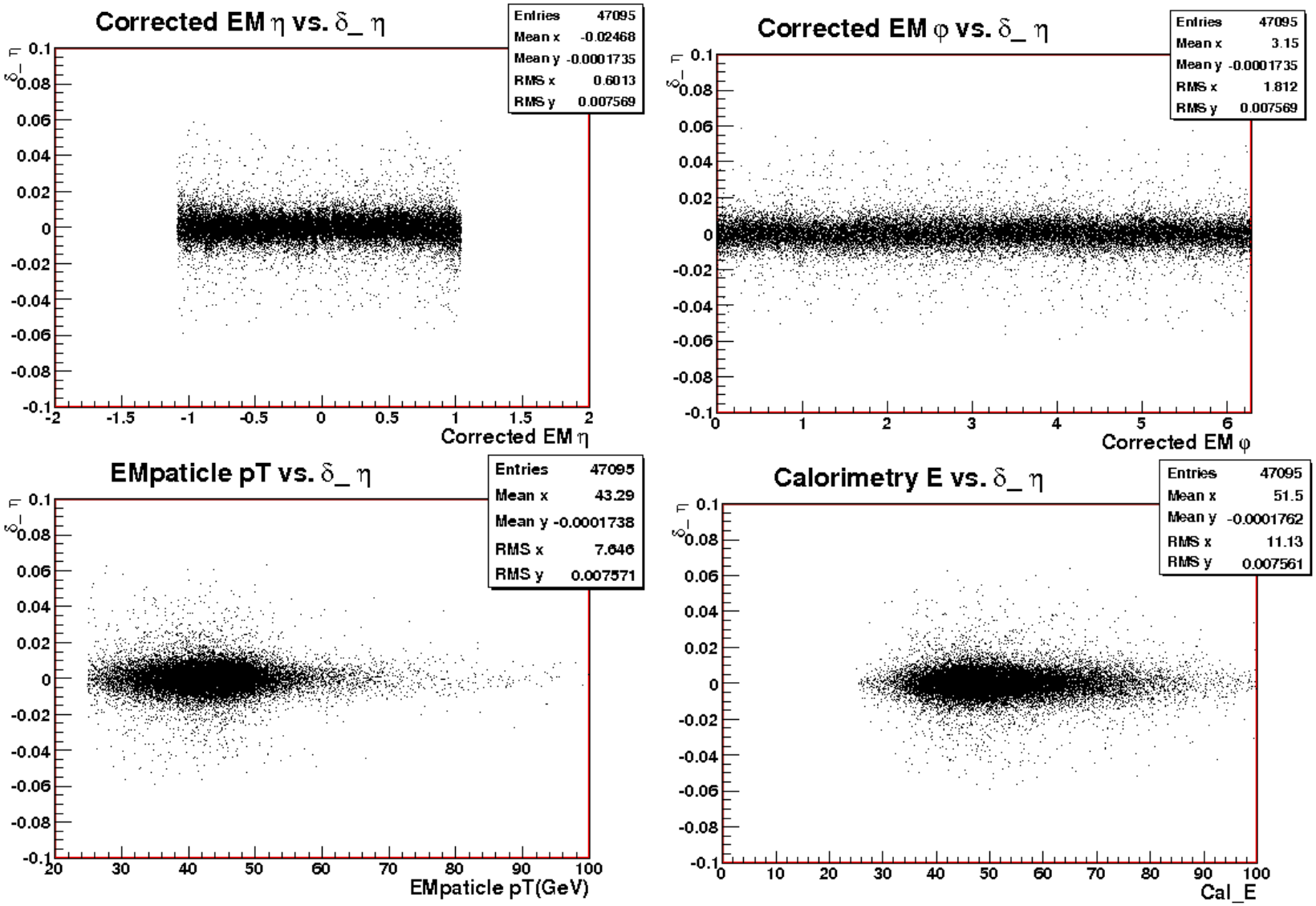


dη_trk_em and dφ_trk_em

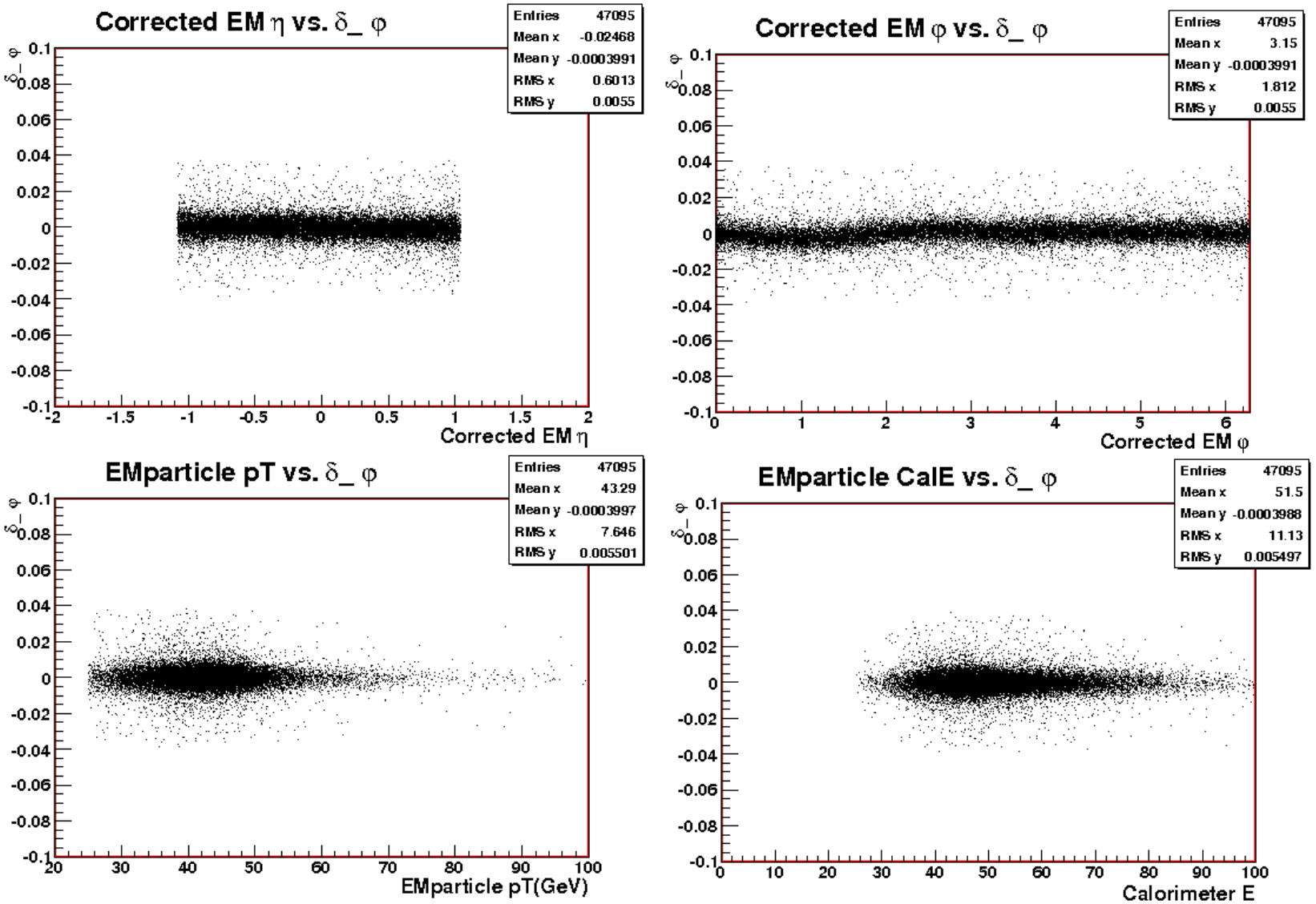




dη dependence vs. EM η,$\varphi$and pT

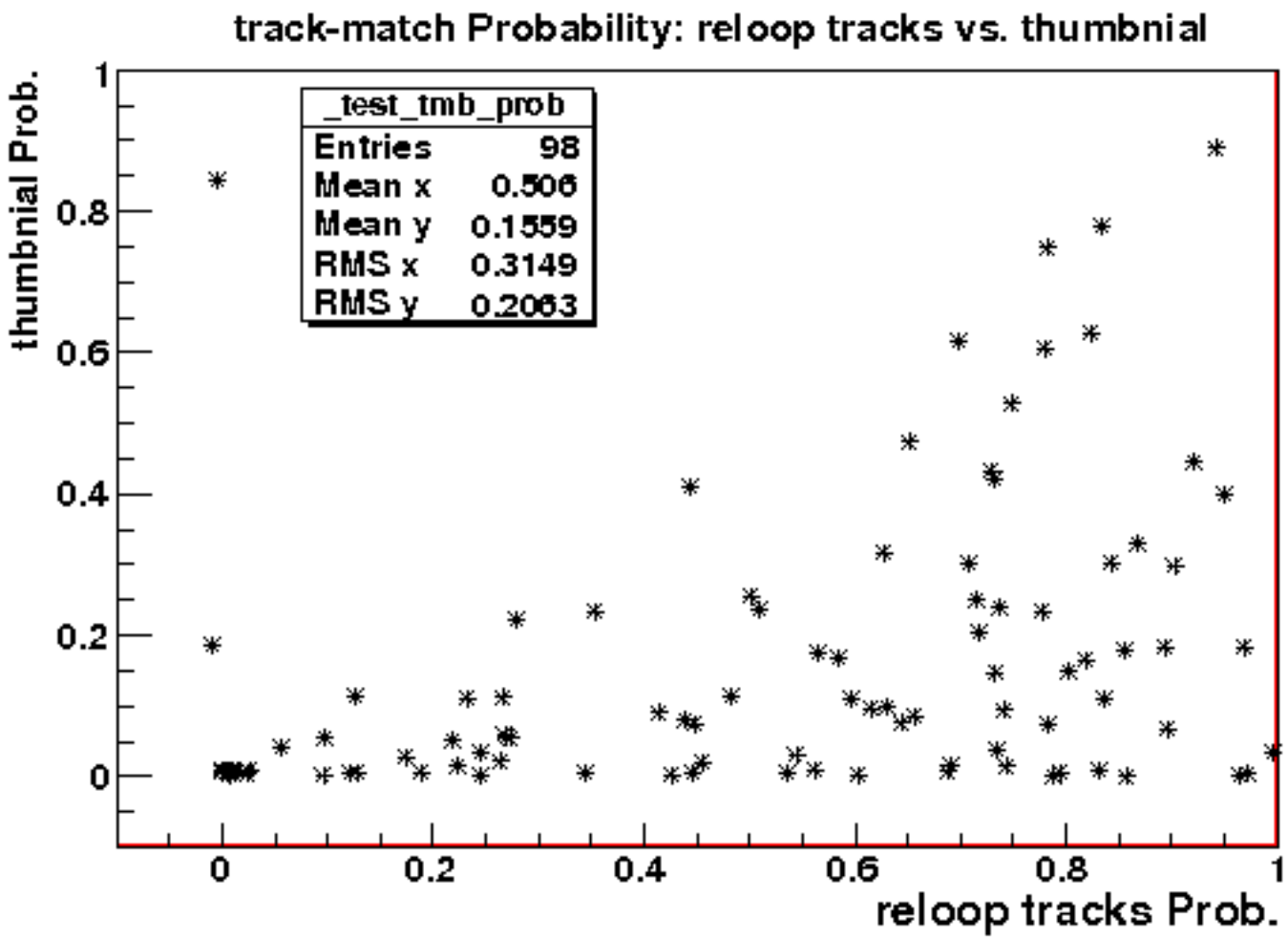


dφ dependence vs. EM η,$\varphi$and pT



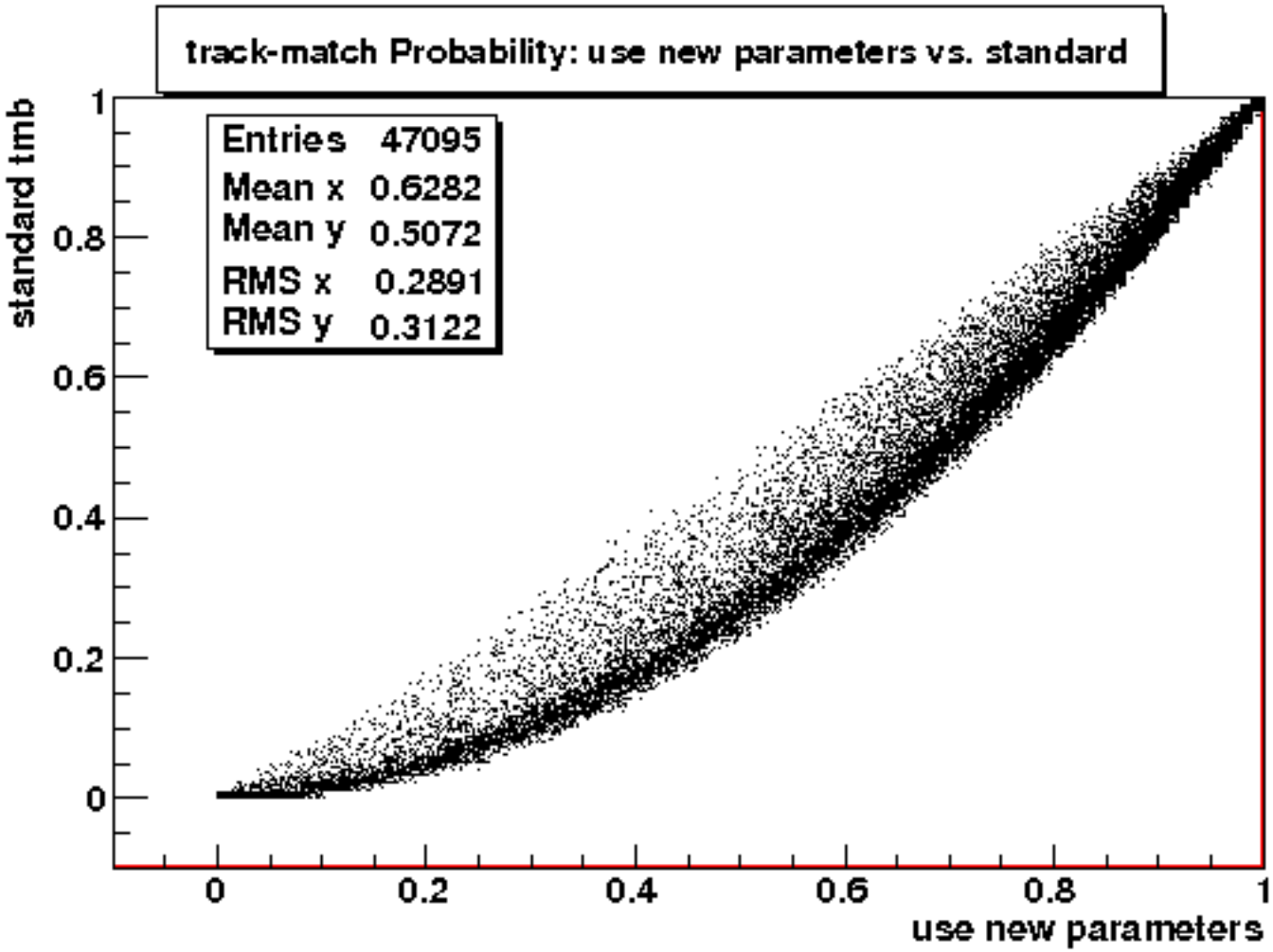
re-loop tracks

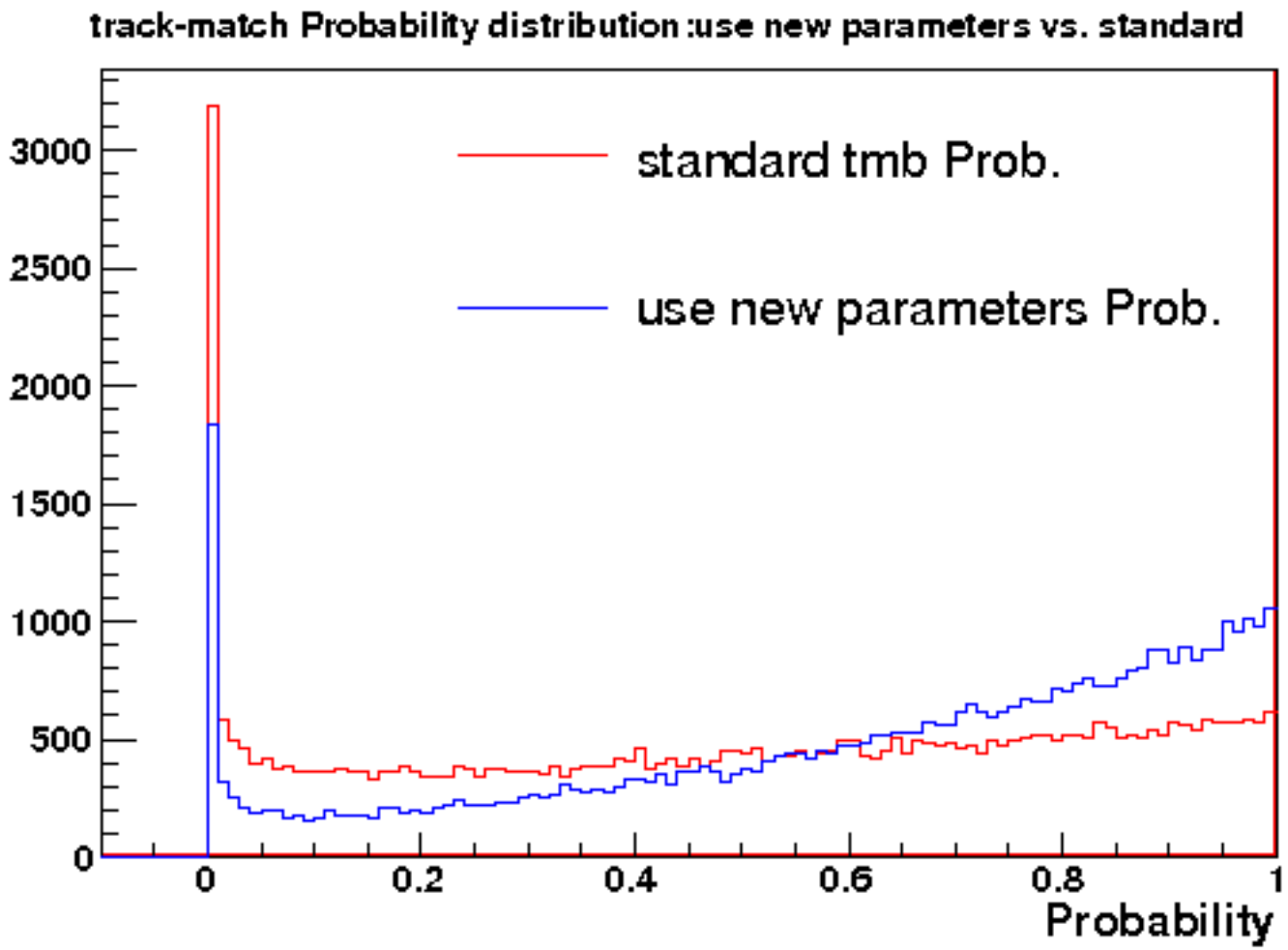
- 1. use loose cuts to loop all track:
  - (1)track pT > 10 GeV
  - (2)dphi_trk_EM > 0.1, deta_trk_EM > 0.1
  - (3)eta_trk < 5
- 2. calculate probability, to see if this track also selected by standard emreco
- 3. select different track : 98/47095 $\approx$ 0.2 %


track-match Probability: reloop tracks vs. thumbnial
_test_tmb_prob
Entries 98
Mean x 0.506
Mean y 0.1559
RMS x 0.3149
RMS y 0.2063
thumbnial Prob.
reloop tracks Prob.
0
0.2
0.4
0.6
0.8
1

2. recalculate track match probability

-- use new value of $\sigma\eta$ and $\sigma\varphi$





the ratio of Prob > 0.01

Before use new value of $\sigma\eta$ and $\sigma\varphi$: 85%

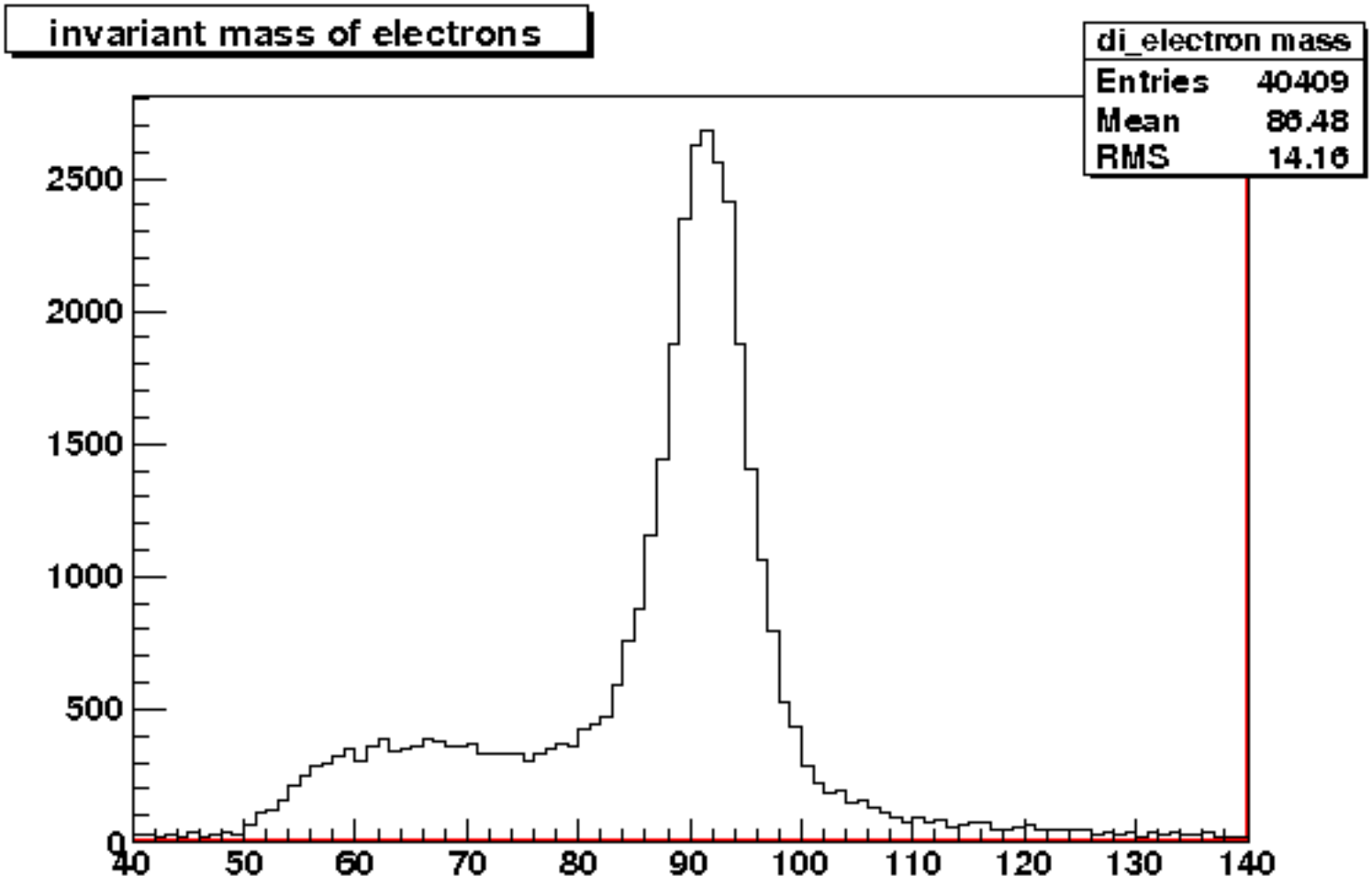
After use new value of $\sigma\eta$ and $\sigma\varphi$: 92%

Summary

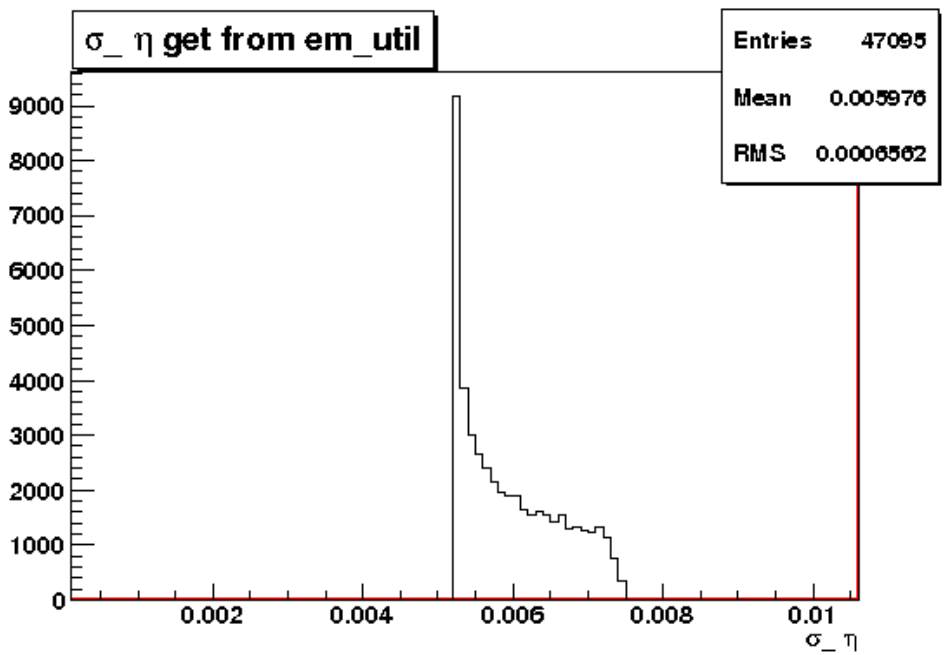
- 1. There is no big problem in p17 electron track finding.
- 2.If we use new value of $\sigma\eta$ and $\sigma\varphi$,we will have a better track-match efficiency in p17 data
- 3.It's time to have a look at p20 and add EOP

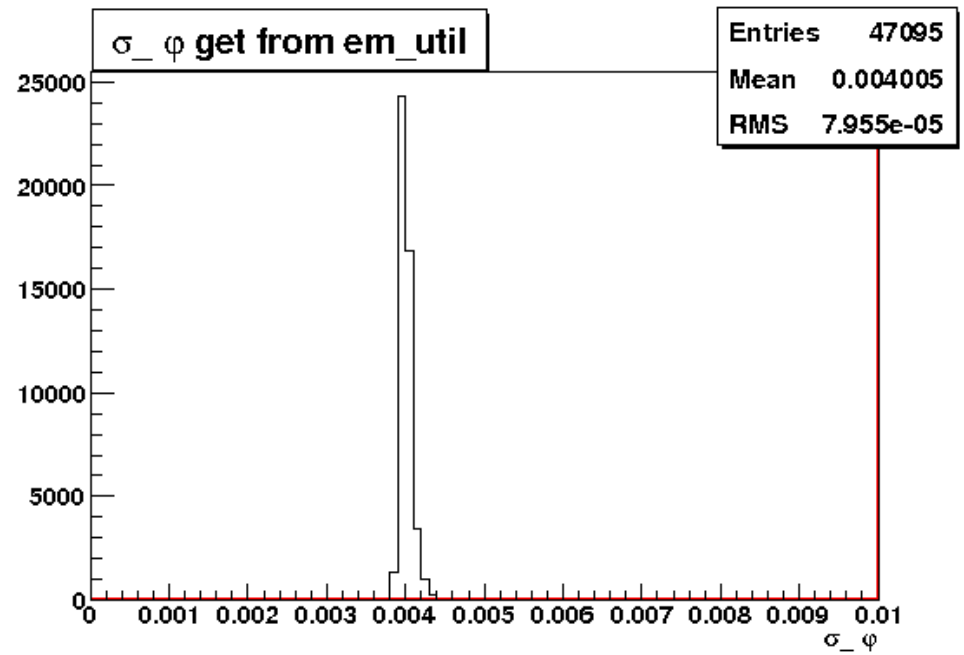
Backup

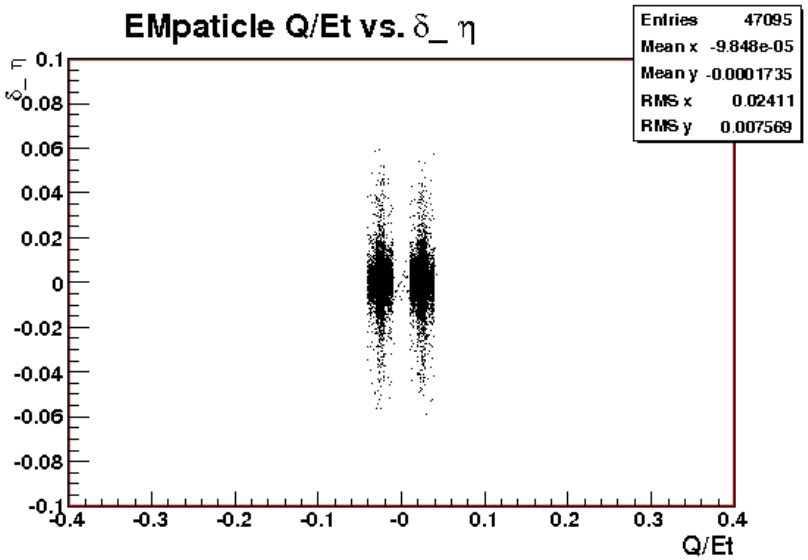
Two electrons invariant mass

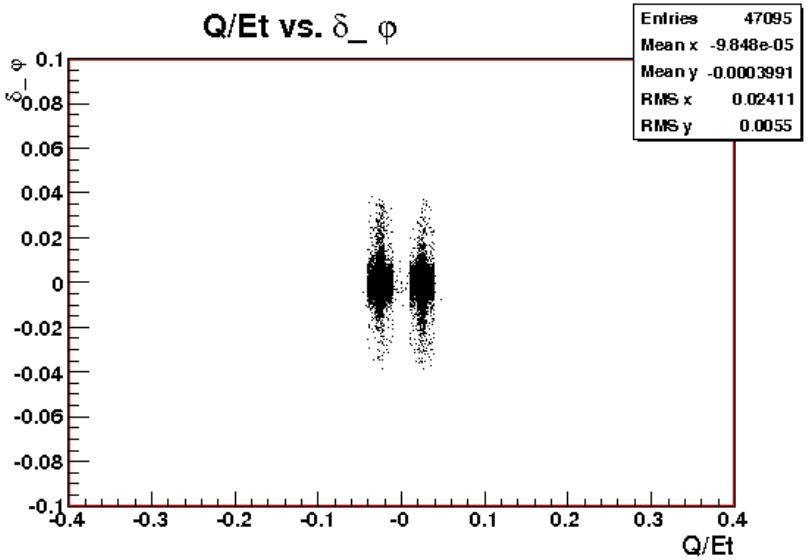


previous $\sigma\eta$ and $\sigma\varphi$ distribution






EMpaticle Q/Et vs. δ_ η
Entries 47095
Mean x -9.848e-05
Mean y -0.0001735
RMS x 0.02411
RMS y 0.007569
δ_ η
Q/Et


Q/Et vs. δ_ φ
Entries 47095
Mean x -9.848e-05
Mean y -0.0003991
RMS x 0.02411
RMS y 0.0055
δ_ φ
Q/Et