Compton run#65080 Data Analysis

PrimeX-II weekly meeting

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outline

65080 run root file :

eg, tdiff , tid ,id1 1d2 , x1 ,x2,y1,y2,e1,e2

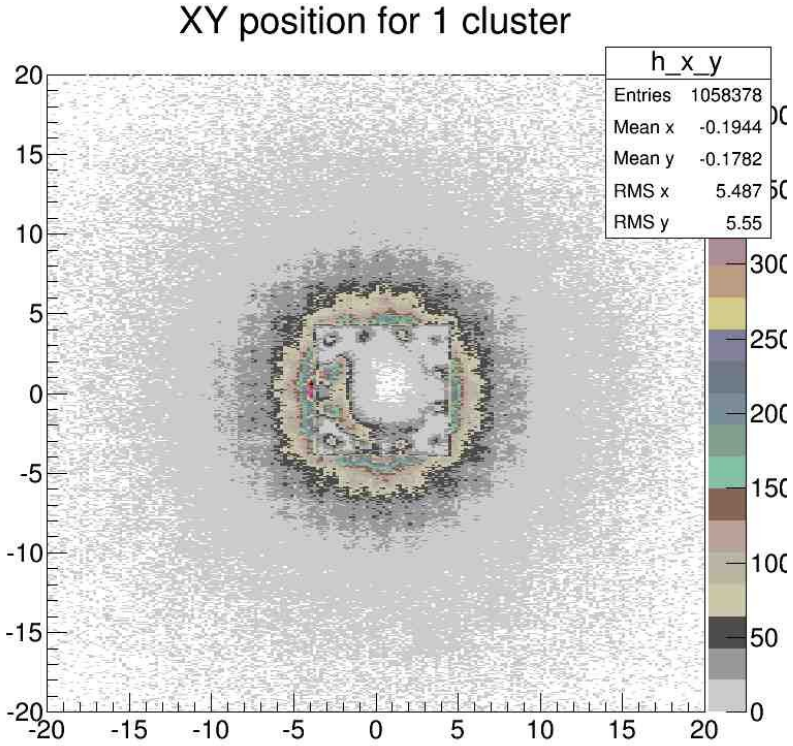
total events 1.06 M

basically followed pawel's analysis note for primex-1

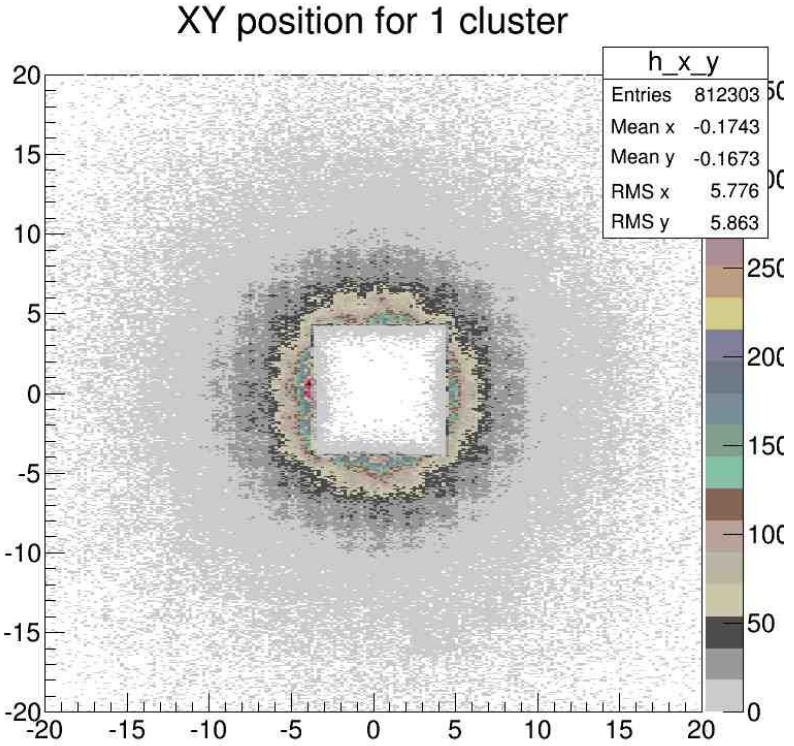
- e1 ,e2< 0.5 GeV cut
- XY position cut
- Tdiff cut
- Azimuthal Angle diff cut
- Cluster Separation cut
- interaction vertex cut (Z position)
- energy conservation cut

XY position cut

use id1&id2 info. cut out the inner layer modules



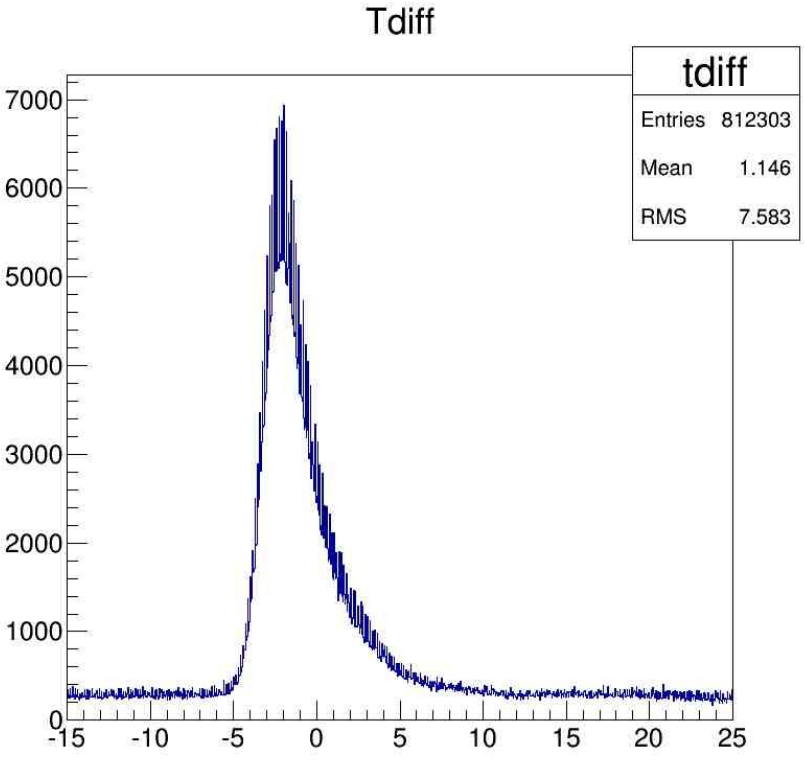
XY position plot before any cut

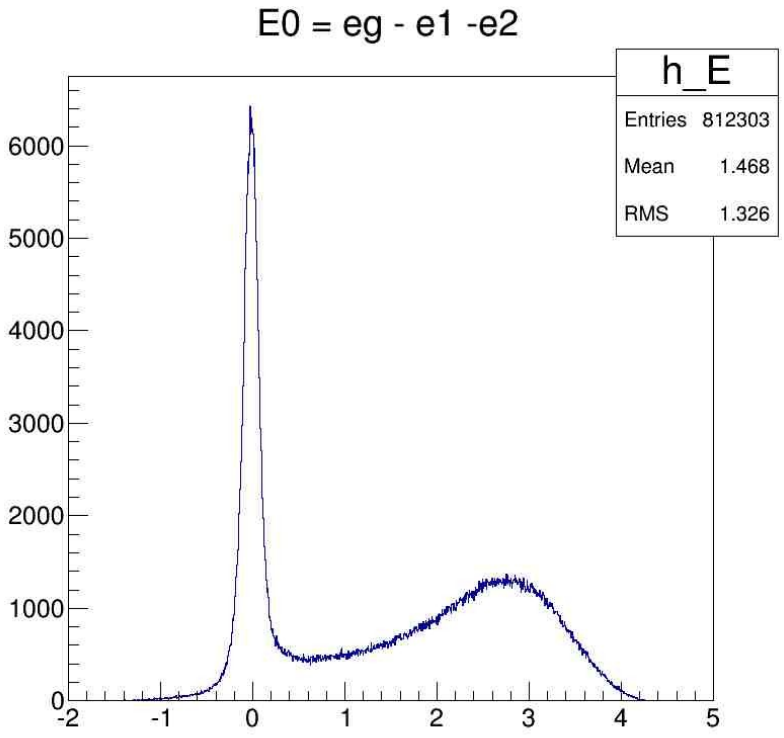


XY position plot after cut

Tdiff cut

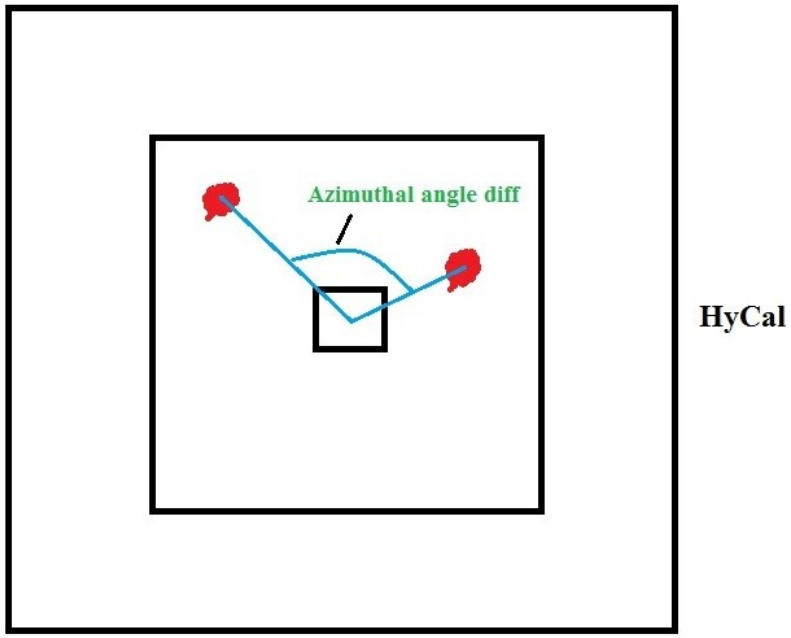
apply energy cut e1>0.5 e2>0.5
then tdiff < -10. || tdiff > 15.)

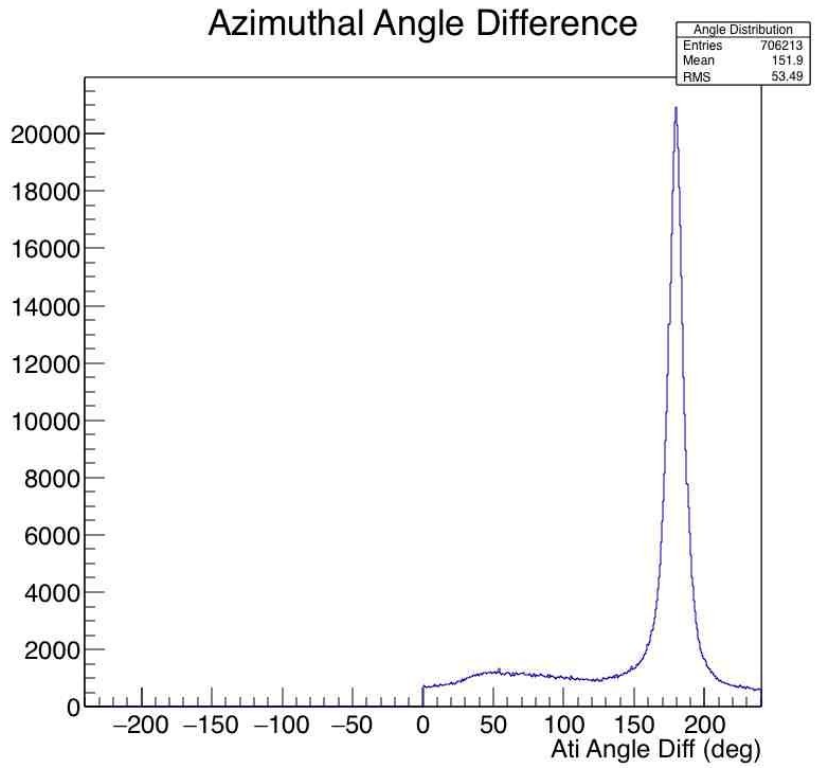




Azimuthal Angle diff cut

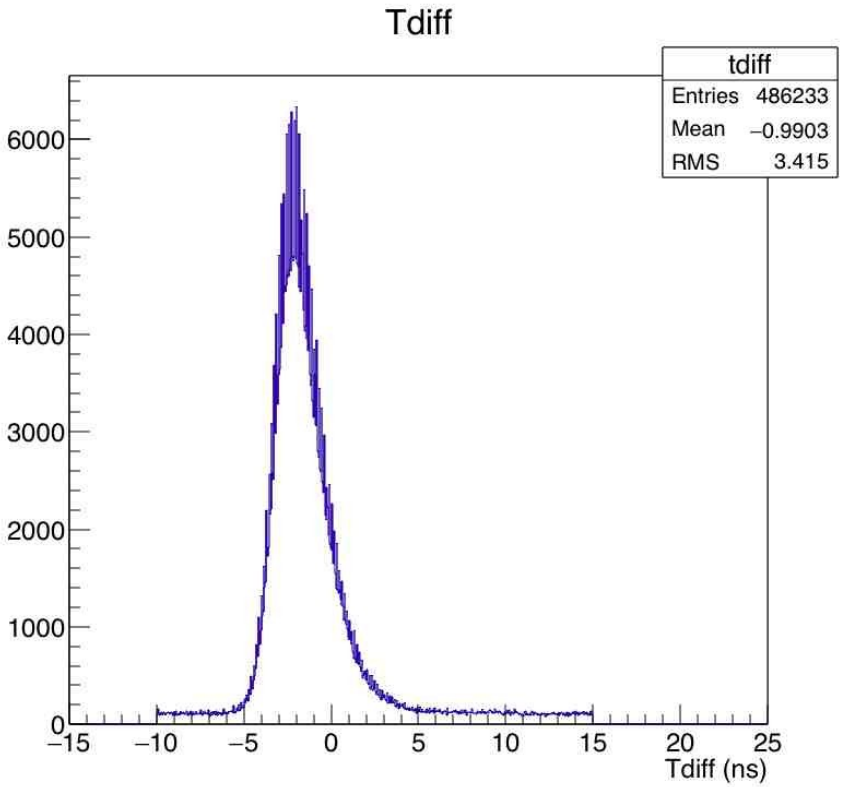
Azimuthal angle diff =

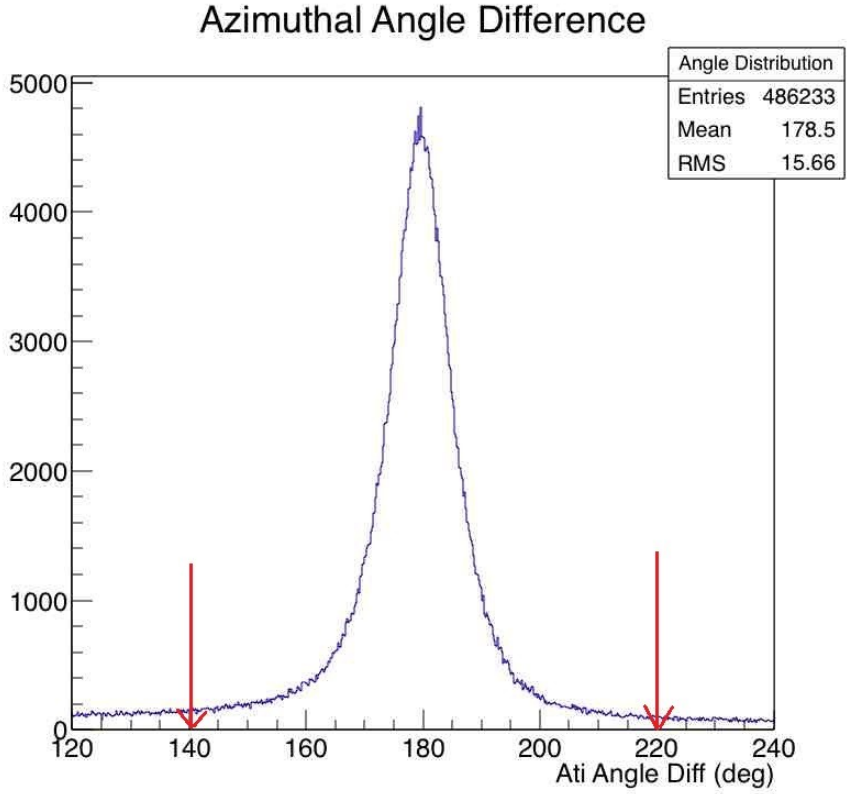




mean value for angle is 151deg, not good

add e1+e2 < 2.5 GeV cut



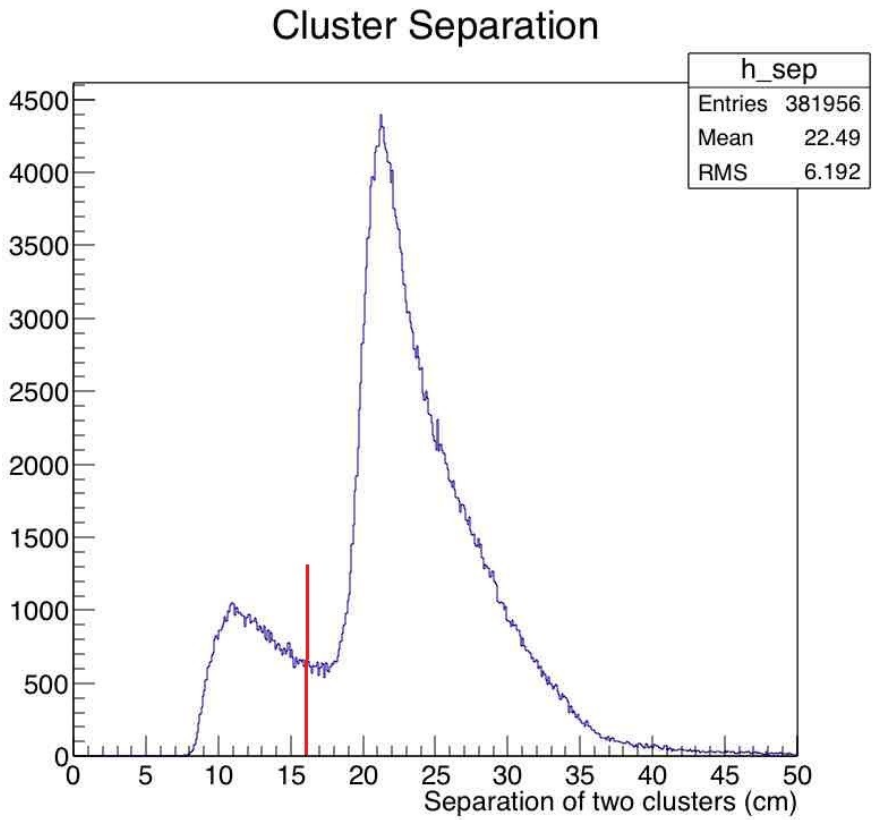


mean value for angle is 178.5 deg

then apply cut (140 - 220 deg) ~ 5*15.6

Cluster Separation cut

is the distance between two clusters : sqrt($(x1-x2)^2+(y1-y2)^2$)

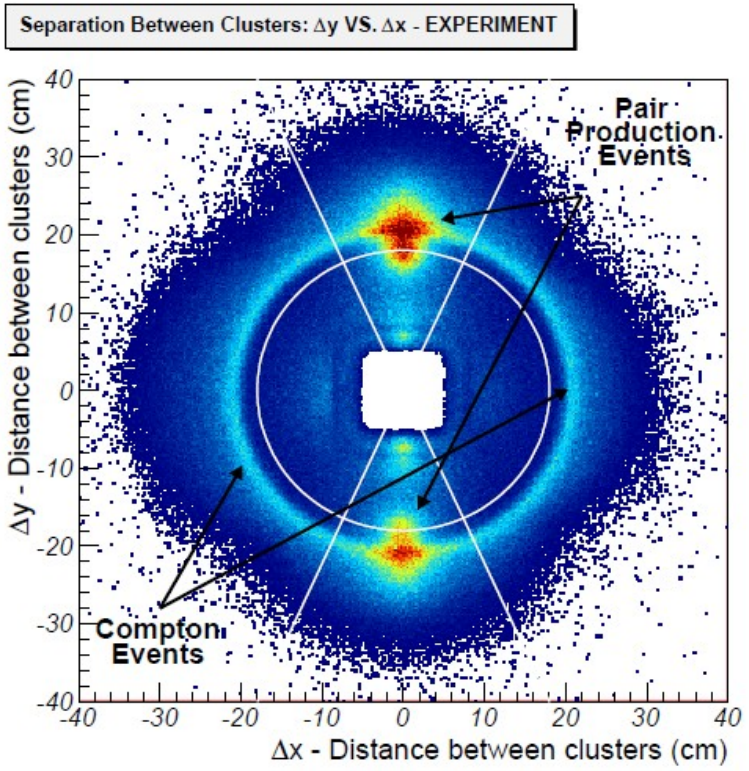


use cut > 16 cm

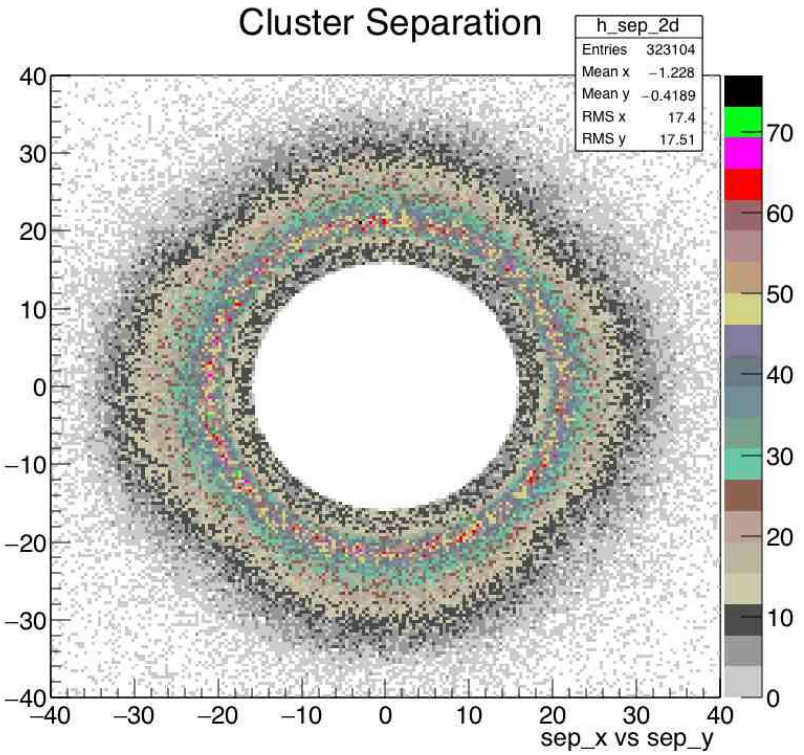
same as pawel

Separation between clusters

pawel results from Primex-1

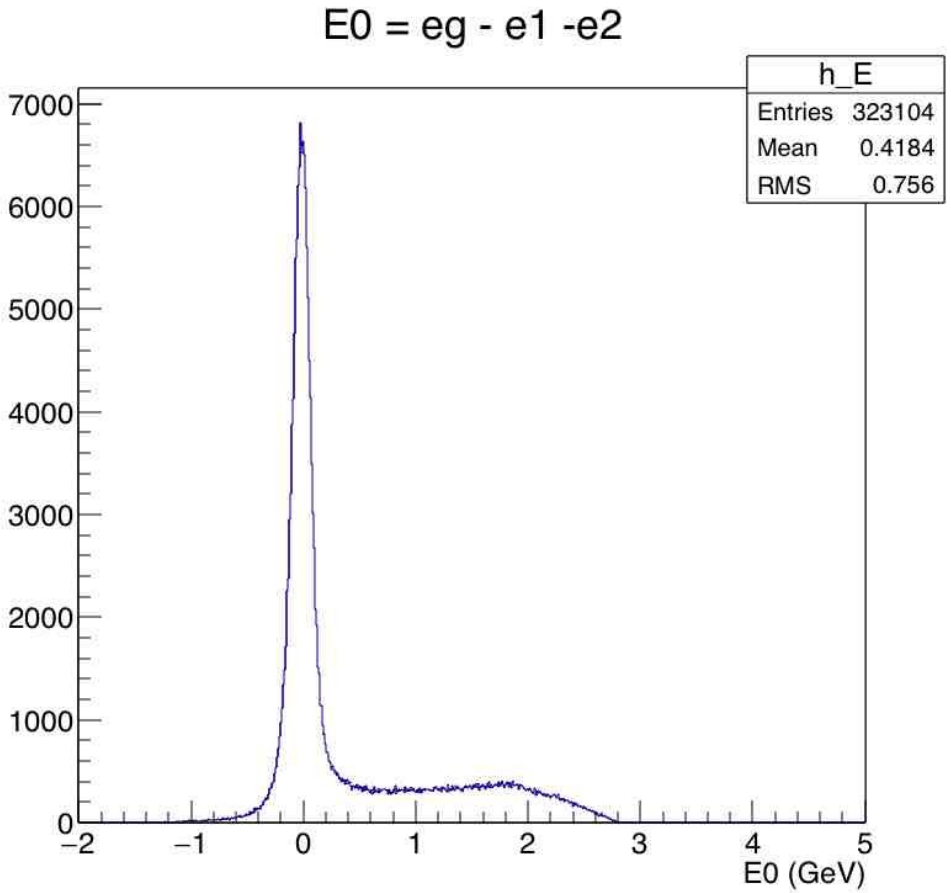


run#65080 results from Primex-2



Energy conservation

E0 = eg - (e1 +e2) ~~ 0 current cut < 2.5GeV. need more cut ?



Z reconstruction

$E' = E0/(1+(1-\cos(\theta\ \gamma))E\ 0/m\ e)$
Similarly, for the electron its energy is given by,

$E' = (E0+me)/(1+(1-\cos(\theta\ \gamma))E\ 0/m\ e)$

Using the above notation the opening angle, $\psi = \arccos(k' \cdot p)$, between scattered electron

and photon can be calculated from the energy-momentum conservation,

$\cos\psi = 1 - m\ e\ E\ 0/E'\ E\ e$.

Then use $\psi = \arctan(r1/z)+\arctan(r2/z)$ we can reconstruct Z position.