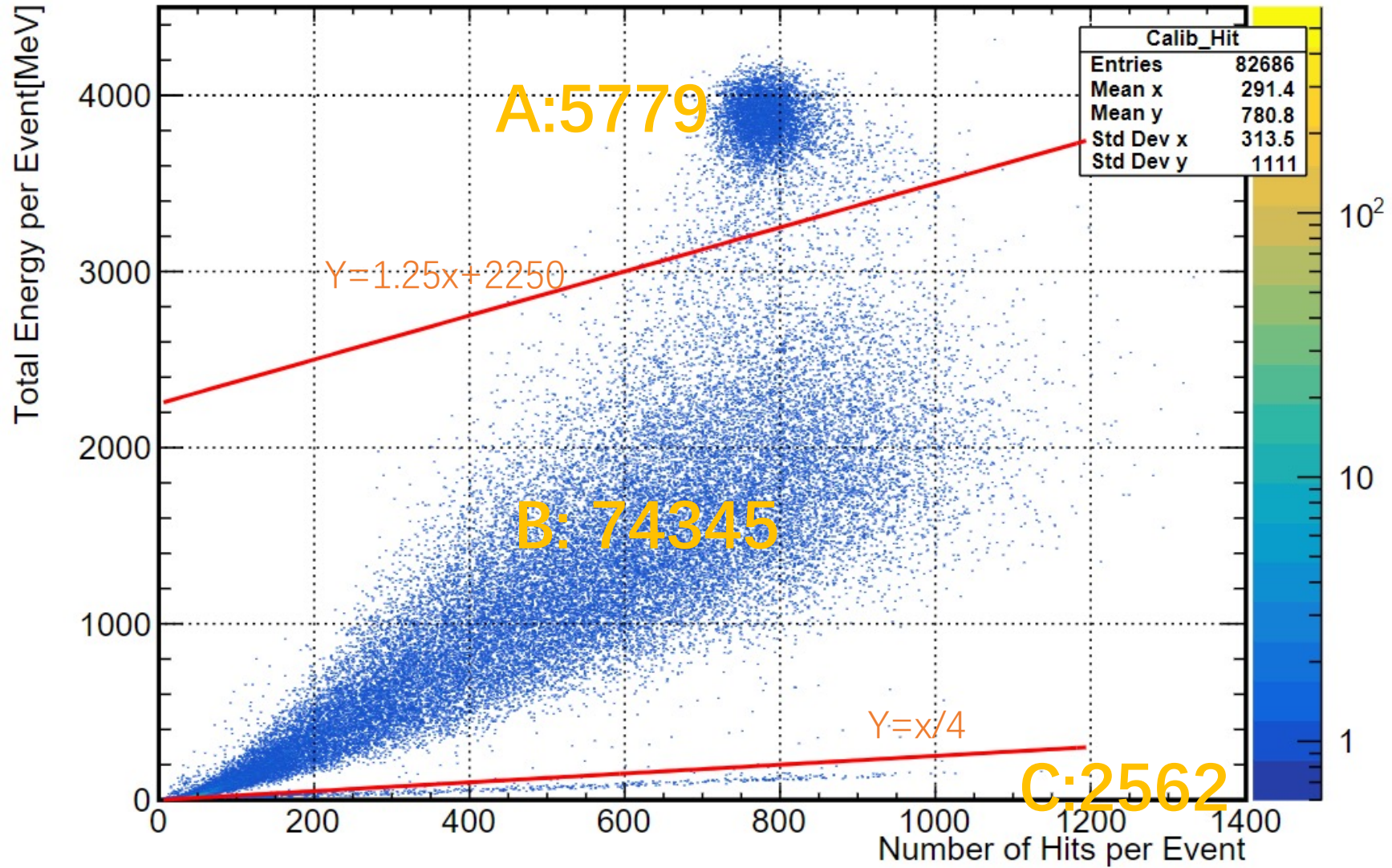




ScEcal Preliminary analysis

Xin Xia

2023/2/23





Display

- A : $Y > 1.25x + 2250$
- B : $Y \leq 1.25x + 2250 \ \&\& \ Y \geq x/4$
- C : $Y < x/4$



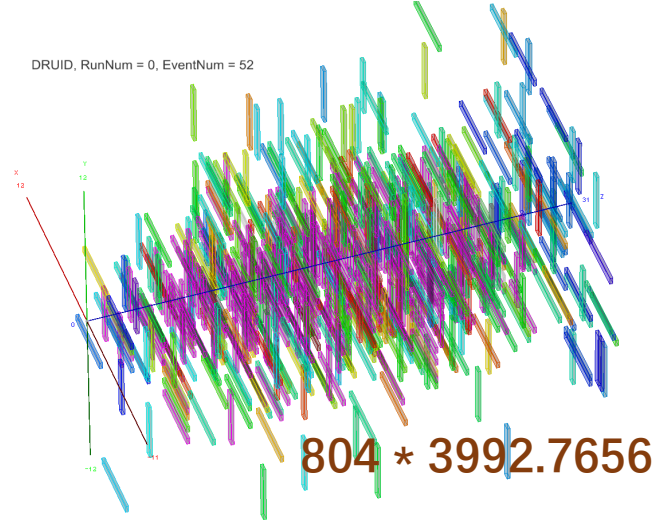
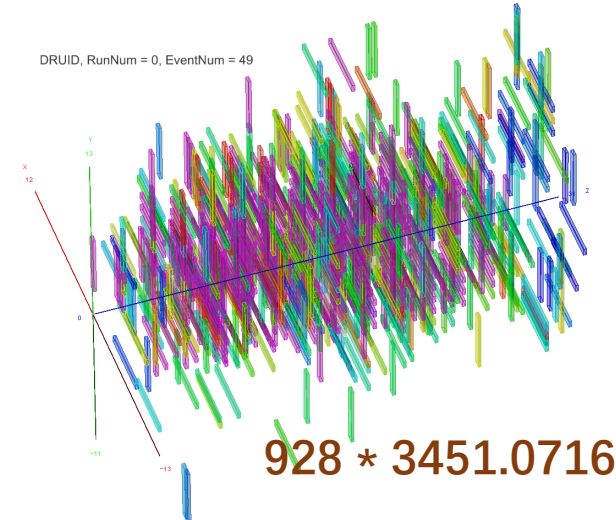
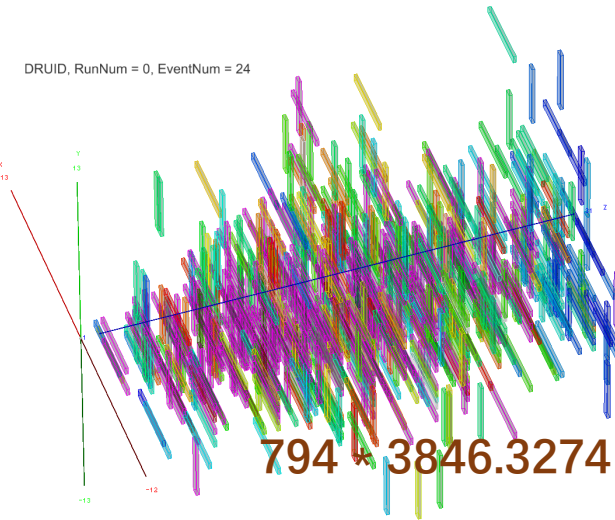
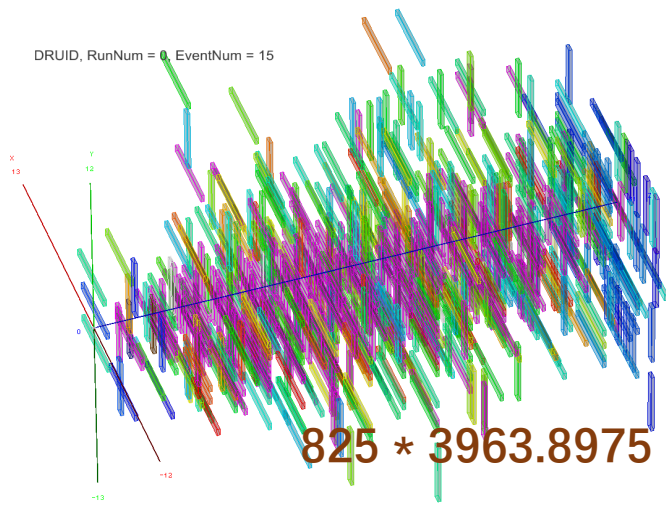
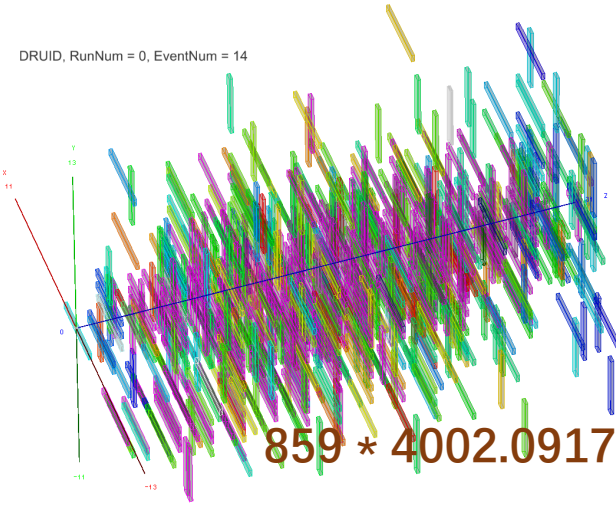
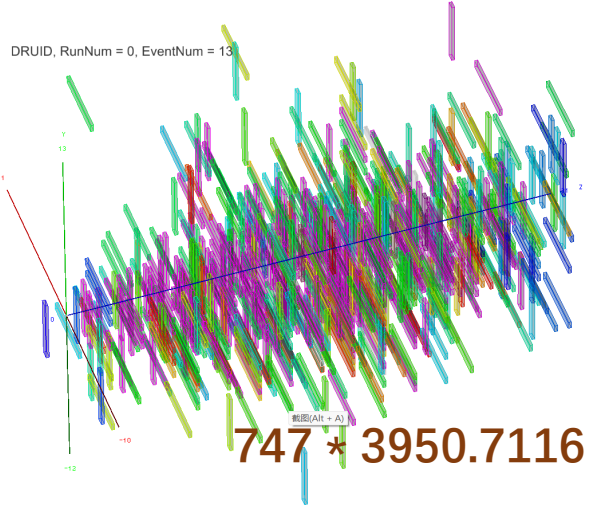
```
*****
*      Row      *      Entry$ *      (@Hit_Ene *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *
*****
*          0 *          0 *          17 *      8.6855338 *          0 *          0 *          1 *
*          1 *          1 *          256 *     270.00328 *          0 *          1 *          0 *
*          2 *          2 *          31 *     16.803370 *          0 *          0 *          1 *
*          3 *          3 *          33 *     14.853559 *          0 *          0 *          1 *
*          4 *          4 *          9 *      3.6429062 *          0 *          0 *          1 *
*          5 *          5 *          5 *     1.4755211 *          0 *          0 *          1 *
*          6 *          6 *          694 *    2230.6977 *          0 *          1 *          0 *
*          7 *          7 *          39 *     17.072808 *          0 *          0 *          1 *
*          8 *          8 *          30 *     13.589563 *          0 *          0 *          1 *
*          9 *          9 *          35 *     17.265987 *          0 *          0 *          1 *
*         10 *         10 *          40 *     19.832129 *          0 *          0 *          1 *
*         11 *         11 *          7 *      2.4431219 *          0 *          0 *          1 *
*         12 *         12 *          38 *     15.219245 *          0 *          0 *          1 *
*         13 *         13 *          747 *    3950.7116 *          1 *          0 *          0 *
*         14 *         14 *          859 *    4002.0917 *          1 *          0 *          0 *
*         15 *         15 *          825 *    3963.8975 *          1 *          0 *          0 *
*         16 *         16 *          313 *    545.81679 *          0 *          1 *          0 *
*         17 *         17 *          713 *    1664.9897 *          0 *          1 *          0 *
*         18 *         18 *          36 *     17.355125 *          0 *          0 *          1 *
*         19 *         19 *          151 *    262.70197 *          0 *          1 *          0 *
*         20 *         20 *          48 *    21.268429 *          0 *          0 *          1 *
*         21 *         21 *          32 *    12.470965 *          0 *          0 *          1 *
*         22 *         22 *          615 *    1407.1094 *          0 *          1 *          0 *
*         23 *         23 *          118 *    25.315102 *          0 *          0 *          1 *
*         24 *         24 *          794 *    3846.3274 *          1 *          0 *          0 *
```


A : $Y > 1.25x + 2250$



```
*****
*      Row      *      Entry$ *      (@Hit_Ene *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *
*****
*      13 *      13 *      747 *      3950.7116 *      1 *      0 *      0 *
*      14 *      14 *      859 *      4002.0917 *      1 *      0 *      0 *
*      15 *      15 *      825 *      3963.8975 *      1 *      0 *      0 *
*      24 *      24 *      794 *      3846.3274 *      1 *      0 *      0 *
*      49 *      49 *      928 *      3451.0716 *      1 *      0 *      0 *
*      52 *      52 *      804 *      3992.7656 *      1 *      0 *      0 *
*      72 *      72 *      753 *      3916.7437 *      1 *      0 *      0 *
*      83 *      83 *      785 *      3875.4345 *      1 *      0 *      0 *
*      84 *      84 *      757 *      4044.2316 *      1 *      0 *      0 *
*      128 *      128 *      814 *      3781.7365 *      1 *      0 *      0 *
*      129 *      129 *      774 *      3730.6863 *      1 *      0 *      0 *
*      140 *      140 *      875 *      3833.1005 *      1 *      0 *      0 *
*      141 *      141 *      816 *      3751.0580 *      1 *      0 *      0 *
*      153 *      153 *      748 *      3716.6003 *      1 *      0 *      0 *
*      156 *      156 *      844 *      3947.1872 *      1 *      0 *      0 *
*      170 *      170 *      793 *      3901.8053 *      1 *      0 *      0 *
*      229 *      229 *      787 *      3617.0964 *      1 *      0 *      0 *
*      245 *      245 *      812 *      3913.1982 *      1 *      0 *      0 *
*      250 *      250 *      804 *      3985.6315 *      1 *      0 *      0 *
*      254 *      254 *      795 *      3952.2895 *      1 *      0 *      0 *
*      261 *      261 *      805 *      4028.9525 *      1 *      0 *      0 *
*      266 *      266 *      800 *      4031.0979 *      1 *      0 *      0 *
*      278 *      278 *      680 *      3221.7183 *      1 *      0 *      0 *
*      282 *      282 *      779 *      3812.7653 *      1 *      0 *      0 *
*      288 *      288 *      775 *      3736.0529 *      1 *      0 *      0 *
```

A : $Y > 1.25x + 2250$



B : $Y \leq 1.25x + 2250$ && $Y \geq x/4$



```

*****
*      Row      *      Entry$ *      (@Hit_Ene *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *
*****
*          0 *          0 *          17 *      8.6855338 *          0 *          1 *          0 *
*          1 *          1 *          256 *     270.00328 *          0 *          1 *          0 *
*          2 *          2 *          31 *     16.803370 *          0 *          1 *          0 *
*          3 *          3 *          33 *     14.853559 *          0 *          1 *          0 *
*          4 *          4 *          9 *      3.6429062 *          0 *          1 *          0 *
*          5 *          5 *          5 *      1.4755211 *          0 *          1 *          0 *
*          6 *          6 *         694 *    2230.6977 *          0 *          1 *          0 *
*          7 *          7 *          39 *     17.072808 *          0 *          1 *          0 *
*          8 *          8 *          30 *     13.589563 *          0 *          1 *          0 *
*          9 *          9 *          35 *     17.265987 *          0 *          1 *          0 *
*         10 *         10 *          40 *     19.832129 *          0 *          1 *          0 *
*         11 *         11 *          7 *      2.4431219 *          0 *          1 *          0 *
*         12 *         12 *          38 *     15.219245 *          0 *          1 *          0 *
*         16 *         16 *         313 *    545.81679 *          0 *          1 *          0 *
*         17 *         17 *         713 *   1664.9897 *          0 *          1 *          0 *
*         18 *         18 *          36 *     17.355125 *          0 *          1 *          0 *
*         19 *         19 *         151 *    262.70197 *          0 *          1 *          0 *
*         20 *         20 *          48 *    21.268429 *          0 *          1 *          0 *
*         21 *         21 *          32 *    12.470965 *          0 *          1 *          0 *
*         22 *         22 *         615 *   1407.1094 *          0 *          1 *          0 *
*         25 *         25 *          45 *    25.403965 *          0 *          1 *          0 *
*         26 *         26 *         722 *   1240.0886 *          0 *          1 *          0 *
*         27 *         27 *          34 *    16.854005 *          0 *          1 *          0 *
*         28 *         28 *          35 *    16.172077 *          0 *          1 *          0 *
*         29 *         29 *         353 *    635.52864 *          0 *          1 *          0 *

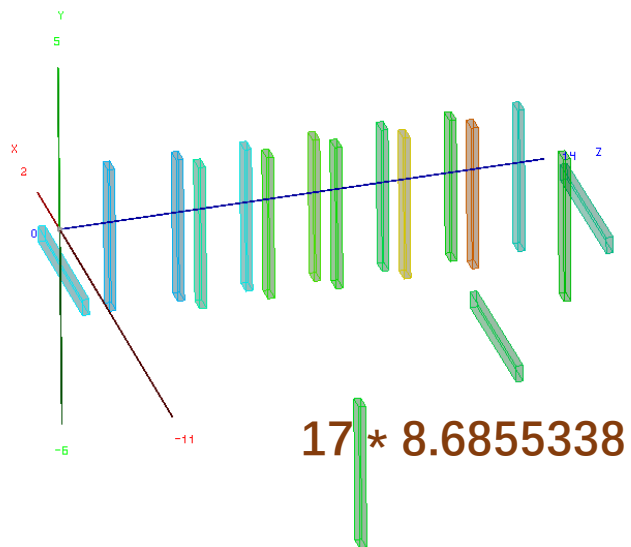
```

B : $Y \leq 1.25x + 2250$ && $Y \geq x/4$

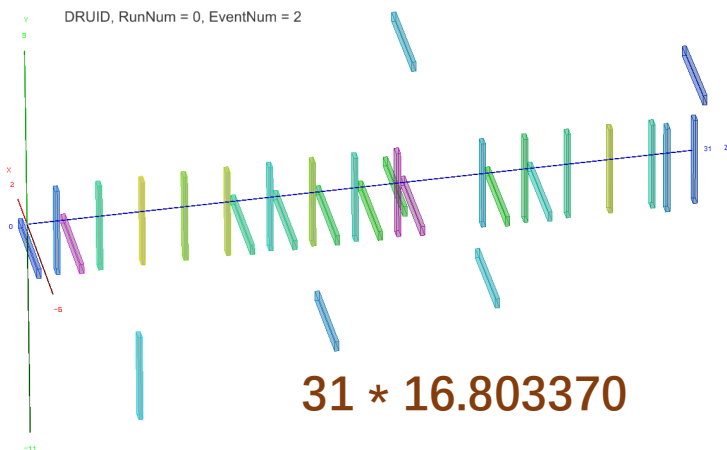


Muon-like

DRUID, RunNum = 0, EventNum = 0



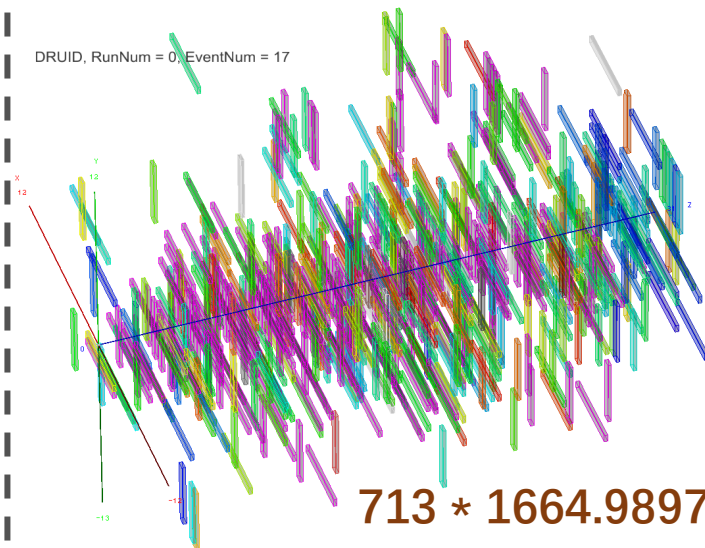
17 * 8.6855338



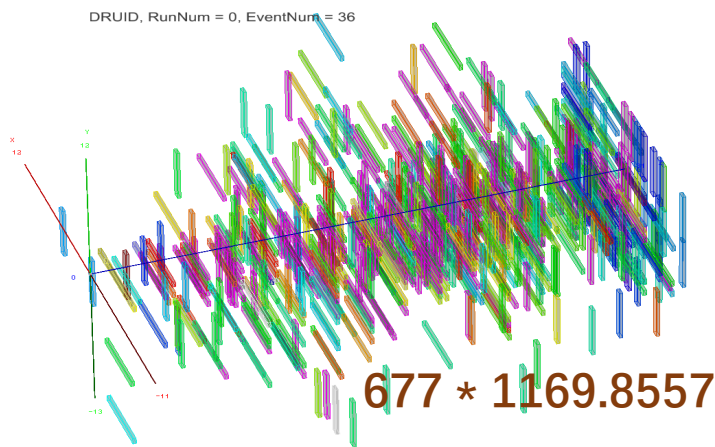
31 * 16.803370

EM-like

DRUID, RunNum = 0, EventNum = 17



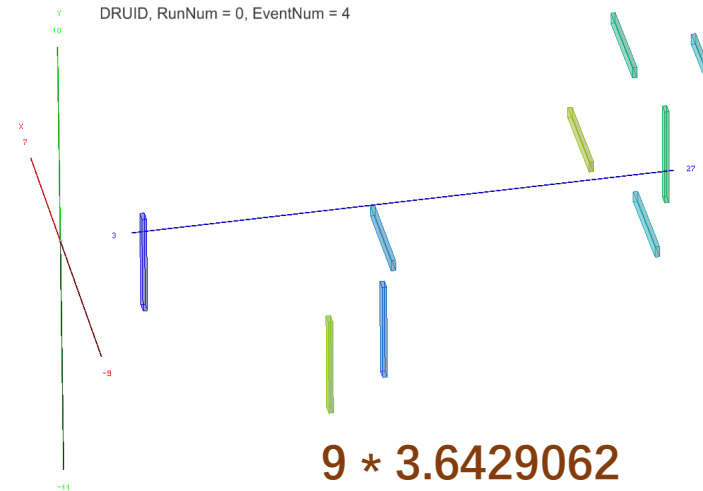
713 * 1664.9897



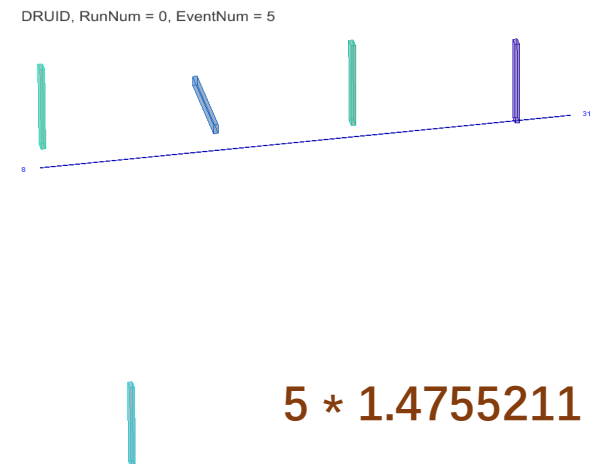
677 * 1169.8557

Noise-like

DRUID, RunNum = 0, EventNum = 4



9 * 3.6429062

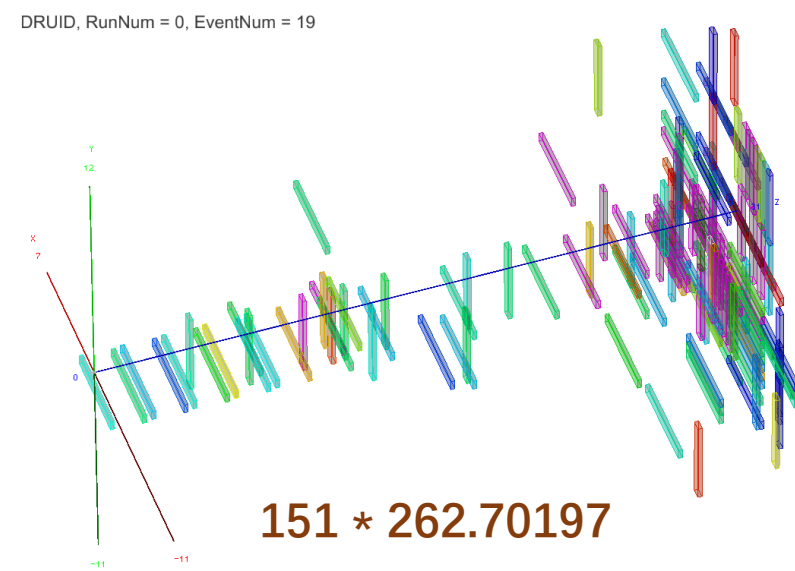
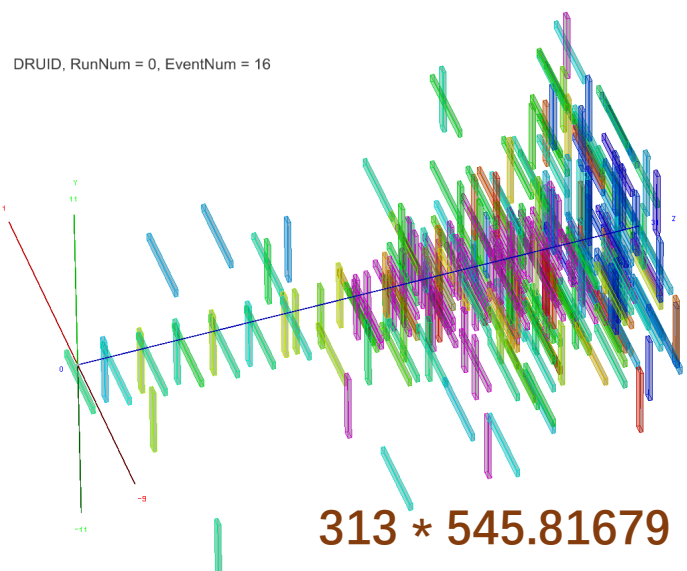
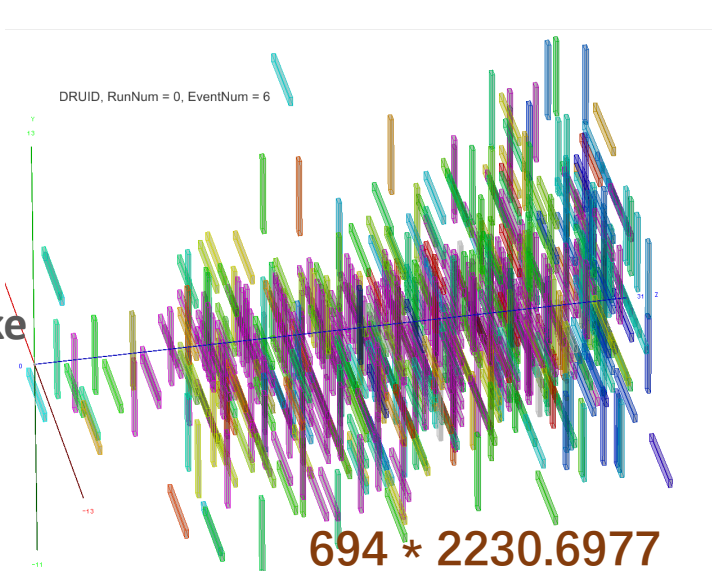


5 * 1.4755211

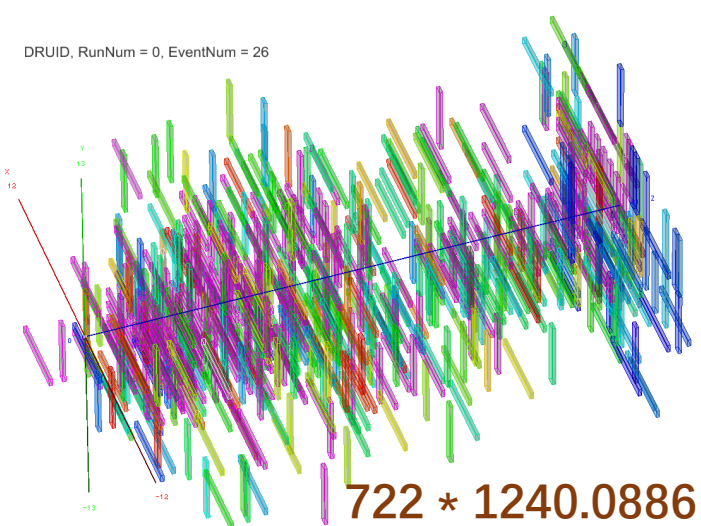
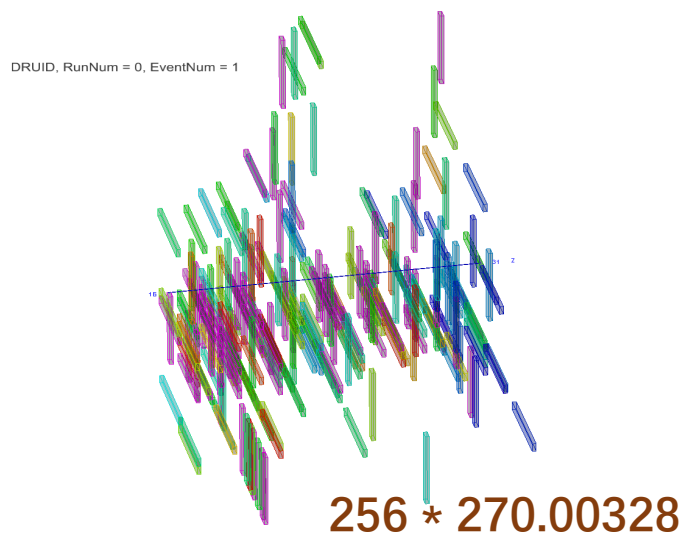
B : $Y \leq 1.25x + 2250$ && $Y \geq x/4$



Hadron-like



Strange



C : $Y < x/4$



```
*****
*      Row      *      Entry$ *      (@Hit_Ene *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *      Sum$(Hit_ *
*****
*      23      *      23      *      118 *      25.315102 *      0 *      0 *      1 *
*      41      *      41      *      269 *      26.076816 *      0 *      0 *      1 *
*      100     *      100     *      255 *      32.731123 *      0 *      0 *      1 *
*      130     *      130     *      35  *      4.5881755 *      0 *      0 *      1 *
*      137     *      137     *      1  *      0.1149396 *      0 *      0 *      1 *
*      150     *      150     *      7  *      1.7269319 *      0 *      0 *      1 *
*      160     *      160     *      30 *      4.2165231 *      0 *      0 *      1 *
*      164     *      164     *      174 *      29.617348 *      0 *      0 *      1 *
*      168     *      168     *      9  *      2.1929513 *      0 *      0 *      1 *
*      206     *      206     *      97 *      16.415259 *      0 *      0 *      1 *
*      252     *      252     *      85 *      8.8307873 *      0 *      0 *      1 *
*      296     *      296     *      9  *      1.4229036 *      0 *      0 *      1 *
*      367     *      367     *      12 *      1.9175133 *      0 *      0 *      1 *
*      409     *      409     *      5  *      1.0905816 *      0 *      0 *      1 *
*      443     *      443     *      225 *      40.601894 *      0 *      0 *      1 *
*      460     *      460     *      827 *      114.76672 *      0 *      0 *      1 *
*      465     *      465     *      350 *      37.361334 *      0 *      0 *      1 *
*      492     *      492     *      88 *      19.703623 *      0 *      0 *      1 *
*      508     *      508     *      14 *      2.6423010 *      0 *      0 *      1 *
*      520     *      520     *      31 *      4.9696367 *      0 *      0 *      1 *
*      598     *      598     *      7  *      1.6734589 *      0 *      0 *      1 *
*      609     *      609     *      81 *      11.646578 *      0 *      0 *      1 *
*      619     *      619     *      29 *      4.2001004 *      0 *      0 *      1 *
*      648     *      648     *      1  *      0.1128322 *      0 *      0 *      1 *
*      696     *      696     *      6  *      1.3991071 *      0 *      0 *      1 *
```

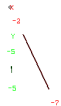



Noise-like

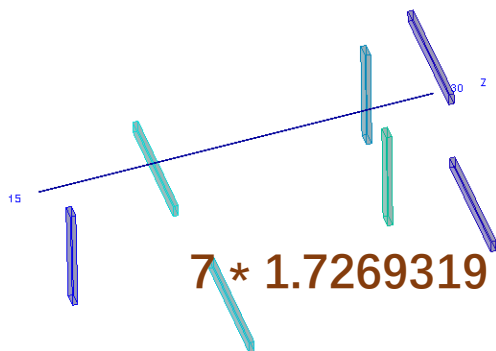
DRUID, RunNum = 0, EventNum = 137



1 * 0.1149396



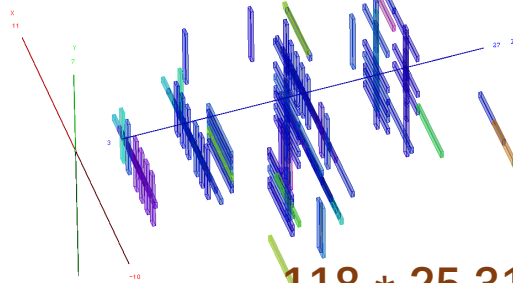
DRUID, RunNum = 0, EventNum = 150



7 * 1.7269319

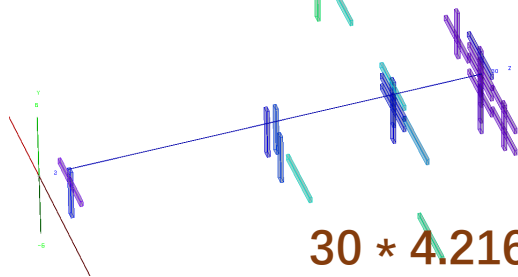
2023/2/23

DRUID, RunNum = 0, EventNum = 23



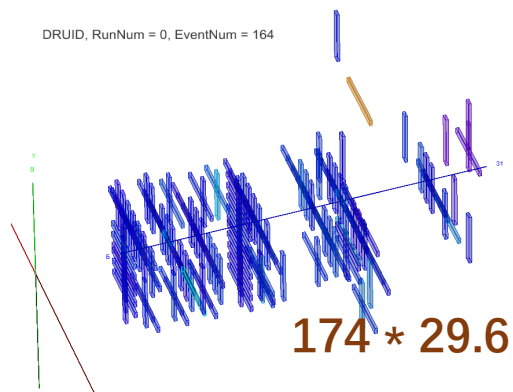
118 * 25.315102

DRUID, RunNum = 0, EventNum = 160



30 * 4.2165231

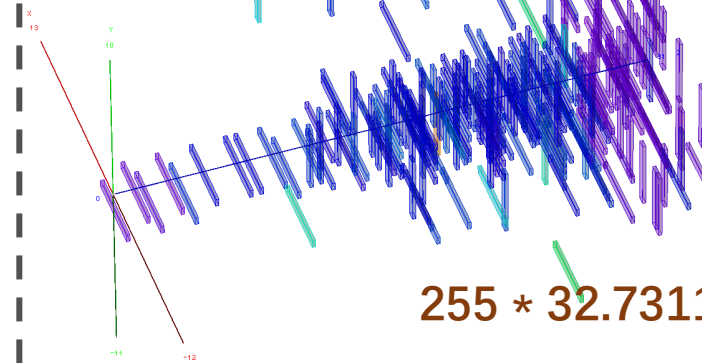
DRUID, RunNum = 0, EventNum = 164



174 * 29.617348

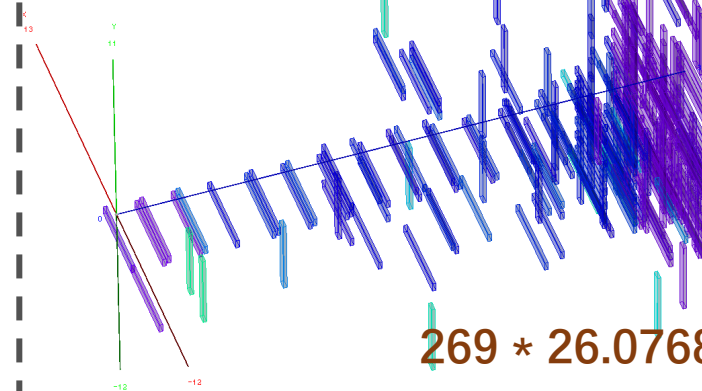
IHEP

DRUID, RunNum = 0, EventNum = 100



255 * 32.731123

DRUID, RunNum = 0, EventNum = 41



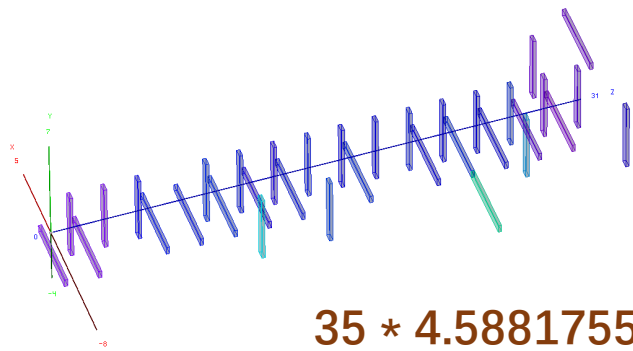
269 * 26.076816

11



Muon-like

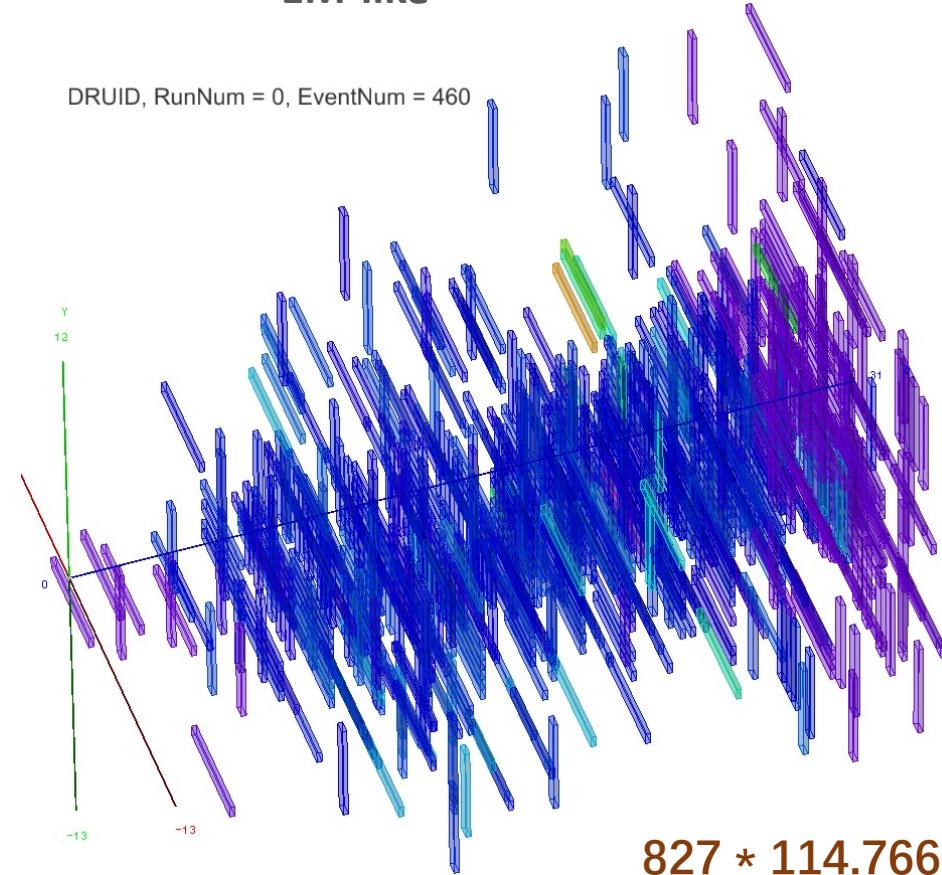
DRUID, RunNum = 0, EventNum = 130



35 * 4.5881755

EM-like

DRUID, RunNum = 0, EventNum = 460

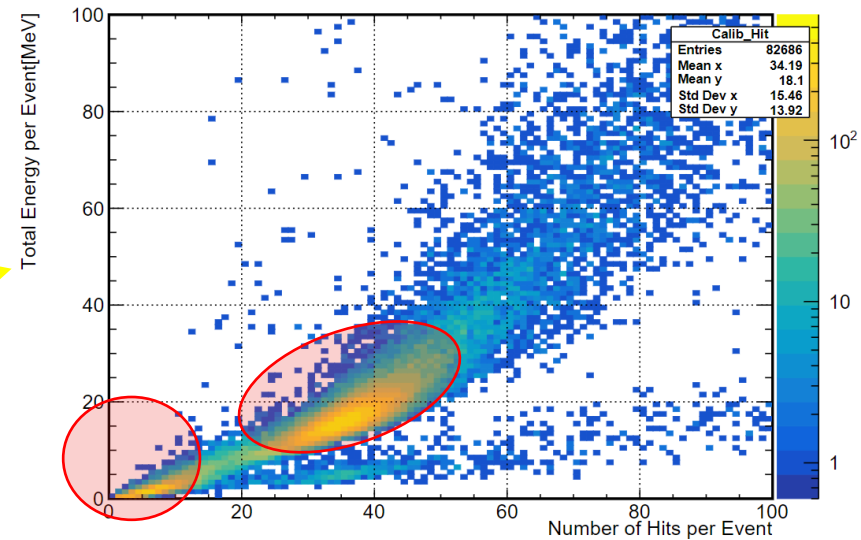
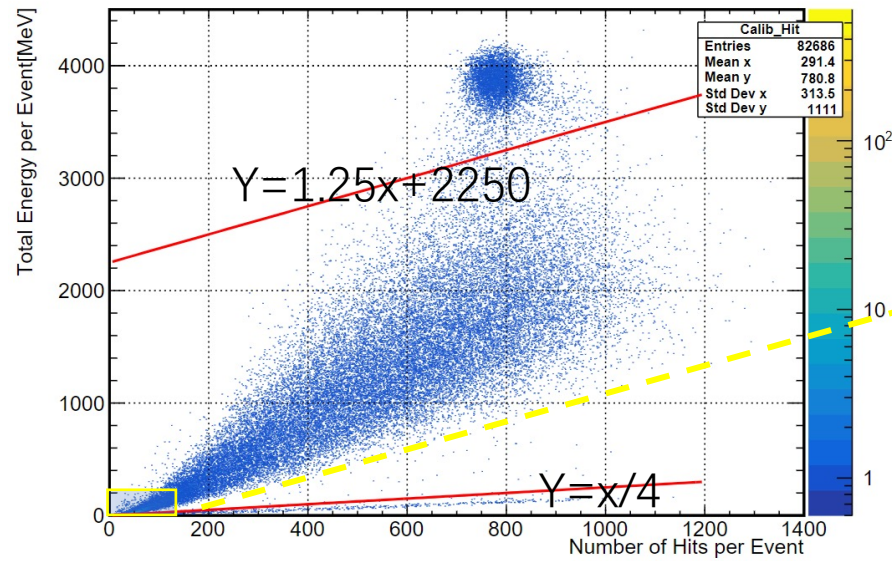


827 * 114.76672

Summary



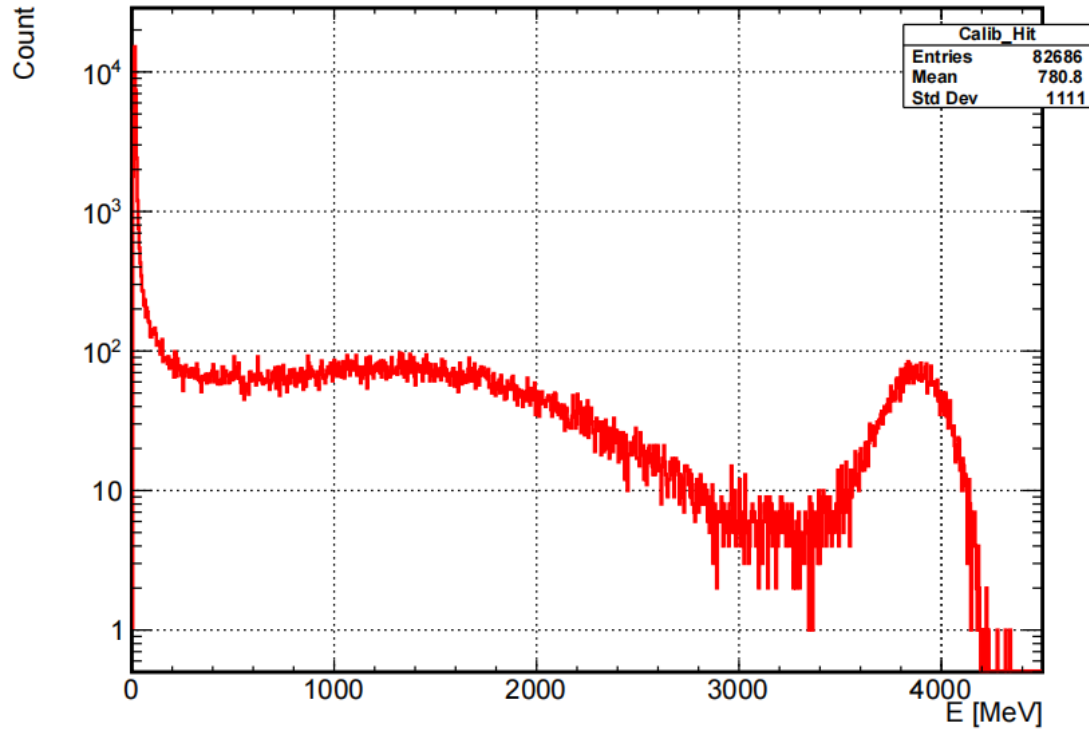
	Range	Component
A	$Y > 1.25x + 2250$	Positron
B	$Y \leq 1.25x + 2250 \ \&\& \ Y \geq x/4$	Noise/Muon/Positron/Hadron/tec...
C	$Y < x/4$	complex



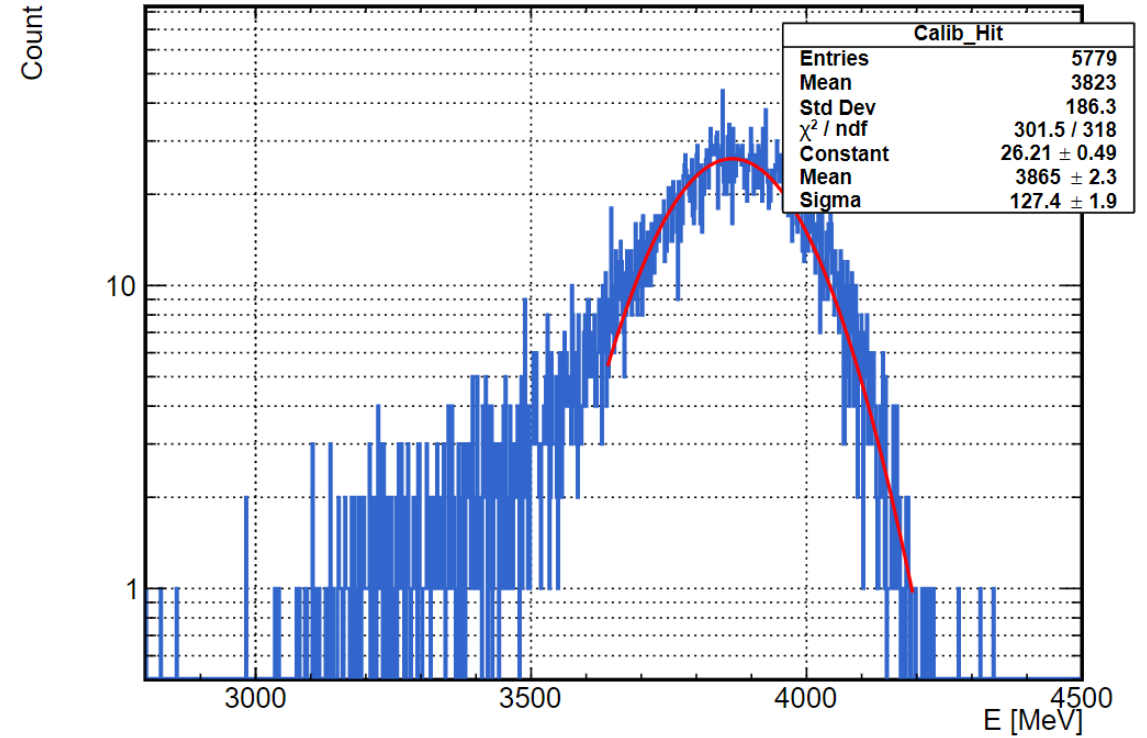


The spectrum of total energy per event

Before cut



After cut





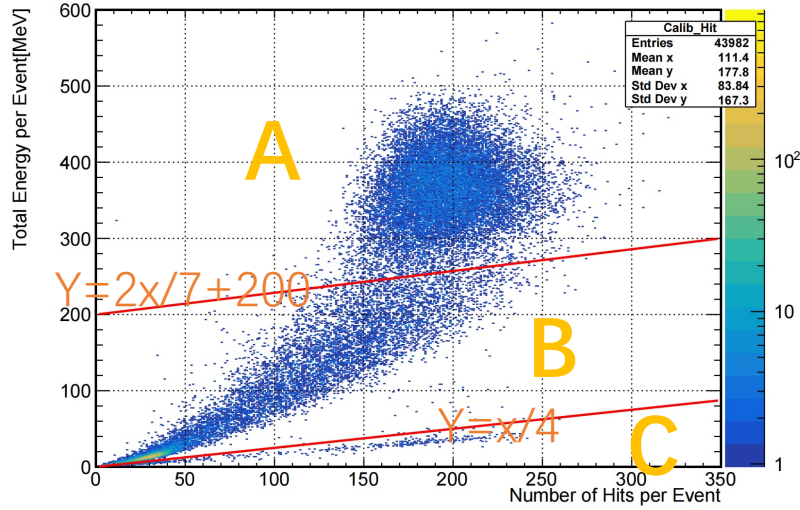
Analysis

- Distributin
- Component ratio
- Energy spectrum Fit
- Energy Resolution and lineraty

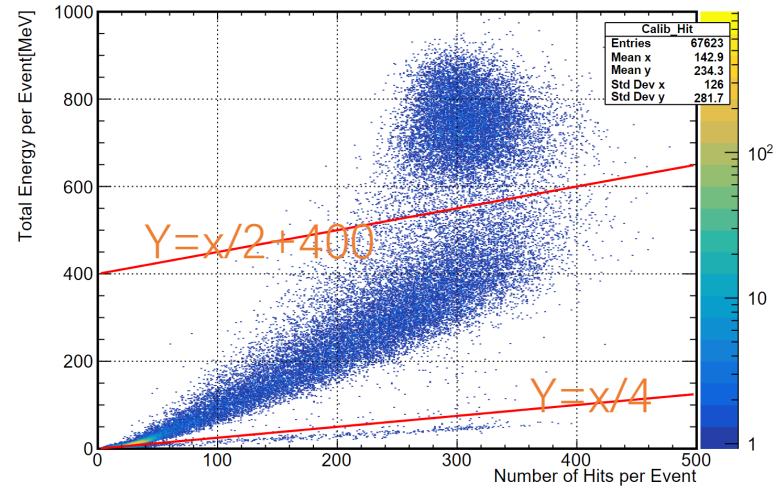
Positron ; Distribution varies with energy



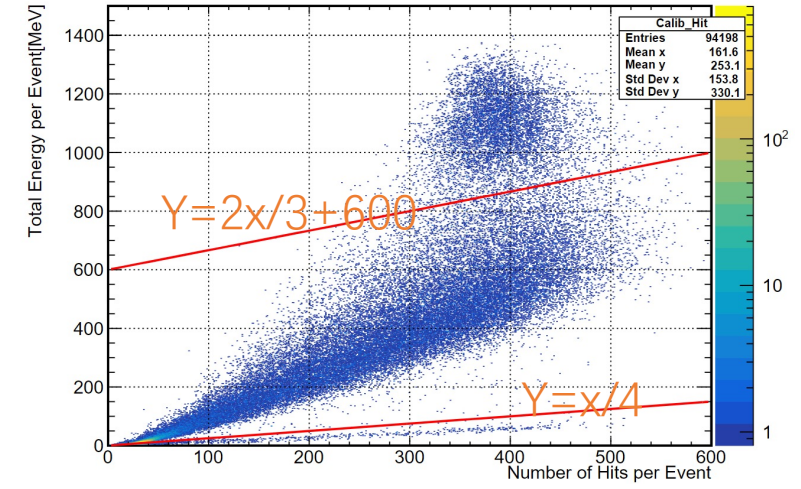
10GeV;ECAL_Run244_20221028_191458



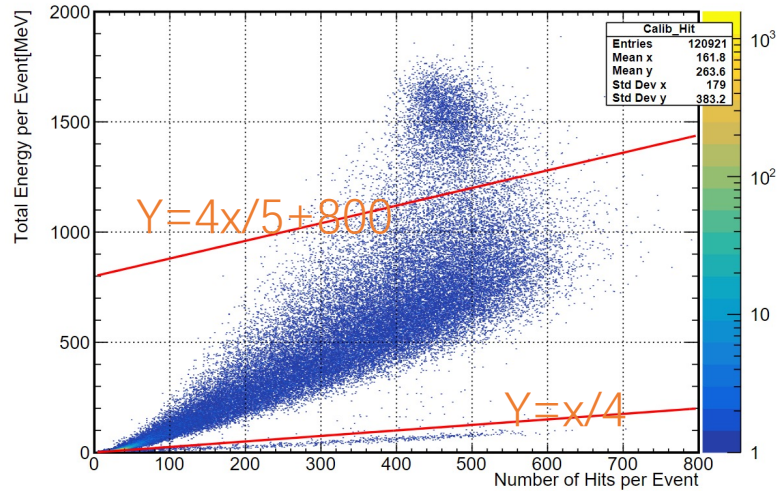
20GeV;ECAL_Run225_20221028_020213



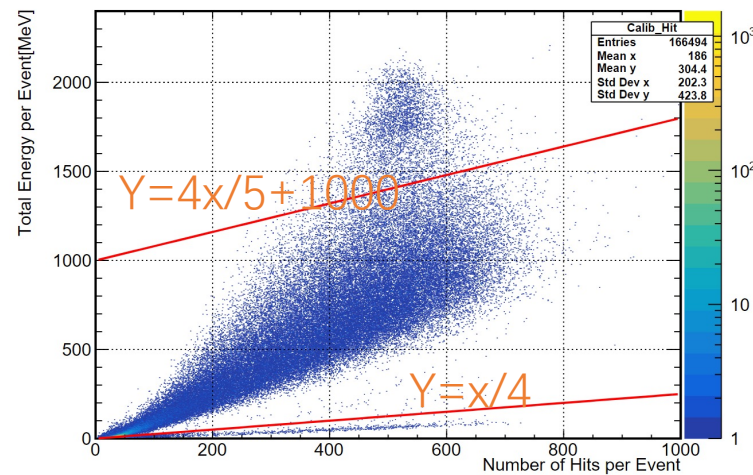
30GeV;ECAL_Run227_20221028_040520



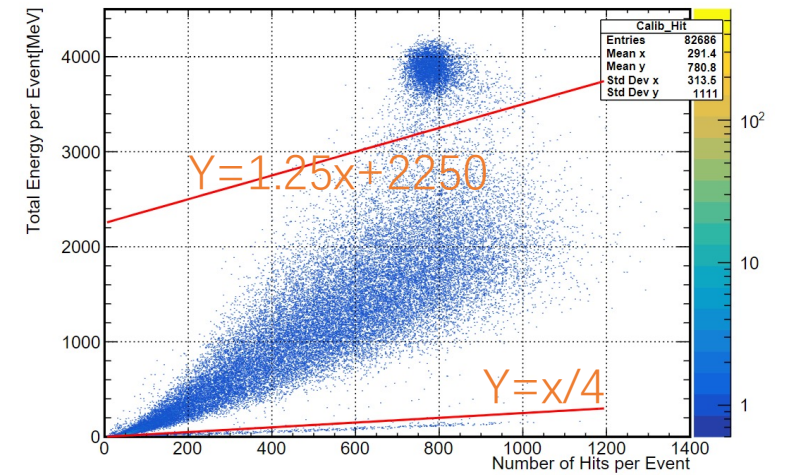
40GeV;ECAL_Run249_20221029_011935



50GeV;ECAL_Run251_20221029_074820



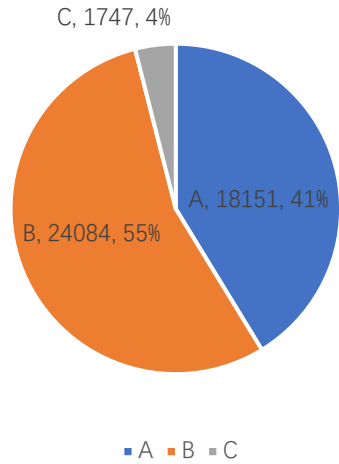
100GeV;ECAL_Run289_20221030_125331



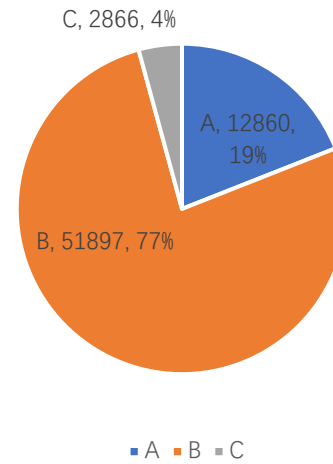
Positron; Proportion of different components



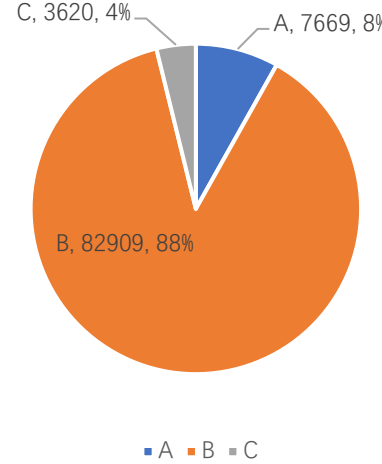
10GeV;ECAL_Run244_20221028_191458



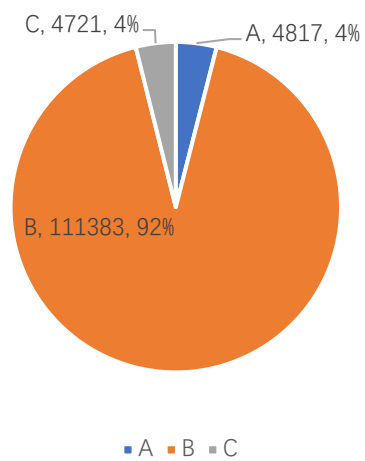
20GeV;ECAL_Run225_20221028_020213



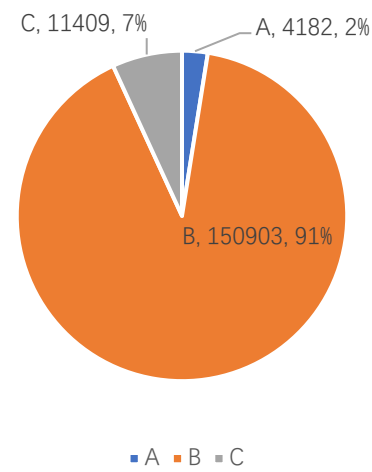
30GeV;ECAL_Run227_20221028_040520



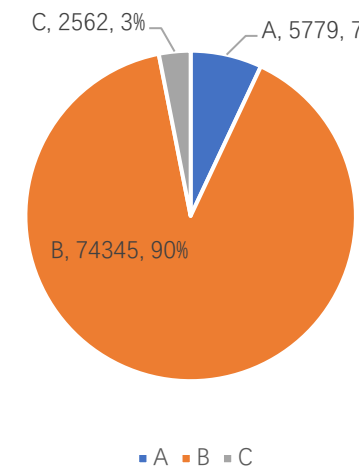
40GeV;ECAL_Run249_20221029_011935



50GeV;ECAL_Run251_20221029_074820



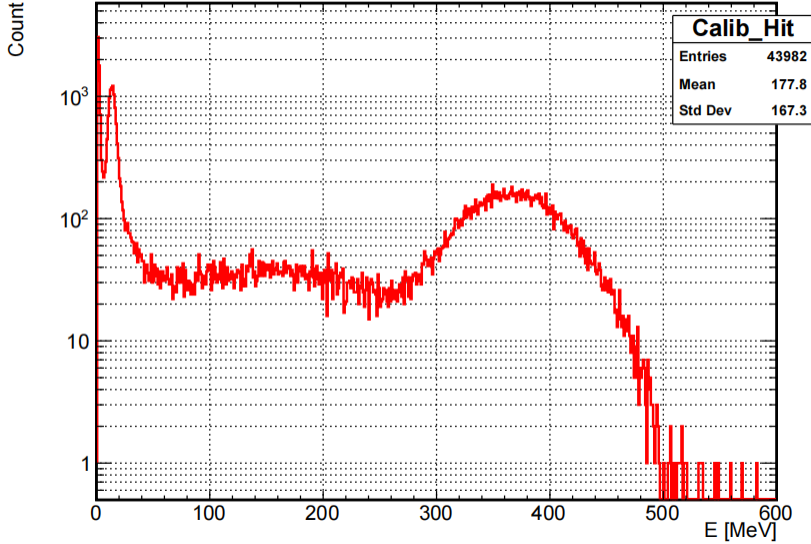
100GeV;ECAL_Run289_20221030_125331



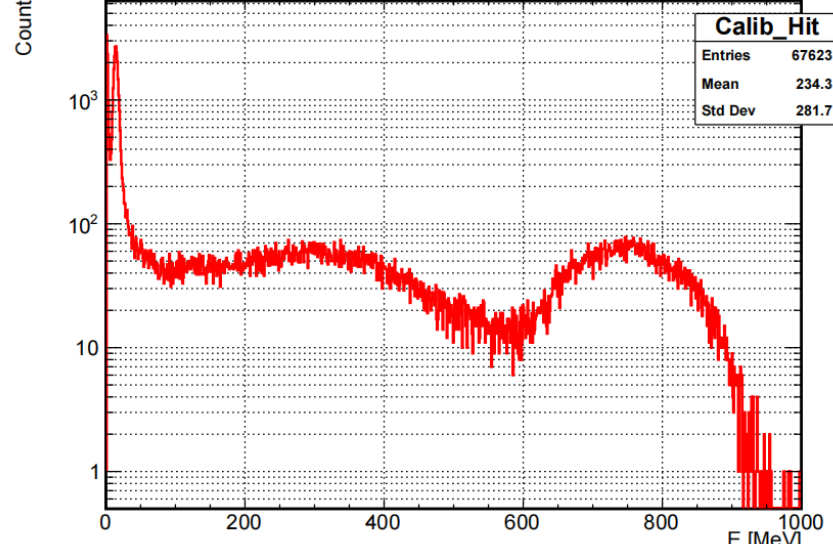
The spectrum of total energy per Event without cut



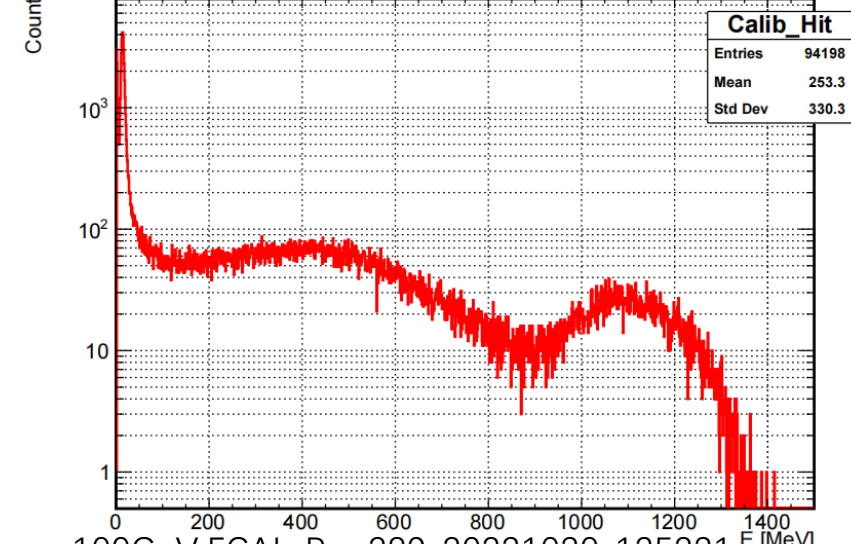
10GeV;ECAL_Run244_20221028_191458



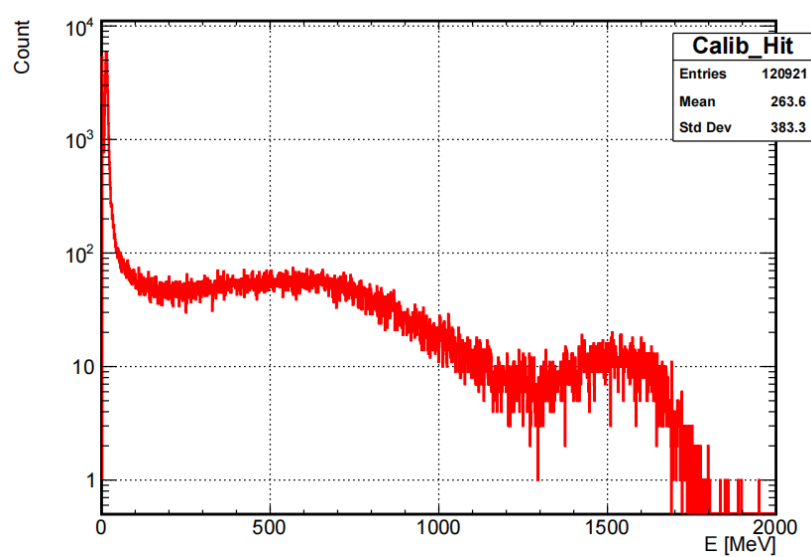
20GeV;ECAL_Run225_20221028_020213



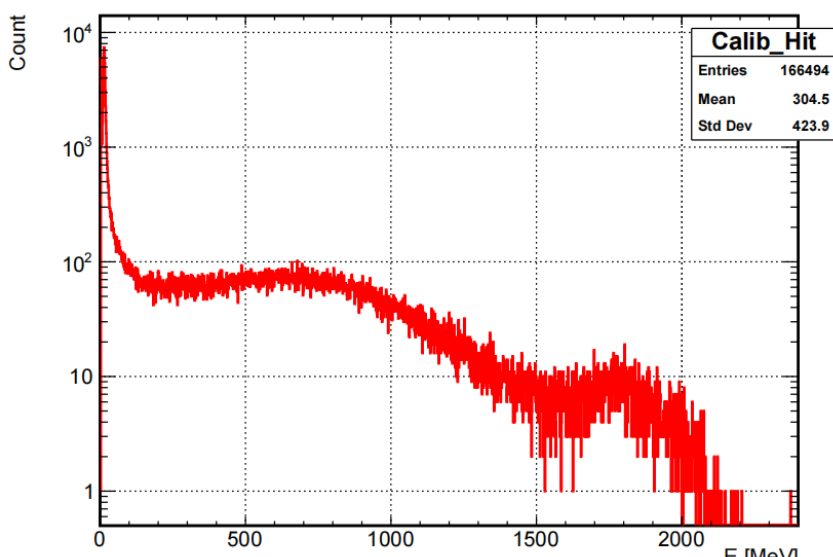
30GeV;ECAL_Run227_20221028_040520



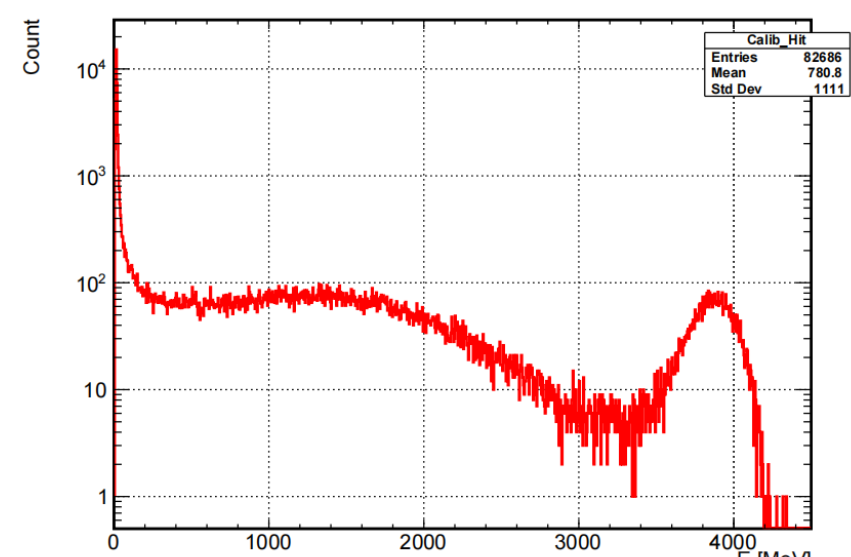
40GeV;ECAL_Run249_20221029_011935



50GeV;ECAL_Run251_20221029_074820



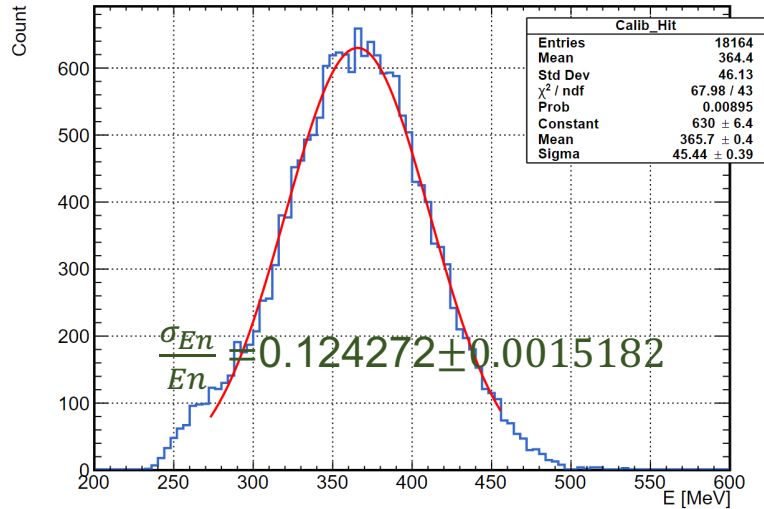
100GeV;ECAL_Run289_20221030_125331



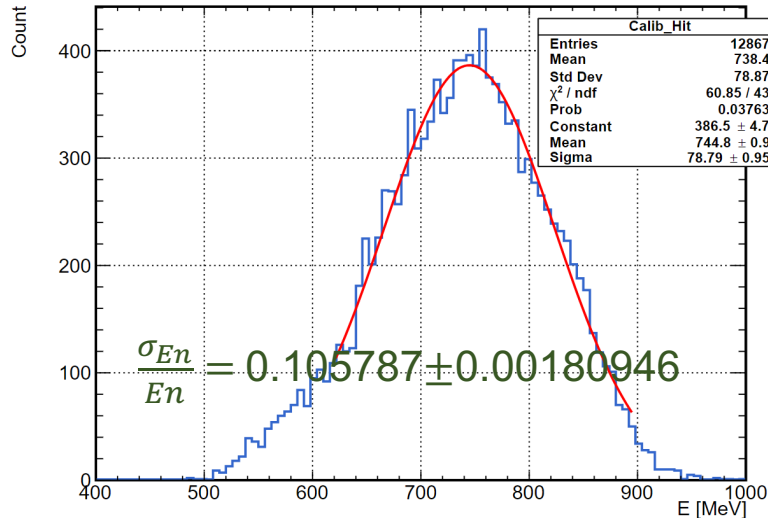
The spectrum of total energy per Event with cut



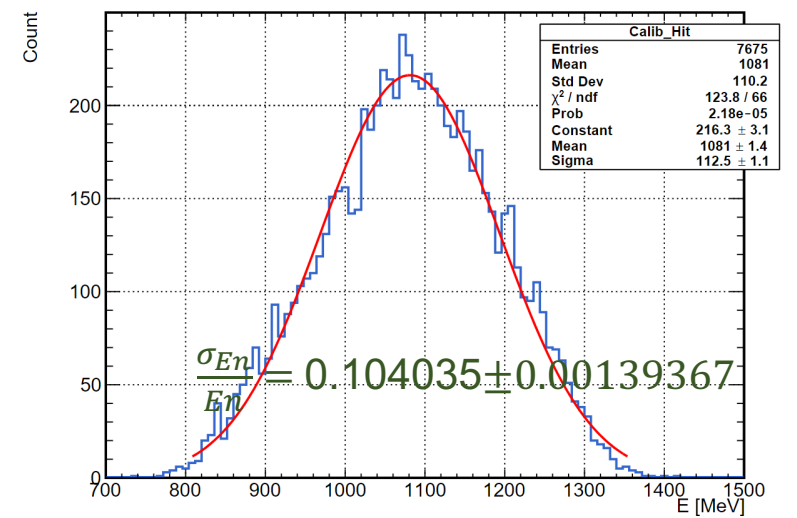
10GeV;ECAL_Run244_20221028_191458



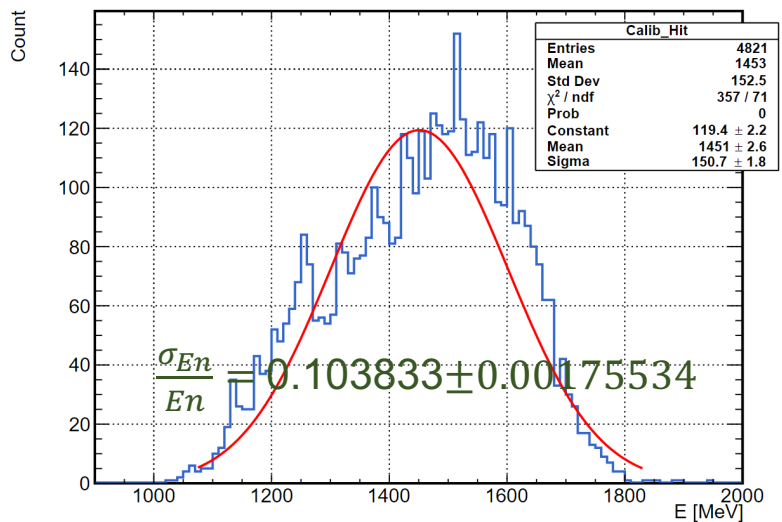
20GeV;ECAL_Run225_20221028_020213



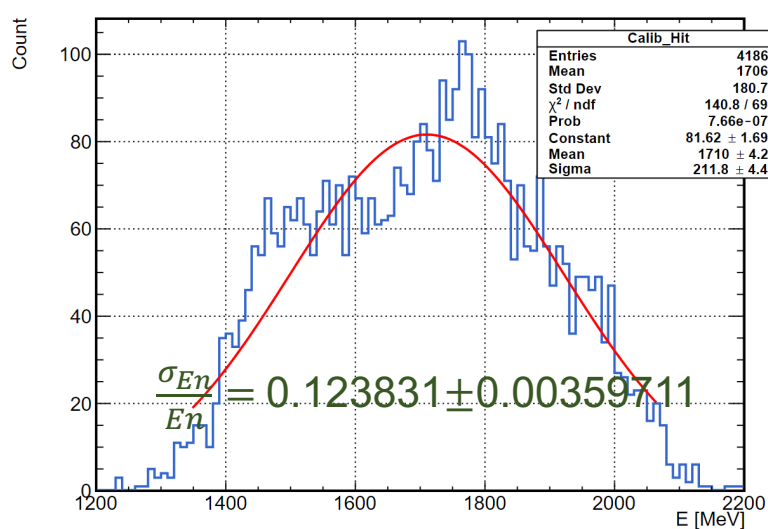
30GeV;ECAL_Run227_20221028_040520



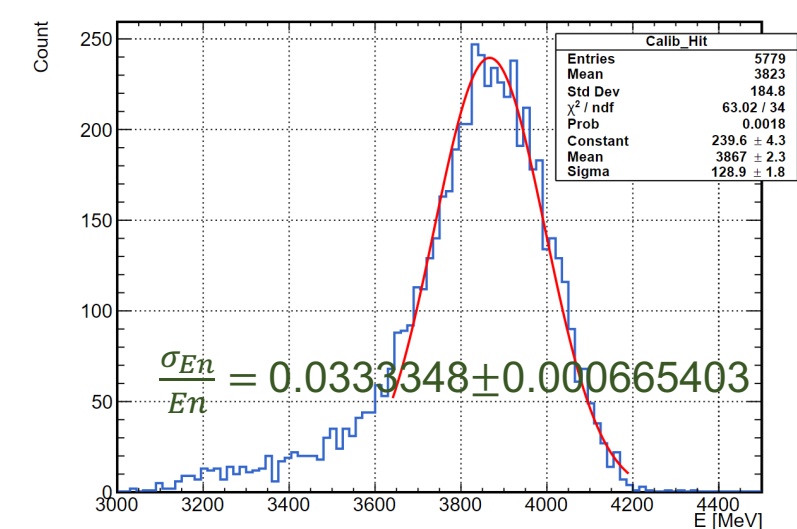
40GeV;ECAL_Run249_20221029_011935



50GeV;ECAL_Run251_20221029_074820



100GeV;ECAL_Run289_20221030_125331

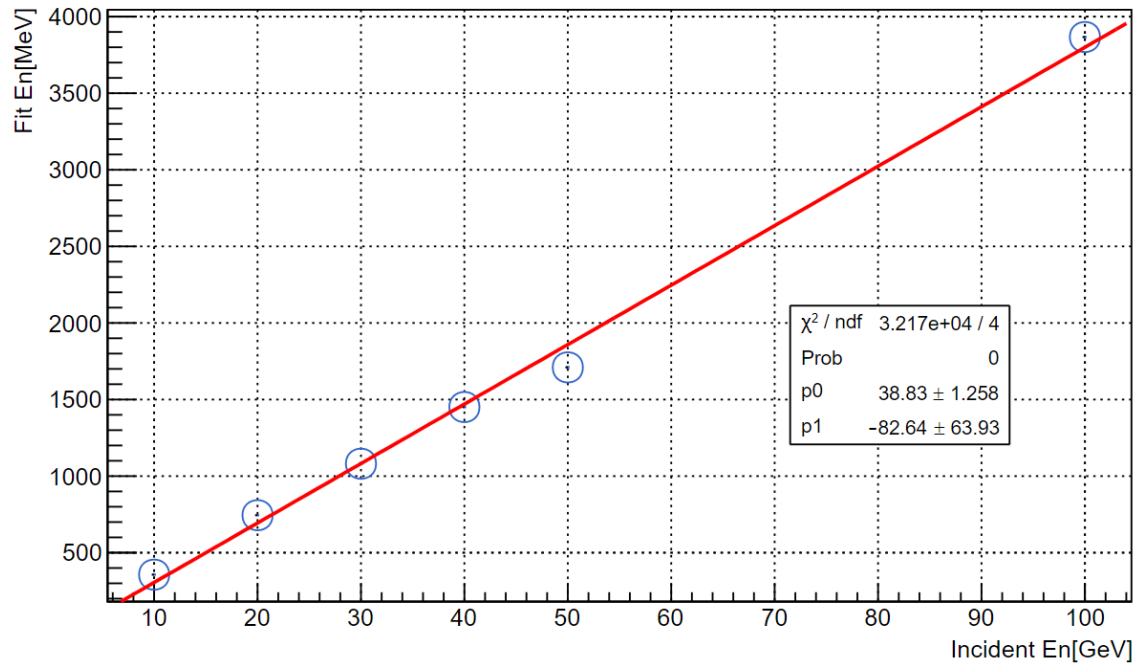


Energy Resolution and linearity



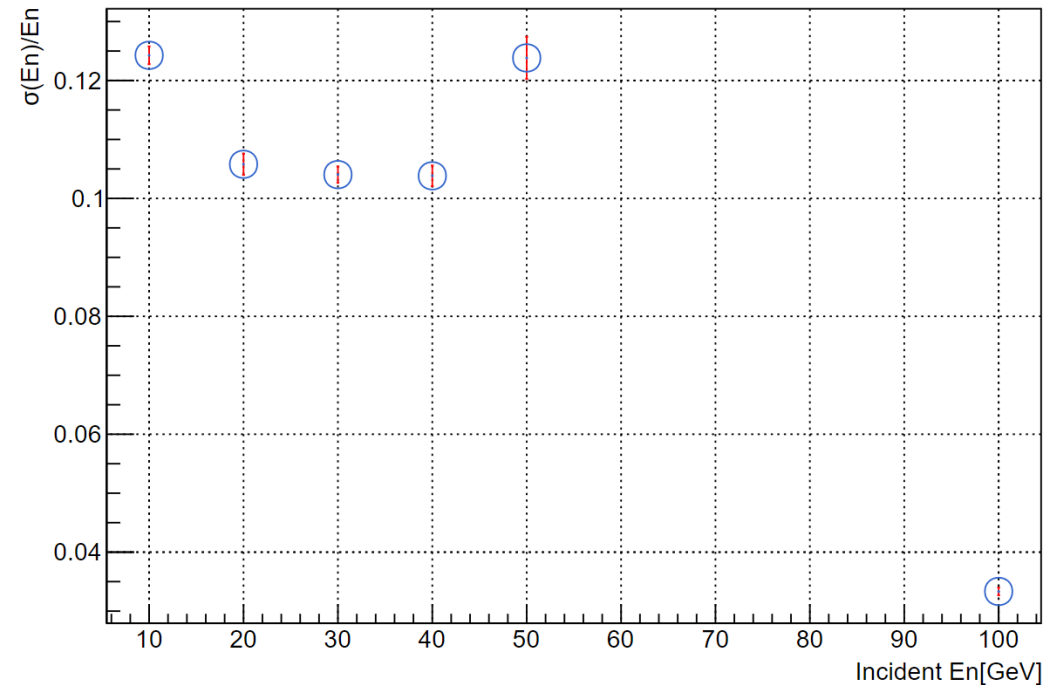
positron	10Gev	20Gev	30Gev	40Gev	50Gev	100Gev
Run.Number	Run244	Run225	Run227	Run249	Run251	Run289
Center value of shower Energy/(MeV)	365.7 ± 0.4	744.8 ± 0.9	1081 ± 1.4	1451 ± 2.6	1710 ± 4.2	3867 ± 2.3
$\frac{\sigma_{En}}{En}$	0.1243 ± 0.0015	0.1058 ± 0.0018	0.1040 ± 0.0014	0.1038 ± 0.0018	0.1238 ± 0.0036	0.0333 ± 0.0007

Energy linearity



2023/2/23

Energy Resolution



IHEP



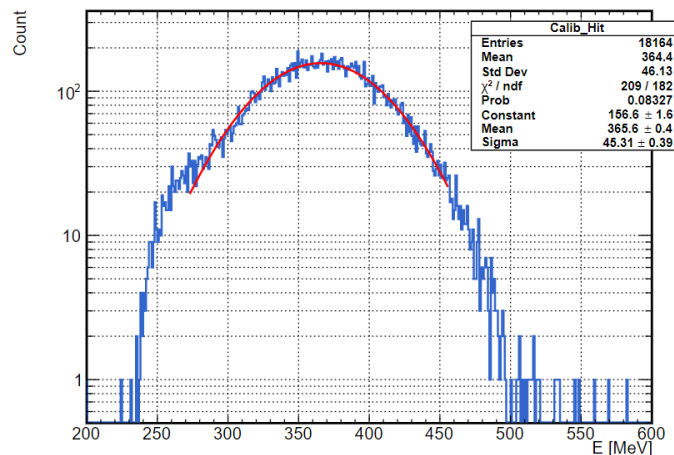
Backup



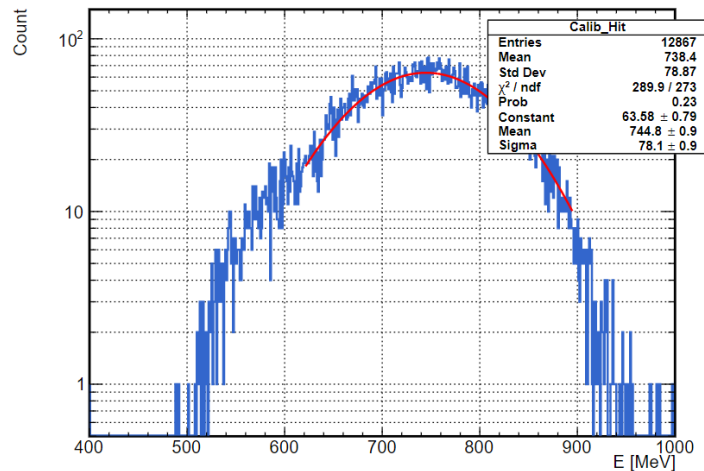
	A	B	C	Total
ECAL_Run244_20221028_191458	18151	24084	1747	43982
ECAL_Run225_20221028_020213	12860	51897	2866	67623
ECAL_Run227_20221028_040520	7669	82909	3620	94198
ECAL_Run249_20221029_011935	4817	111383	4721	120921
ECAL_Run251_20221029_074820	4182	150903	11409	166494
ECAL_Run289_20221030_125331	5779	74345	2562	82686



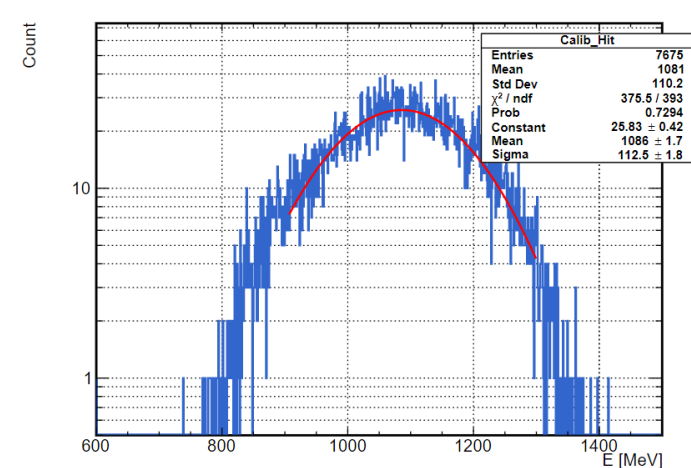
10GeV;ECAL_Run244_20221028_191458



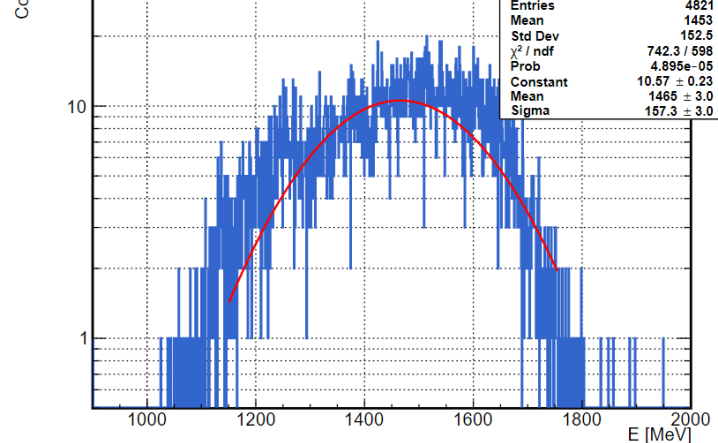
20GeV;ECAL_Run225_20221028_020213



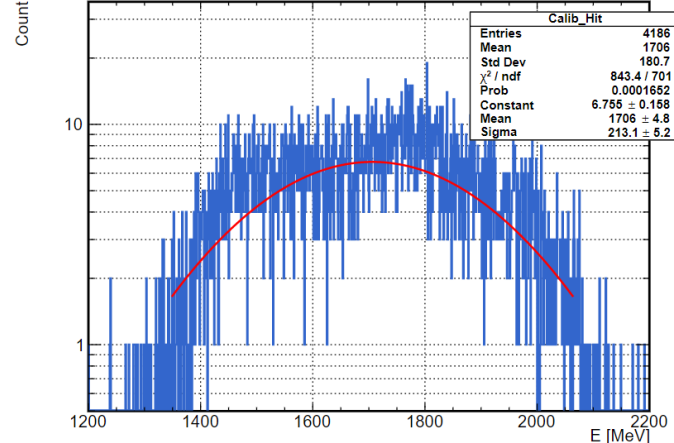
30GeV;ECAL_Run227_20221028_040520



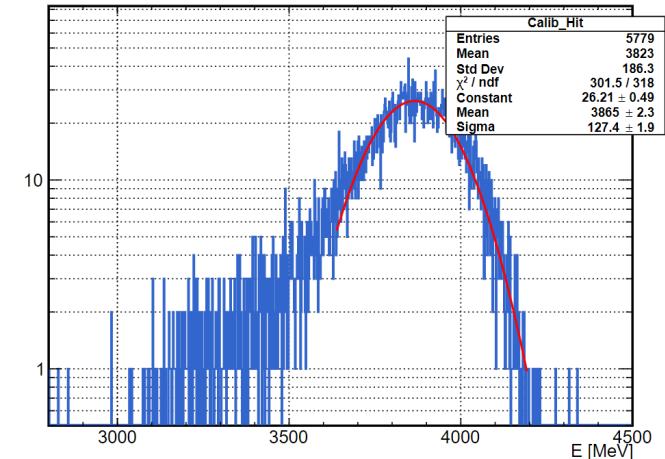
40GeV;ECAL_Run249_20221029_011935



50GeV;ECAL_Run251_20221029_074820

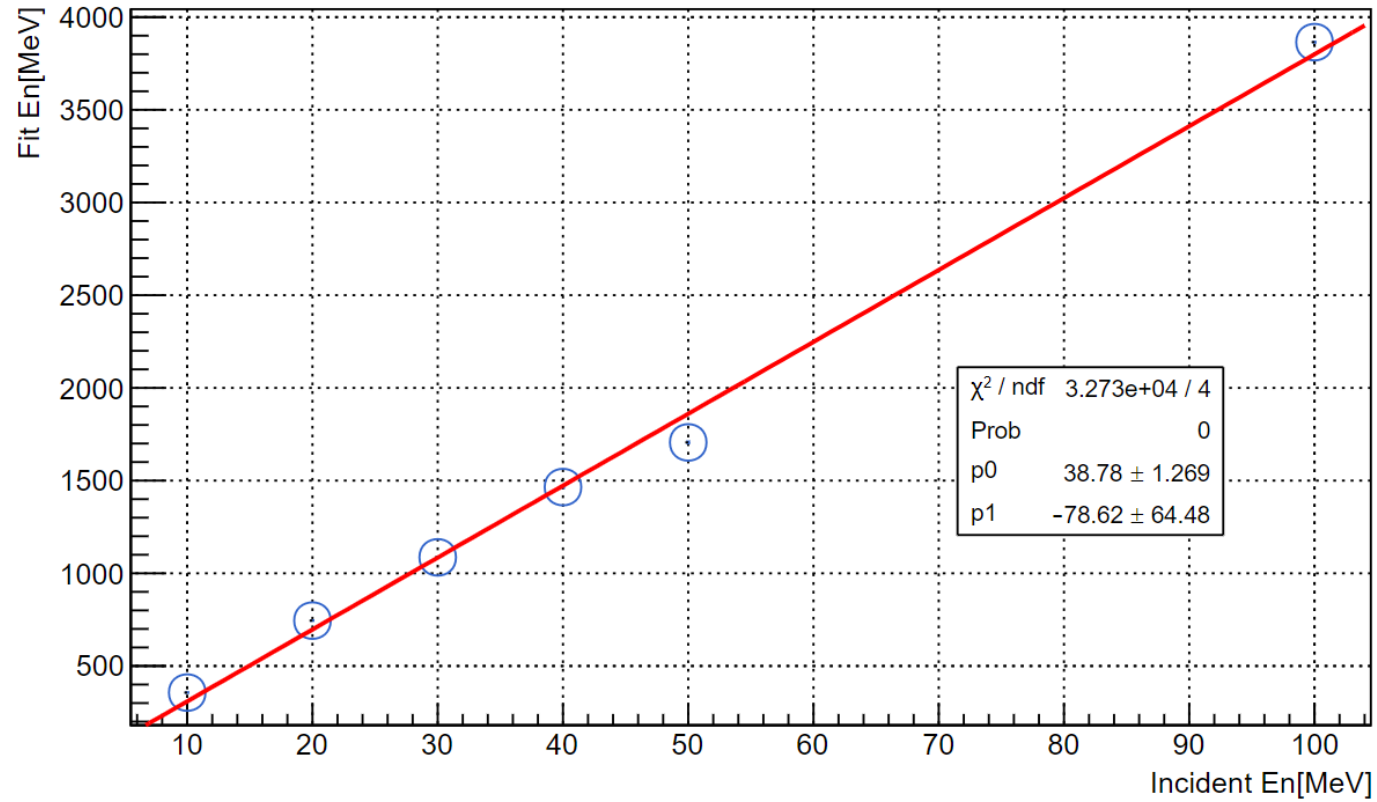


100GeV;ECAL_Run289_20221030_125331



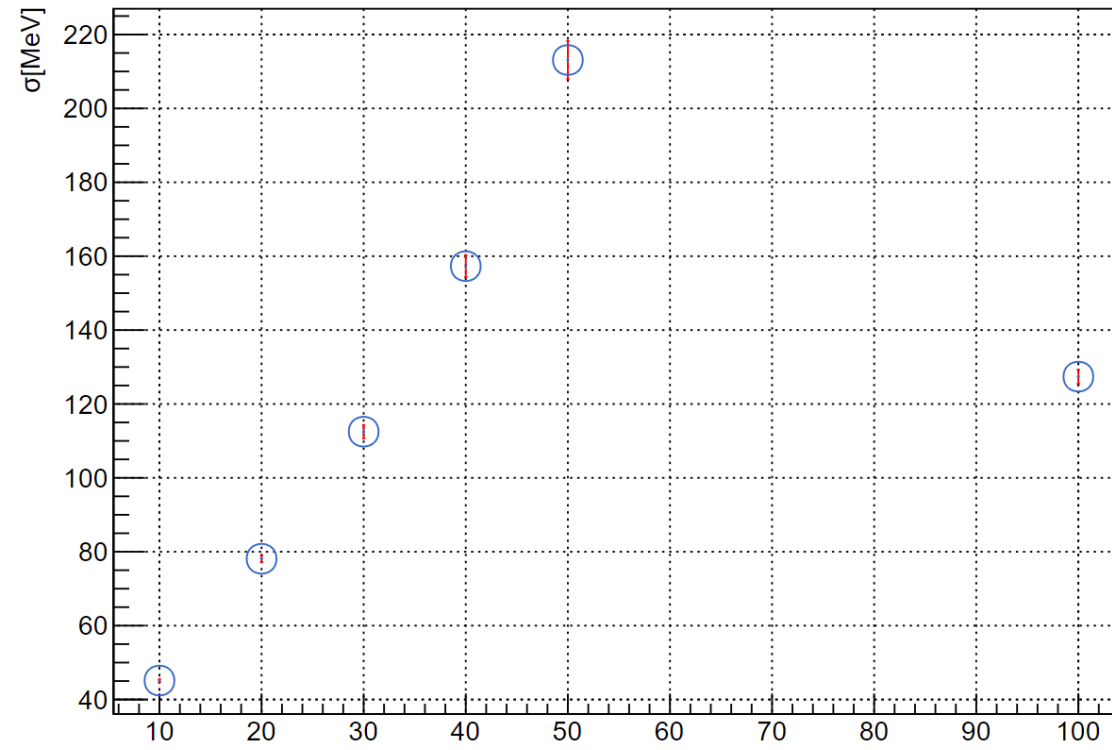


Energy linearity





Energy Resolution





positron	10Gev	20Gev	30Gev	40Gev	50Gev	100Gev
Run.Number						
Center value of shower Energy/(GeV)	365.6 ± 0.4	744.8±0. 9	1086±1.7	1465 ±3.0	1706 ± 4.8	3865 ±2.3
Energy solution/(GeV)	45.13±0.39	78.1±0.9	112.5 ±1.8	157.3±3.0	213.1±5.2	127.4 ± 1.9

positron	10Gev	20Gev	30Gev	40Gev	50Gev	100Gev
Run.Number						
Center value of shower Energy/(GeV)	365.7 ± 0.4	744.8±0. 9	1081±1.4	1451 ± 2.6	1710 ± 4.2	3867 ±2.3
Energy solution/(GeV)	45.44 ±0.39	78.79 ± 0.95	112.5 ±1.1	150.7 ± 1.8	211.8±4.4	128.9 ± 1.8



