

Report_170823

Information

- Data
 - Run65 Minimum bias data with good spill selection
- M.C.
 - $1e9$ KL3 π^0 generation
- All distributions are normalized with P.O.T.
 - $3.8e7/2e14$ (3 π^0 flux)

Incident Gamma Energy

- Reconstruction of incident energy of 6th gamma going to Barrel
- Opening angle is related to HitZ of Barrel

$$E_6 = \frac{M_\pi^2}{2E_5(1-\cos\theta)}$$

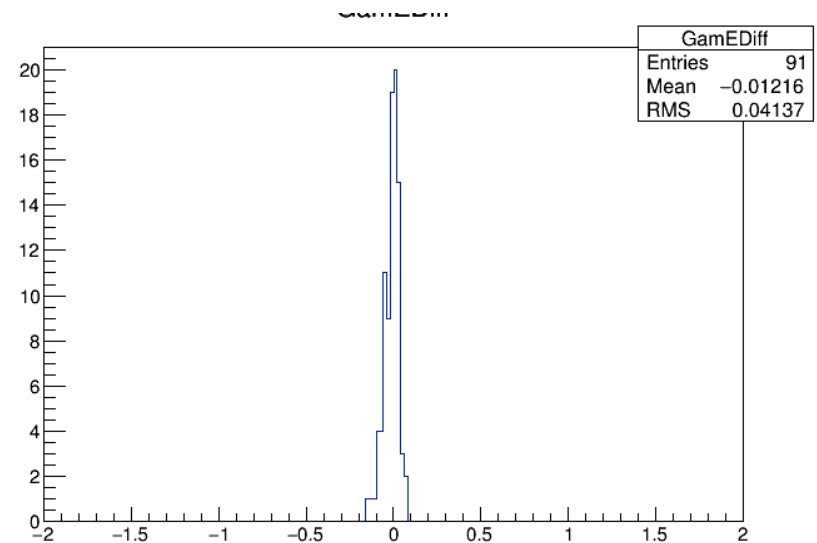
- Only one hit in Barrel

Event Statistics (M.C.)

- After full selection : 38163
 - Veto & Kinematical cut & Only one hit
- Total mismatched event(or mis-reco) : 162
 - Dalitz decay background : 0
 - Two Gammas going to Barrel (From GenEndPos)
 - 92
 - No Gamma Going to Barrel : 70
- Low S.F. event : 90
 - 4 events are mismatched events

Two gammas going to barrel

- Bug of GenEndPos
- New Gamma matching using momentum
 - All events are mismatched due to bug of GenEndPos
- Those events are well reconstructed



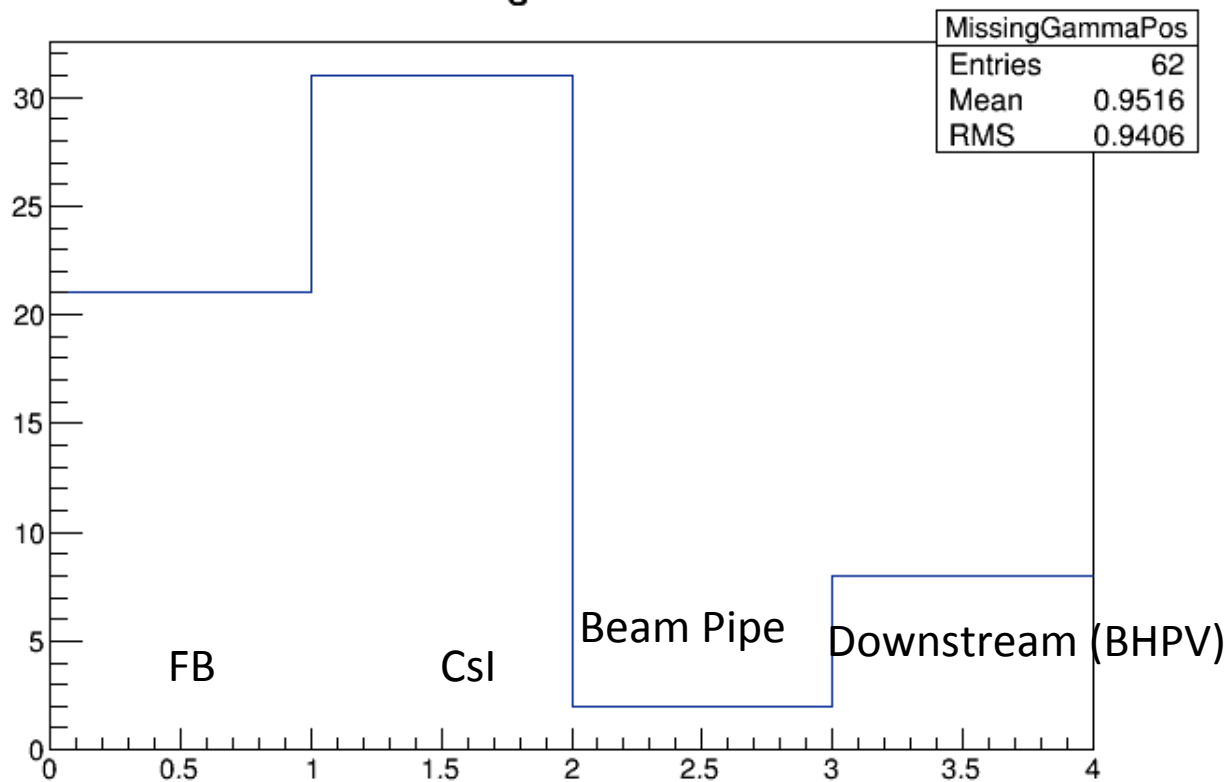
*For one event,
GenEndPos of 2gammas direct same module

No gamma going to barrel

- Matching Number==4 -> 3 events
 - One to one matching for 4 gammas
- Matching Number==5 -> 64 events
 - One to one matching for 5 gammas
- Matching Number==6 -> 3 events
 - One to one matching for 4 gammas && double matching for one gamma

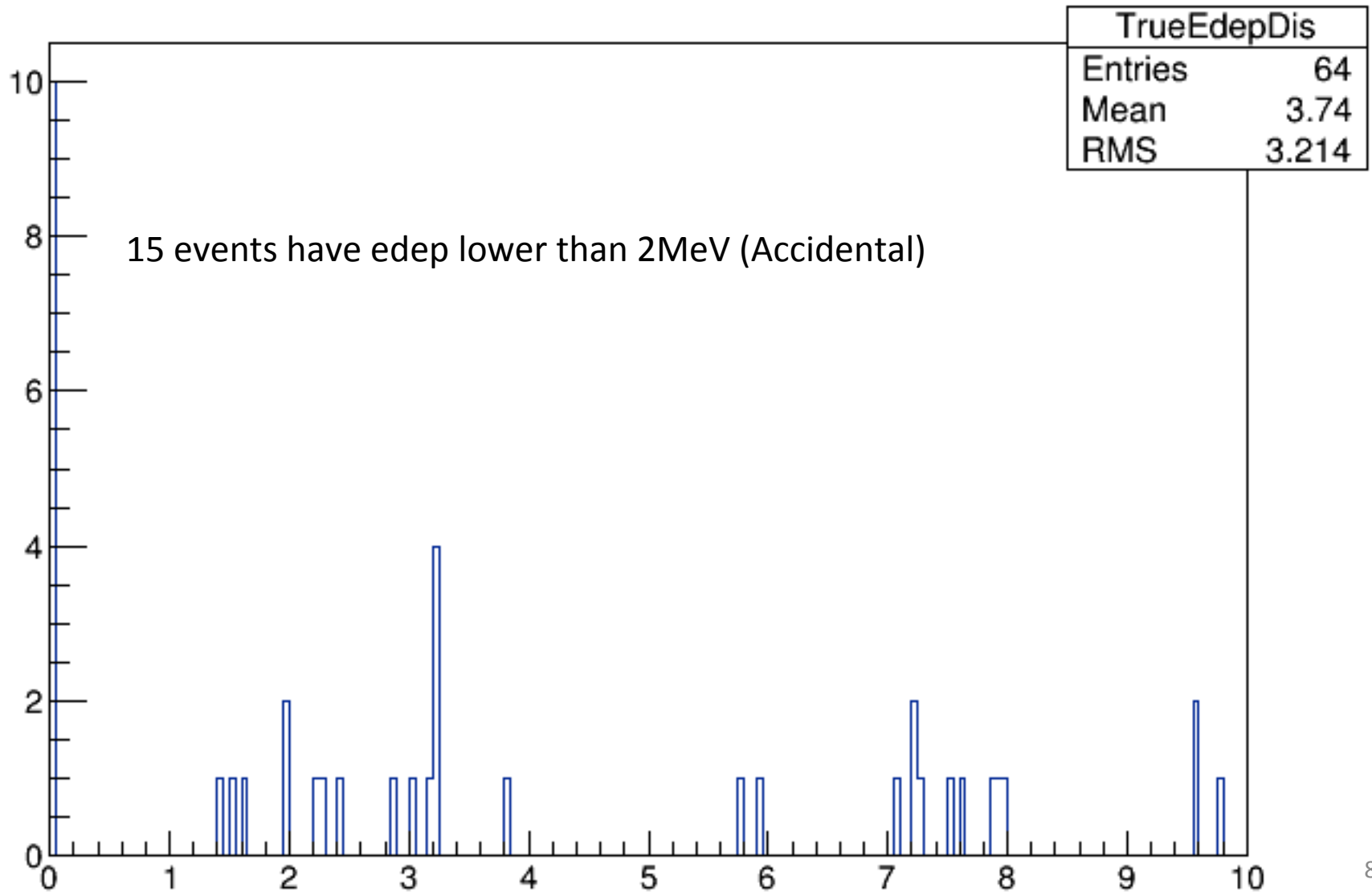
Matching number == 5

- One gamma doesn't go to barrel



Undecided gamma position
436.51, 833.193, 6090.7
-192.026, 916.081, 6116.32

True Edep for Matching number == 5



Matching number == 4

- MatchingNumber == 4
 - MisMatching occur due to Energy Reco. of Gamma for 2 events
 - Accidental Hit on Barrel && 2 gammas make one cluster for 1 event

Evt Num	Reco	Gen
1	-50.5657, 553.764, 386.35	-83.1173, 506.007,, 282.345
2	-181.581, -363.96, 585.859	-107.608, -355.715, 351.388

Mis Reco. of Energy

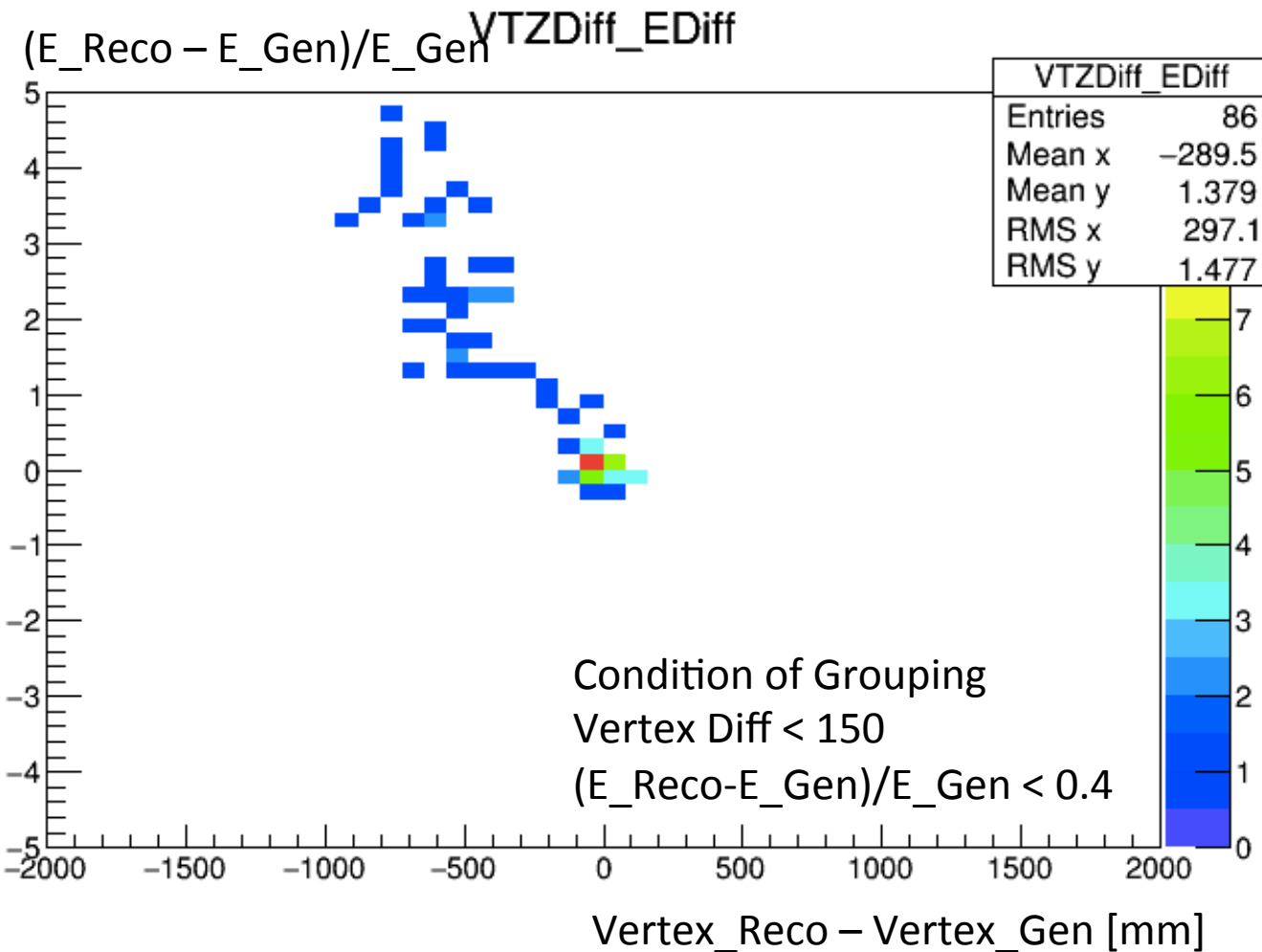
Matching Number == 6

- Double matching occur due to adjacent 2 gammas
 - 3 events from back splash?
 - In all 3 events, no gamma went to barrel
 - Csl(1), FB(1), BeamPipe(1)
- All information are ready at backup

Low S.F. Event

- Mismatched 4 events
 - 2 events : two gamma going to barrel
 - 2 events : no gamma going to barrel
 - 1 event : Matching number 5
 - One gamma going to BHPV
 - True Edep (2.2)On module55, Back Splash?
 - 1 event : Matching number 4
 - Energy Reconstruction of Gamma is failed
- Will be not used for Low S.F. event study

Event Grouping



- Event set 1.
Good Vertex Reco &
Good Energy Reco
35
- Event set 2.
Good Vertex Reco &
Bad Energy Reco
3
- Event set 3.
Bad Vertex Reco &
Bad Energy Reco
48

Event set 2.

Evt No	EDEP(Reco)	EDEP(True)	HitZ(Reco)	HitZ(NoResolution)	HitZ(True, Weighted)
1	2.519	2.603	4957	4831	4509
2	2.257	2.064	5500	5493	4849
3	6.772	9.774	5241	5106	4443

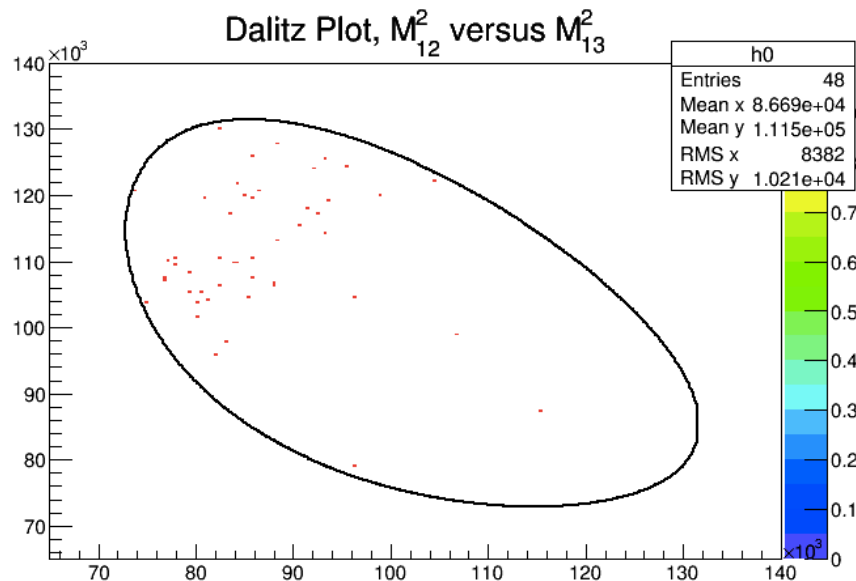
*1.177, 21.83, 44, -853.3, 769.3, 4475, 11,
 0.9767, 21.85, 44, -857, 770.7, 4480, 11,
 0.06876, 22.62, 44, -944.2, 883.7, 4659, 11,
 0.02426, 22.62, 44, -944.1, 883.6, 4659, 11,
 0.02457, 22.62, 44, -944, 883.5, 4659, 11,
 0.03362, 22.62, 44, -944, 883.5, 4659, 11,
 0.02865, 22.62, 44, -943.9, 883.4, 4659, 11,
 0.02561, 22.62, 44, -943.8, 883.3, 4659, 11,
 0.03299, 22.62, 44, -943.8, 883.3, 4659, 11,
 0.02547, 22.62, 44, -943.8, 883.4, 4660, 11,
 0.02729, 22.62, 44, -943.8, 883.4, 4660, 11,
 0.03862, 22.62, 44, -943.8, 883.5, 4660, 11,
 0.1202, 22.62, 44, -943.8, 883.6, 4660, 11,*

EVT No1

EDEP//Time//ModID//X//Y//Z//PID

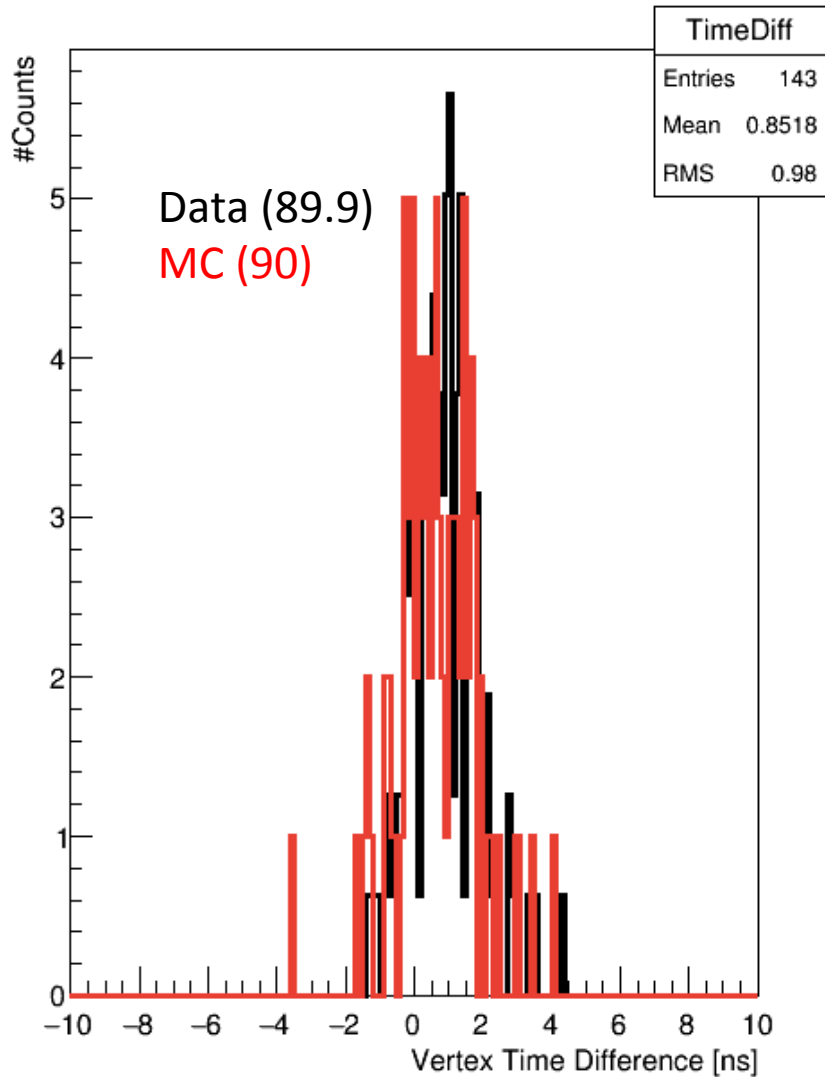
Event set 3.

- Mis-reconstruction of vertex induces Mis-reconstruction of energy
 - low sampling fraction
- All events have wrongly paired pion

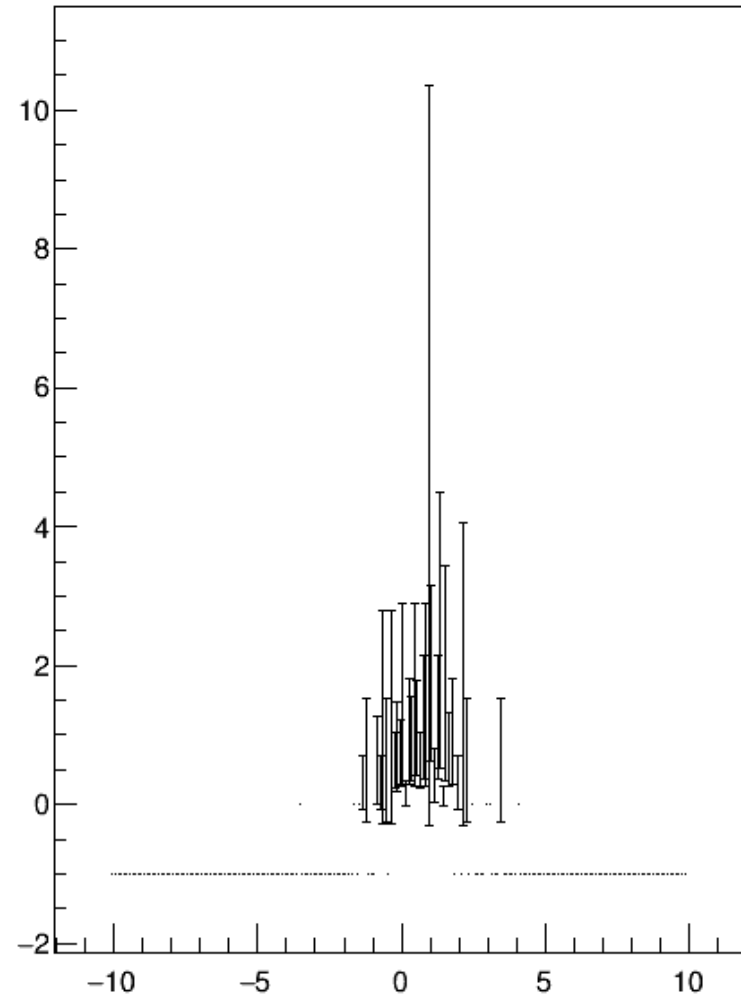


Detector Response

Vertex Time Difference Distribution

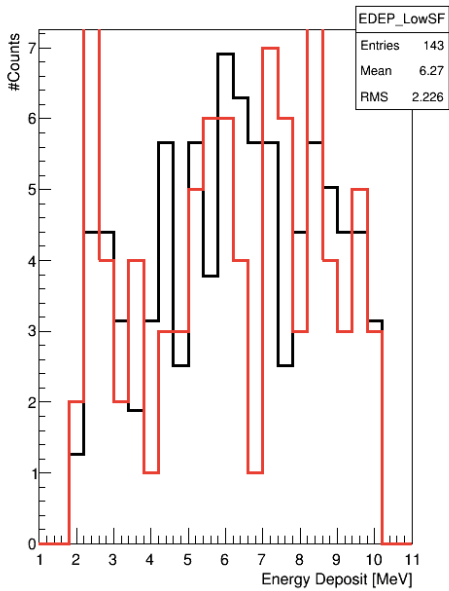


Data/M.C.

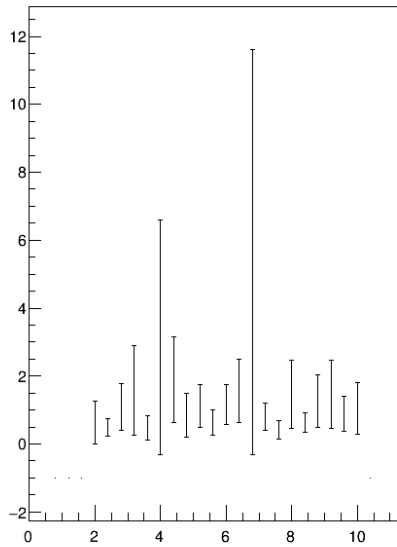


Detector Response (2)

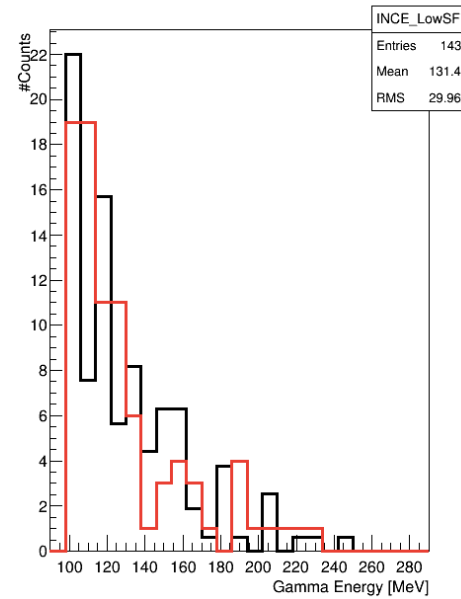
Energy Deposit Distribution



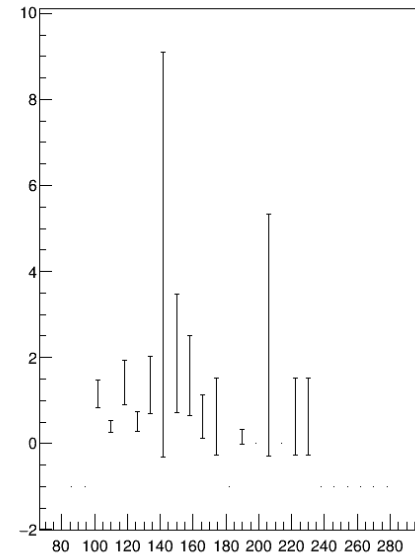
Data/M.C.



Gamma Energy Distribution

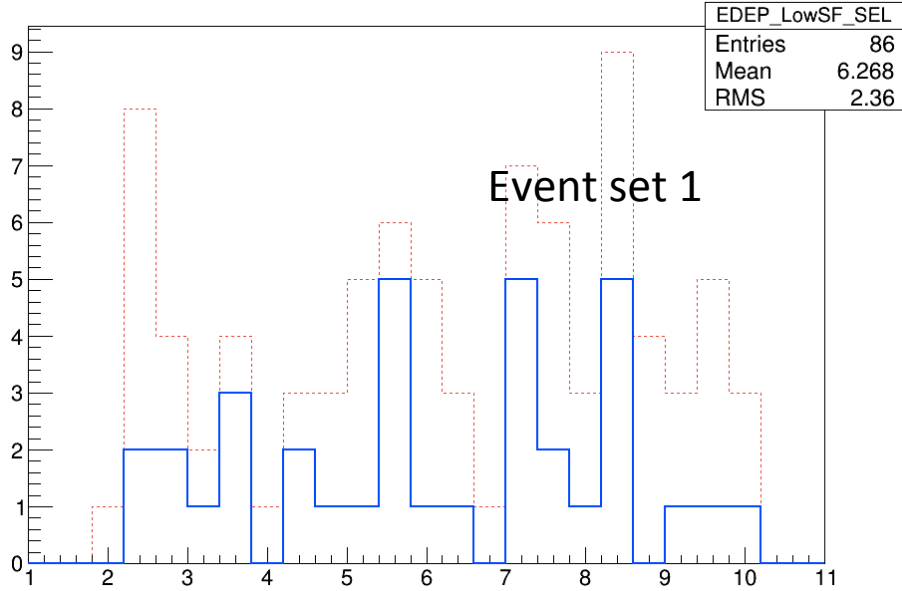


Data/M.C.

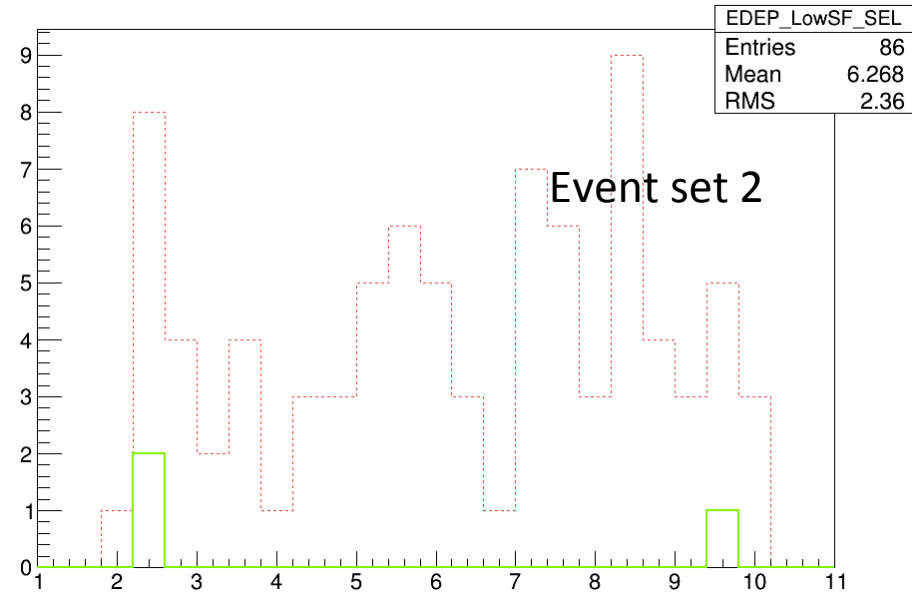


Event Decomposition

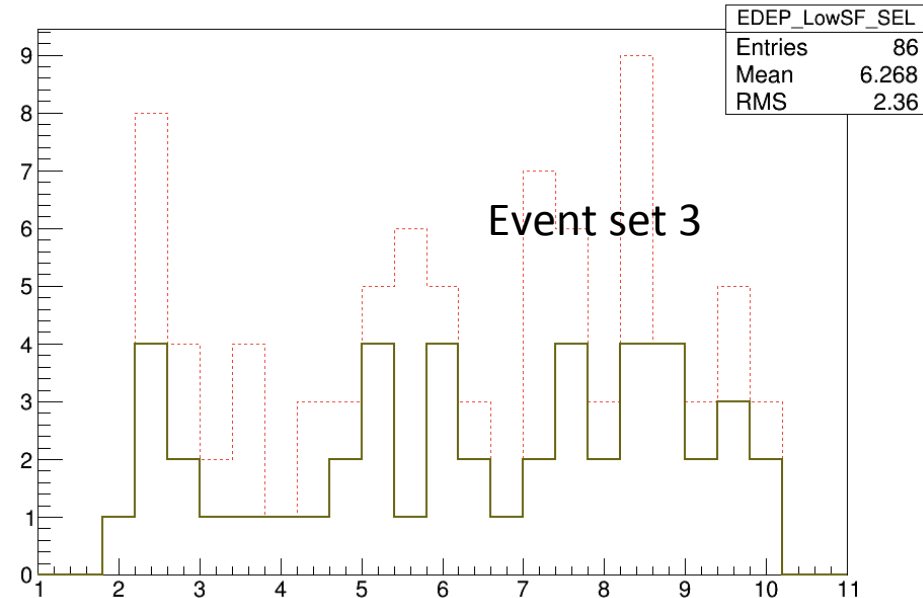
EDEP_LowSF_SEL



EDEP_LowSF_SEL



EDEP_LowSF_SEL



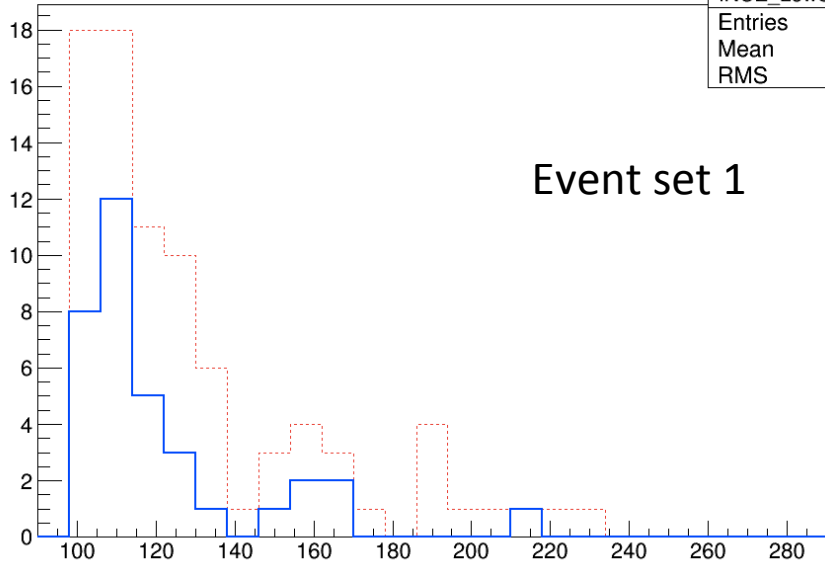
Energy deposit distribution

Event Decomposition

INCE_LowSF_SEL

INCE_LowSF_SEL	
Entries	86
Mean	129.8
RMS	31.59

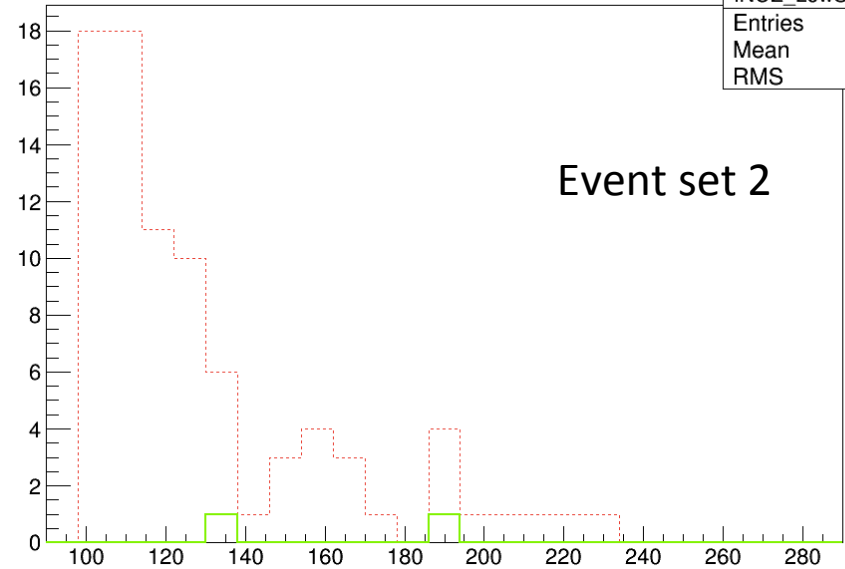
Event set 1



INCE_LowSF_SEL

INCE_LowSF_SEL	
Entries	86
Mean	129.8
RMS	31.59

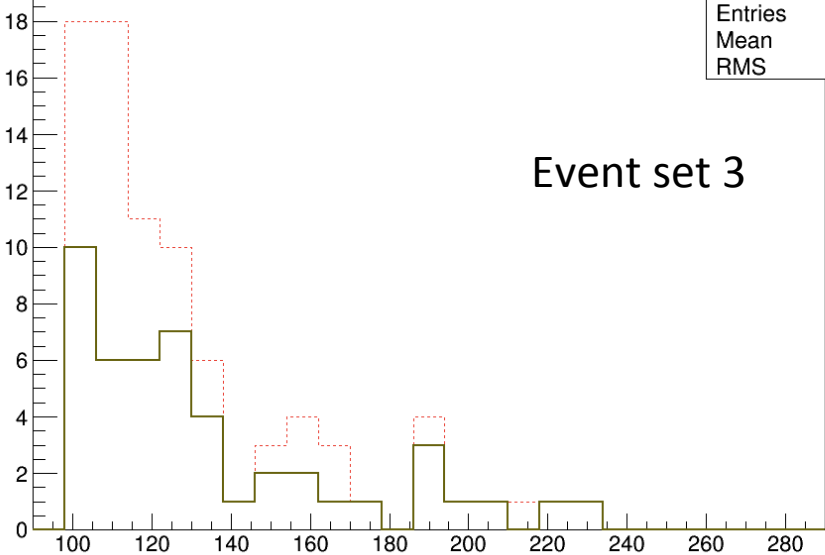
Event set 2



INCE_LowSF_SEL

INCE_LowSF_SEL	
Entries	86
Mean	129.8
RMS	31.59

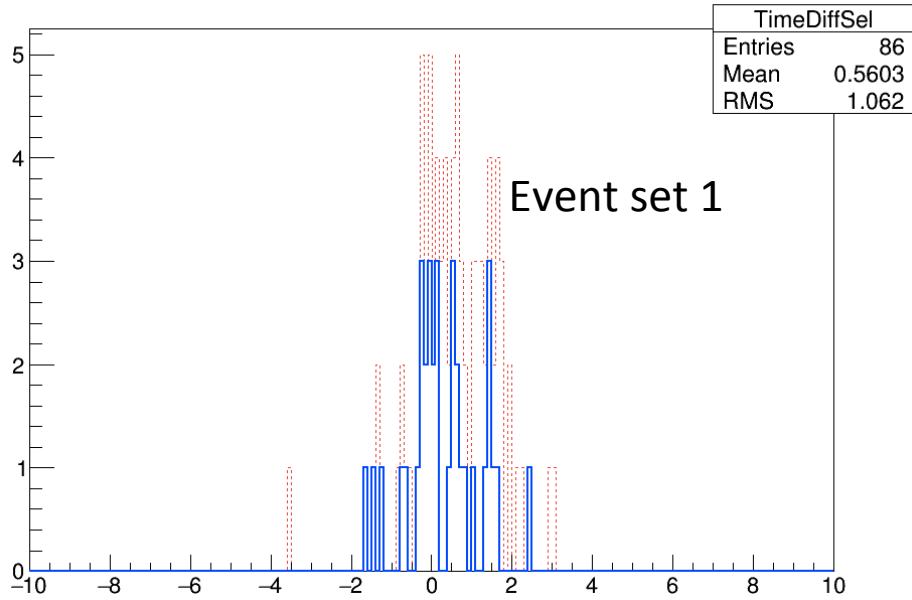
Event set 3



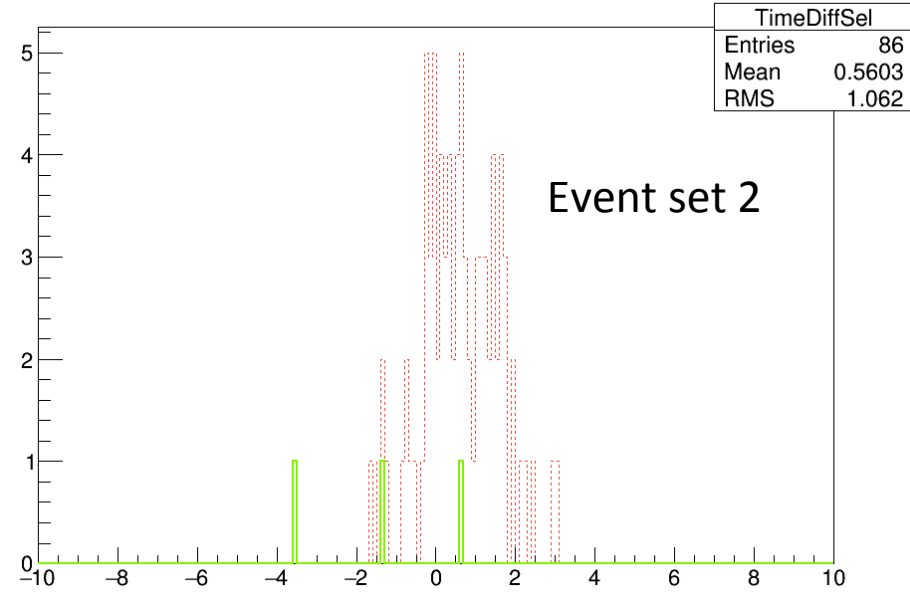
Incident gamma energy distribution

Event Decomposition

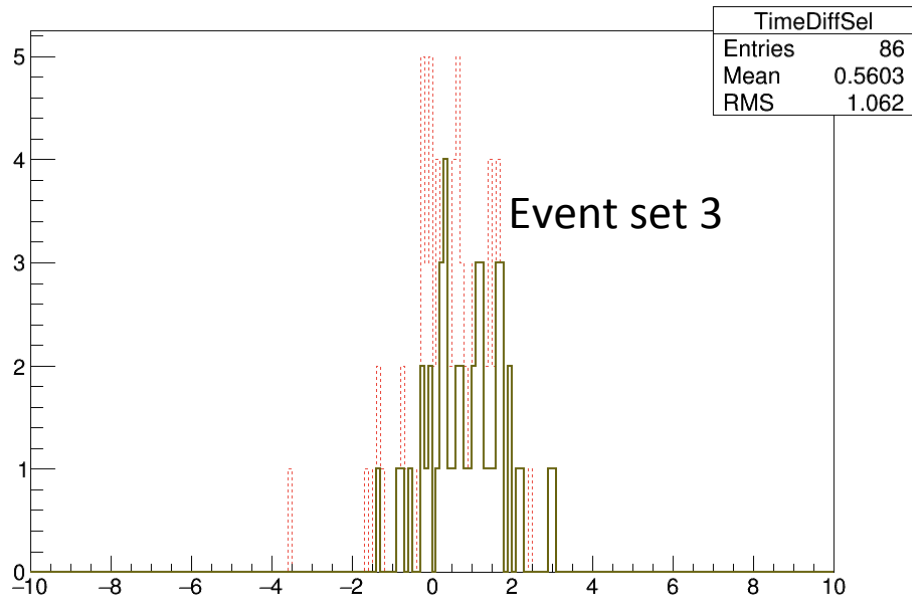
TimeDiffSel



TimeDiffSel



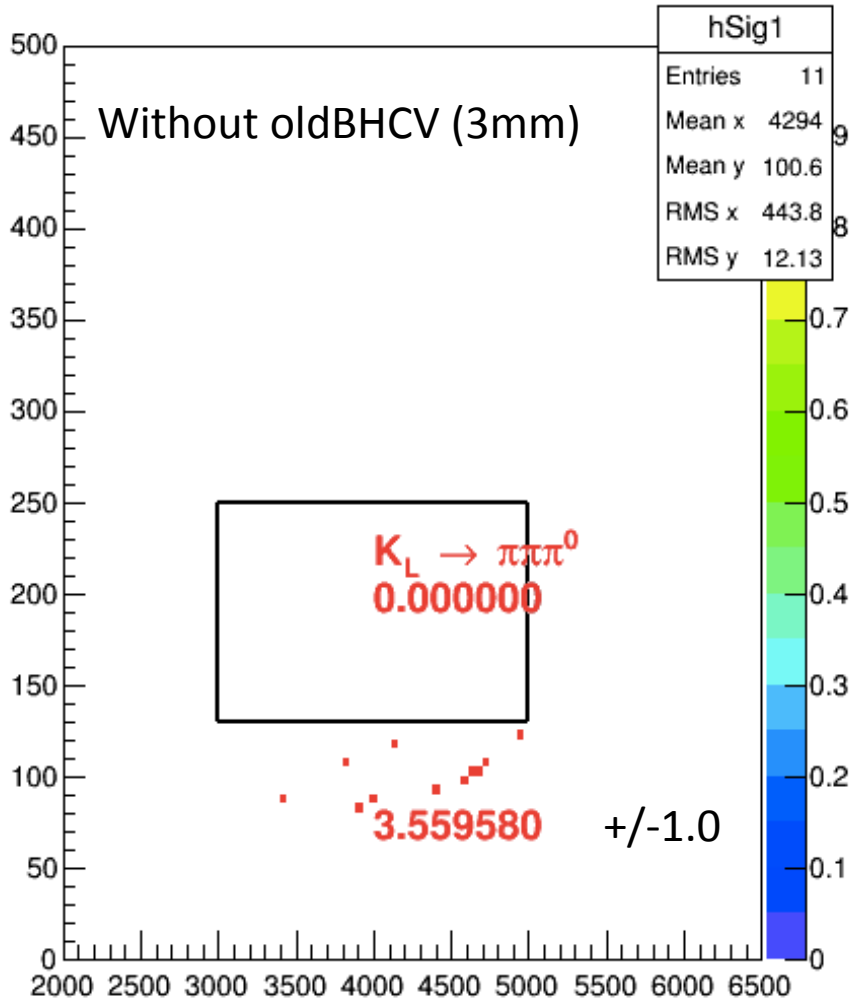
TimeDiffSel



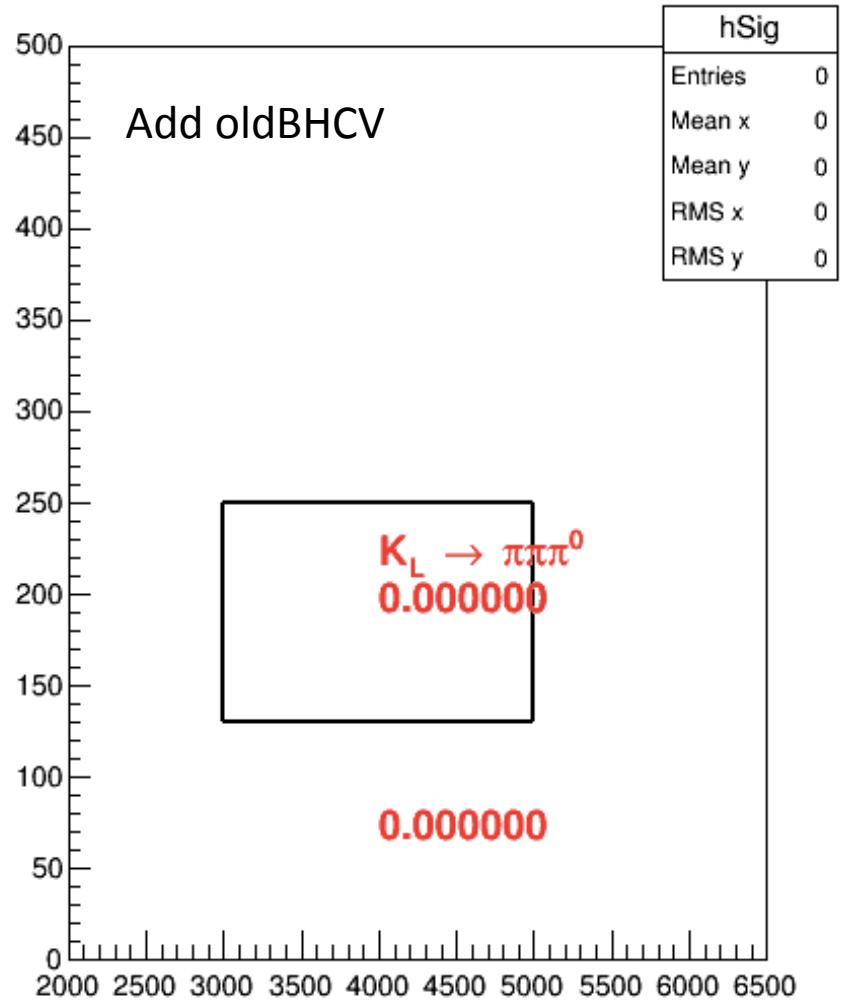
Vertex Time Difference Distribution

KLpipipi0 M.C.

hSig1



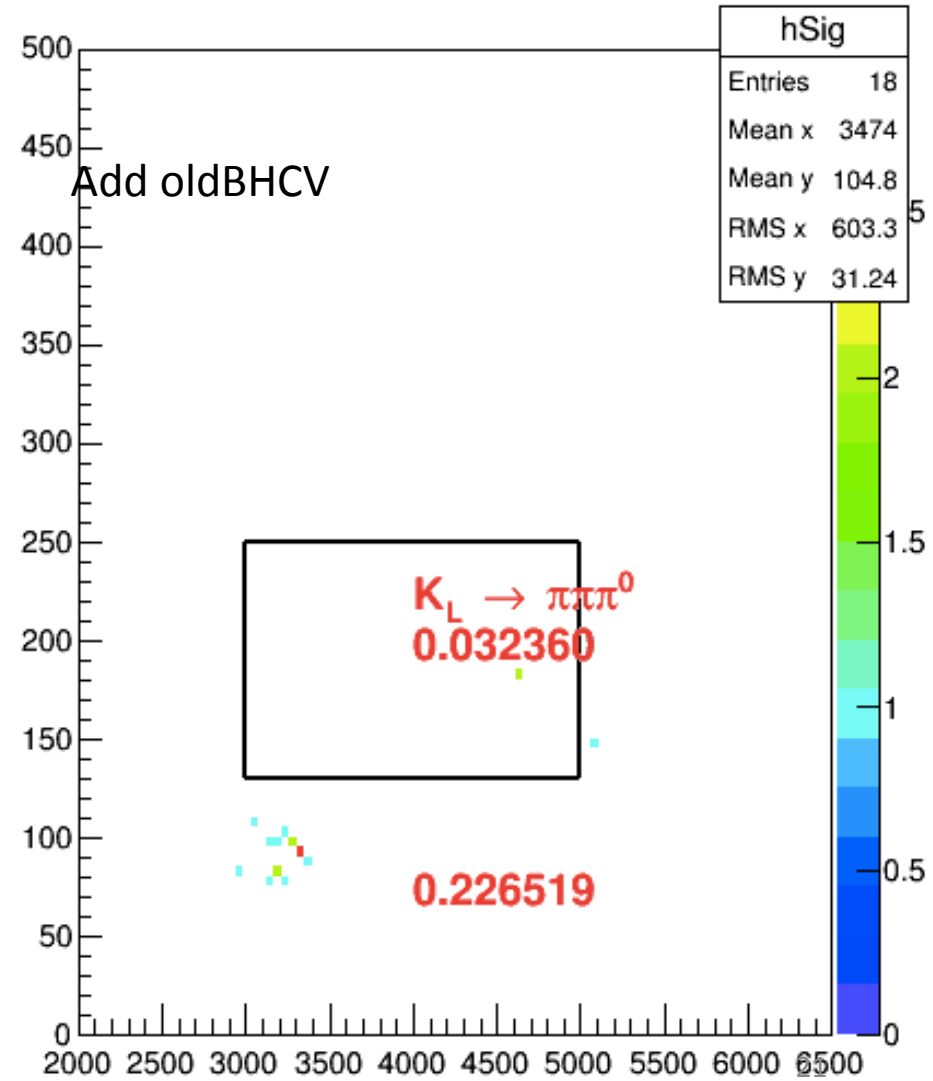
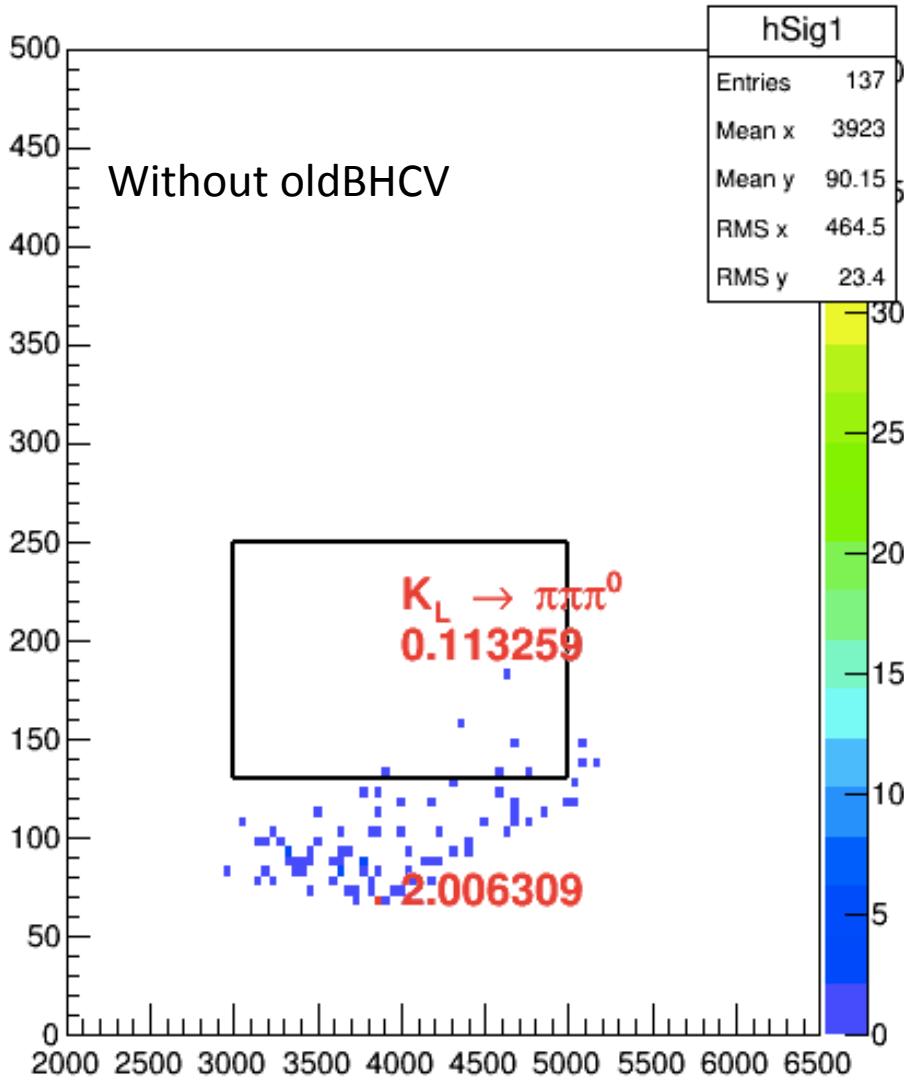
hSig



KLpipipi0 M.C. (Recycle)

hSig1

hSig



backup

Matching Number==6 (1)

*GammaPosGen******

506.322, 667.993, 6197.19, 132.479
-228.112, -535.751, 6172.43, 253.361
429.207, 636.084, 6192.77, 114.374
227.489, -109.185, 6168, 211.059
-383.71, -56.9072, 6181.85, 427.228
162.633, -345.857, 6161.51, 355.611

*Rec******

-373.407, -62.434, 430.577
163.511, -334.316, 364.276
-232.336, -542.83, 248.876
502.617, 655.692, 132.298
238.359, -113.52, 220.39

*CBAREvent******

ModID : 7
7, 20.0507, 30.6733
13, 1.24105, -192.266
39, 8.49041, 31.665
7, 19.9872
13, 0
39, 8.04985

Matching Number==6 (2)

*GammaPosGen******

*771.653, 91.5438, 6159.55, 274.443
-309.171, -411.783, 6177.82, 378.882
558.031, 280.058, 6186.66, 209.341
277.978, -199.371, 2746.18, 32.3694
-391.955, 672.935, 6194.58, 372.592
-166.115, -261.214, 6158.1, 429.933*

*Rec******

*-158.497, -255.898, 420.868
-376.864, 664.016, 382.876
-306.388, -409.454, 378.165
762.068, 81.4053, 275.363
576.953, 282.405, 207.163*

*CBAREvent******

ModID : 19

*4, 1.43632, 227.505
19, 8.64506, 25.2222
32, 1.57849, -29.4774
36, 2.19688, 152.433
49, 1.72386, -5.71099
4, 0
19, 8.50551
32, 0
36, 0
49, 0*

Matching Number==6 (3)

*GammaPosGen******

-224.473, -292.458, 6151.25, 440.947

301.994, -96.4111, 6157.46, 380.698

-94.8216, -24.0404, 7457.54, 399.782

-162.238, 797.075, 6162.95, 229.19

205.199, 175.996, 6190.56, 670.1

-221.693, -91.8652, 6161.78, 311.365

*Rec******

-215.416, -284.647, 435.26

293.863, -92.6604, 388.34

-215.136, -90.8288, 336.239

-165.316, 782.844, 205.975

214.047, 190.682, 673.083

*CBAREvent******

ModID : 63

5, 3.27728, 101.265

42, 1.77871, 31.1661

61, 1.65206, -158.126

63, 2.00381, 31.6766

5, 0

42, 1.61352

61, 0

63, 1.5329