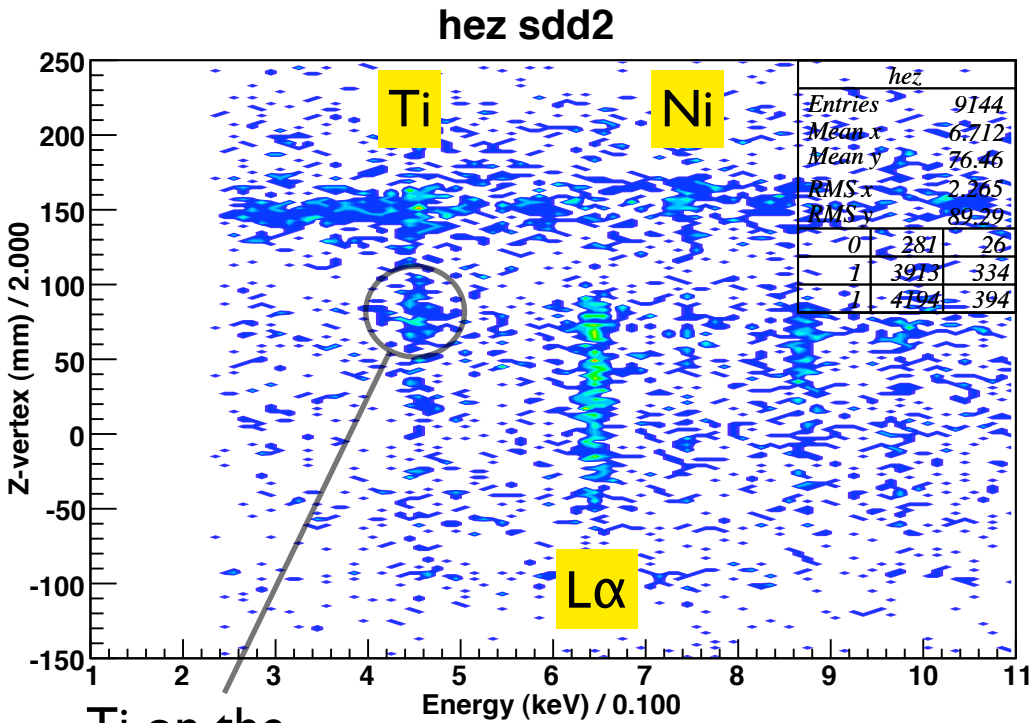
# To get “pure” stopped-K events

## KstopID

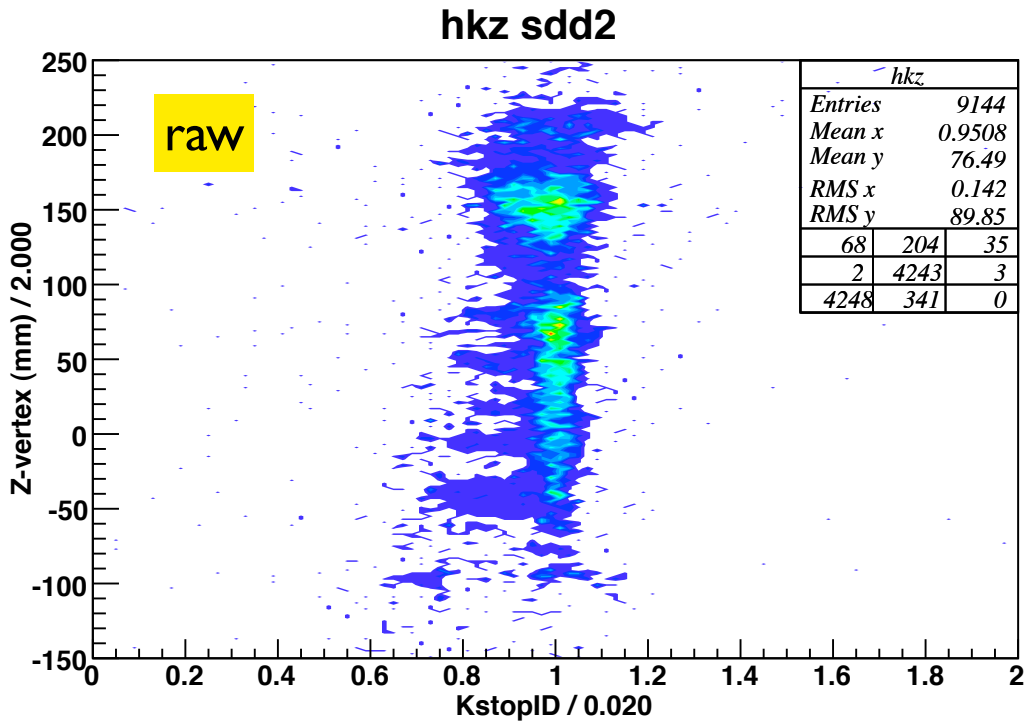
z dependence and Lα region cut

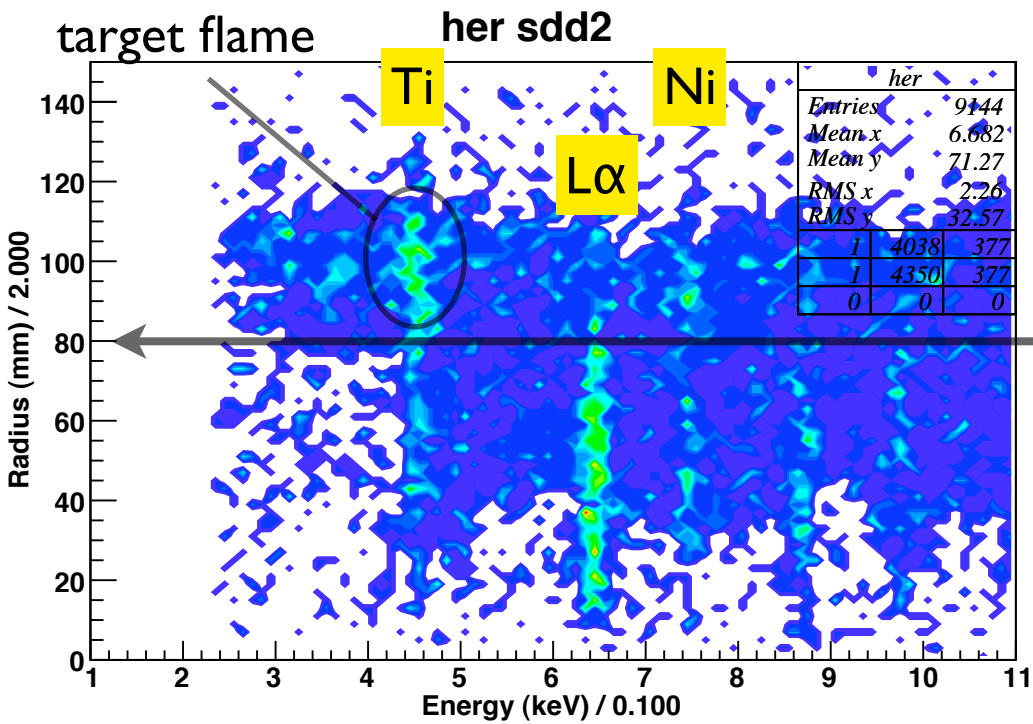
background subtraction

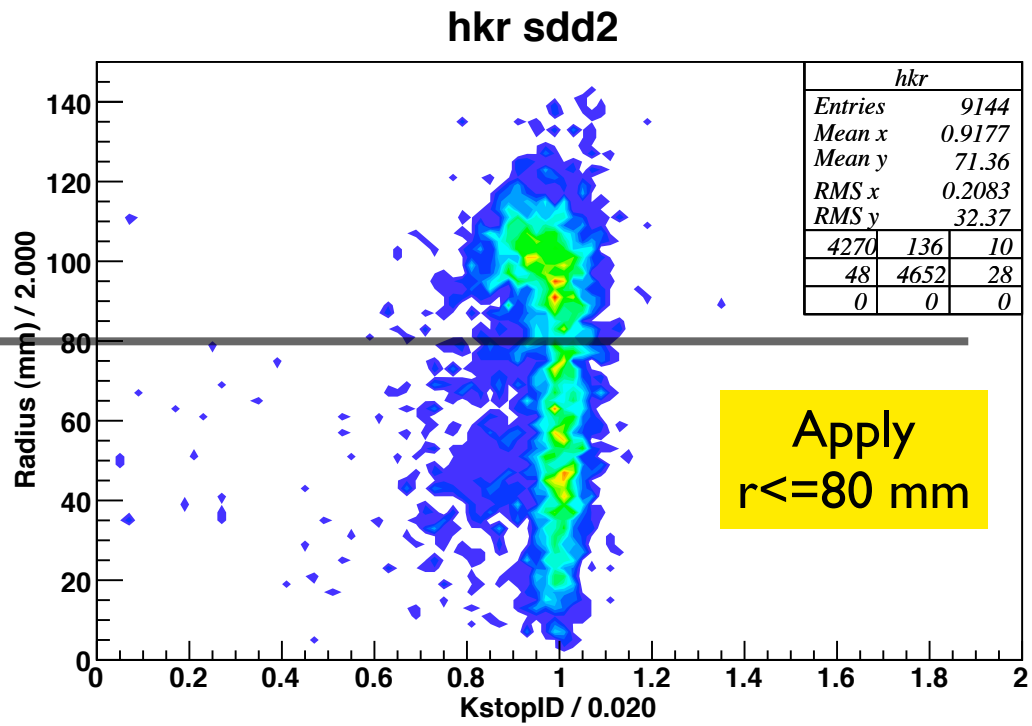
Oct 2nd  Hideyuki Tatsuno

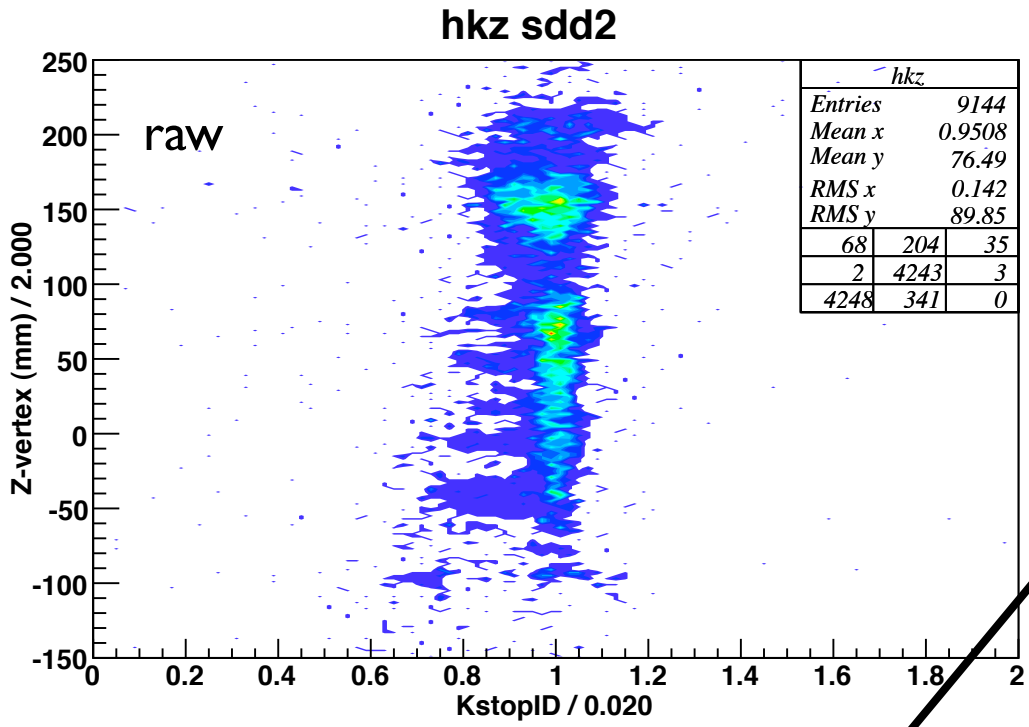


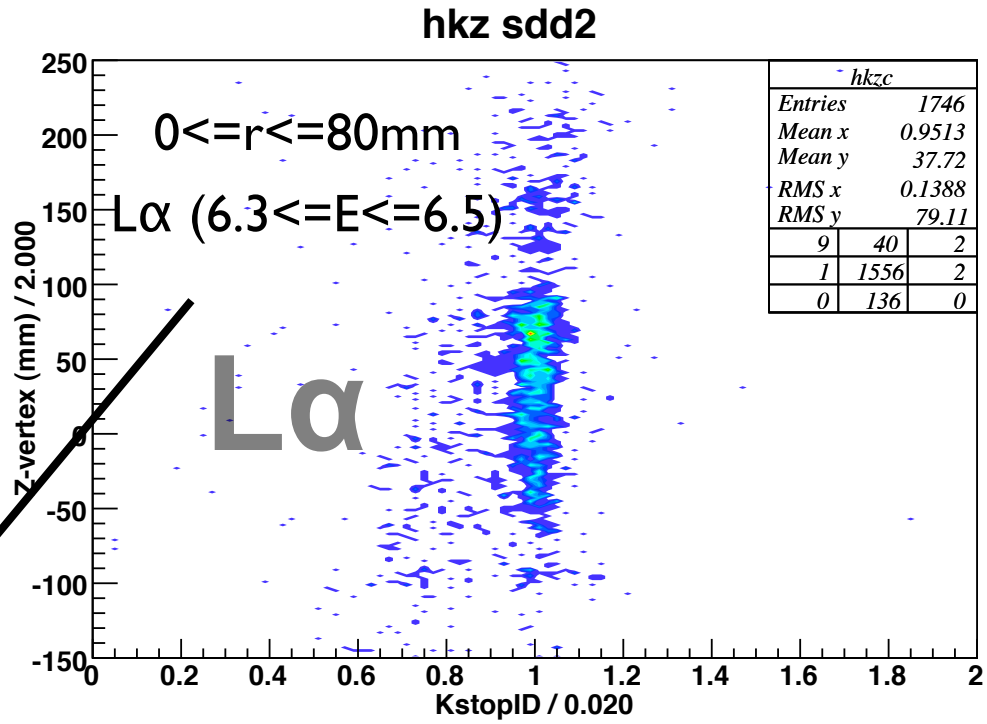

Ti on the target flame

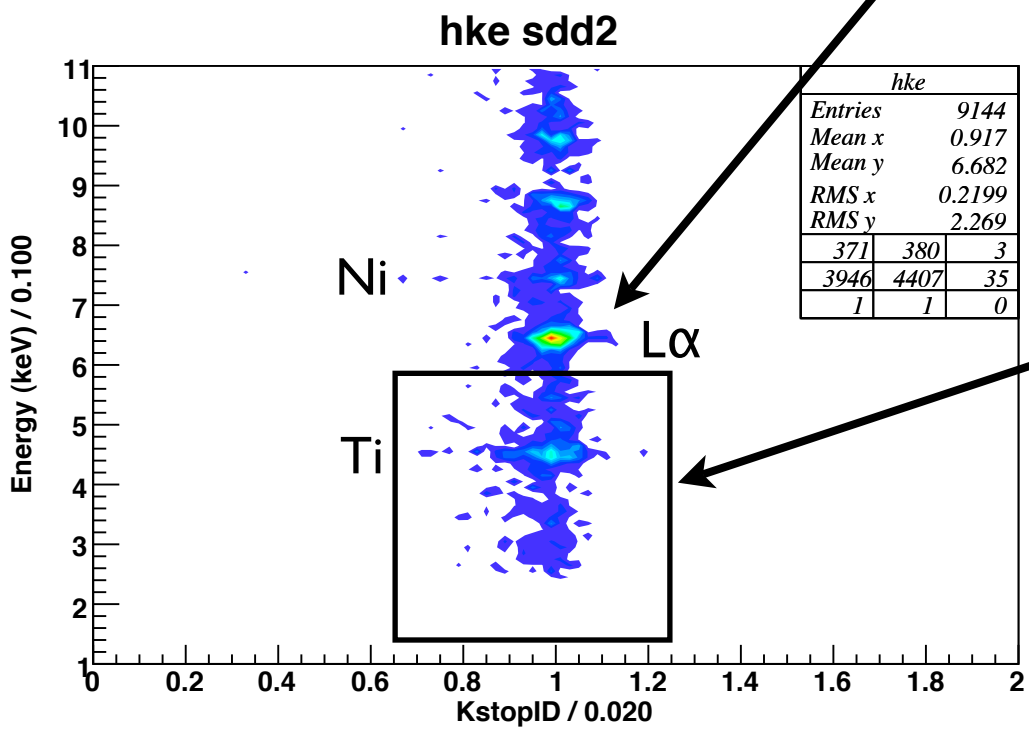


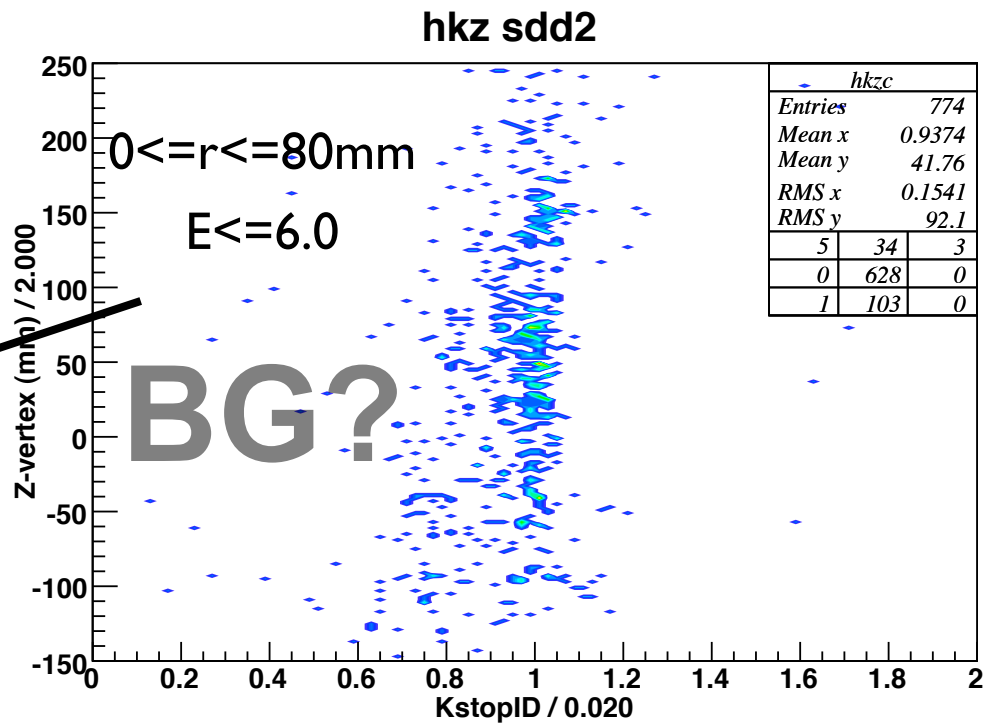



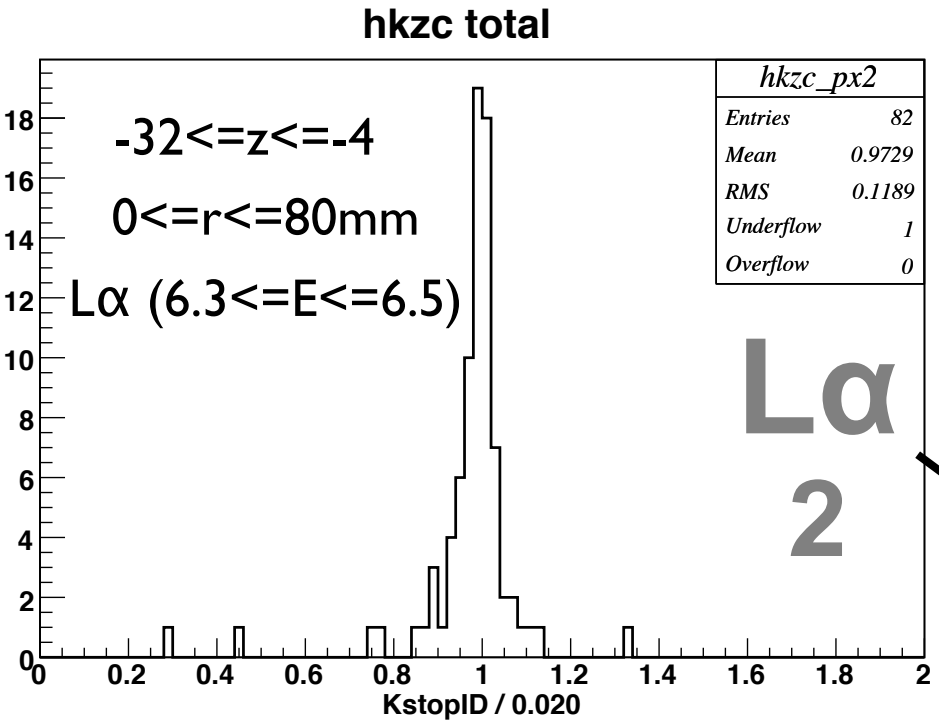




hkz sdd2
raw
hkz
Entries 9144
Mean x 0.9508
Mean y 76.49
RMS x 0.142
RMS y 89.85
68 204 35
2 4243 3
4248 341 0
Z-vertex (mm) / 2.000
KstopID / 0.020

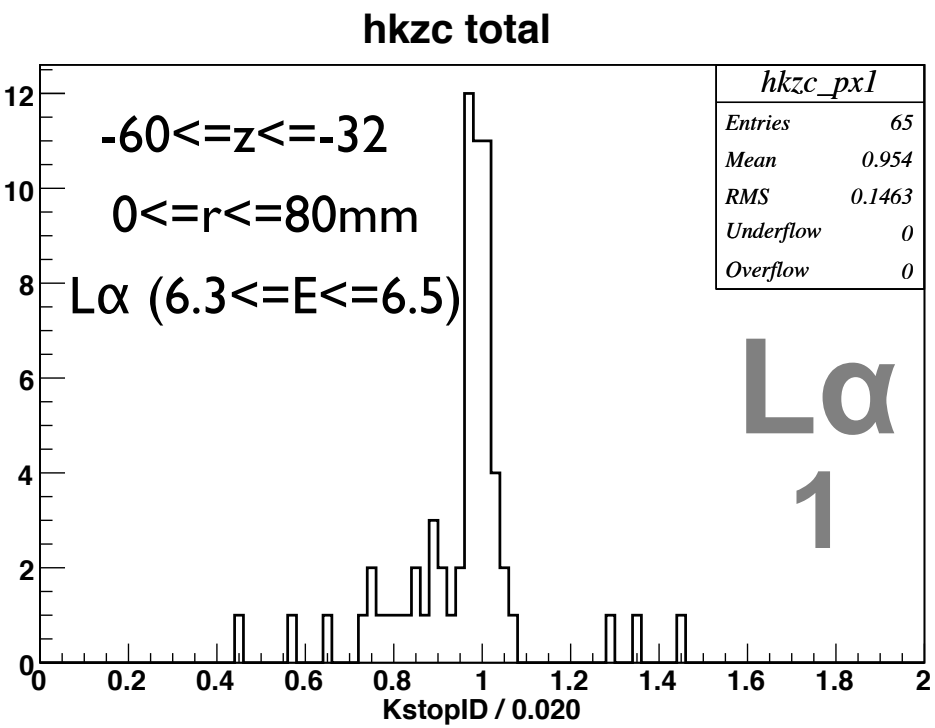

hkz sdd2
0<=r<=80mm
Lα (6.3<=E<=6.5)
Lα
hkzc
Entries 1746
Mean x 0.9513
Mean y 37.72
RMS x 0.1388
RMS y 79.11
9 40 2
1 1556 2
0 136 0
Z-vertex (mm) / 2.000
KstopID / 0.020


hke sdd2
Ni
Lα
Ti
hke
Entries 9144
Mean x 0.917
Mean y 6.682
RMS x 0.2199
RMS y 2.269
371 380 3
3946 4407 35
1 1 0
Energy (keV) / 0.100
KstopID / 0.020


hkz sdd2
0<=r<=80mm
E<=6.0
BG?
hkzc
Entries 774
Mean x 0.9374
Mean y 41.76
RMS x 0.1541
RMS y 92.1
5 34 3
0 628 0
1 103 0
Z-vertex (mm) / 2.000
KstopID / 0.020



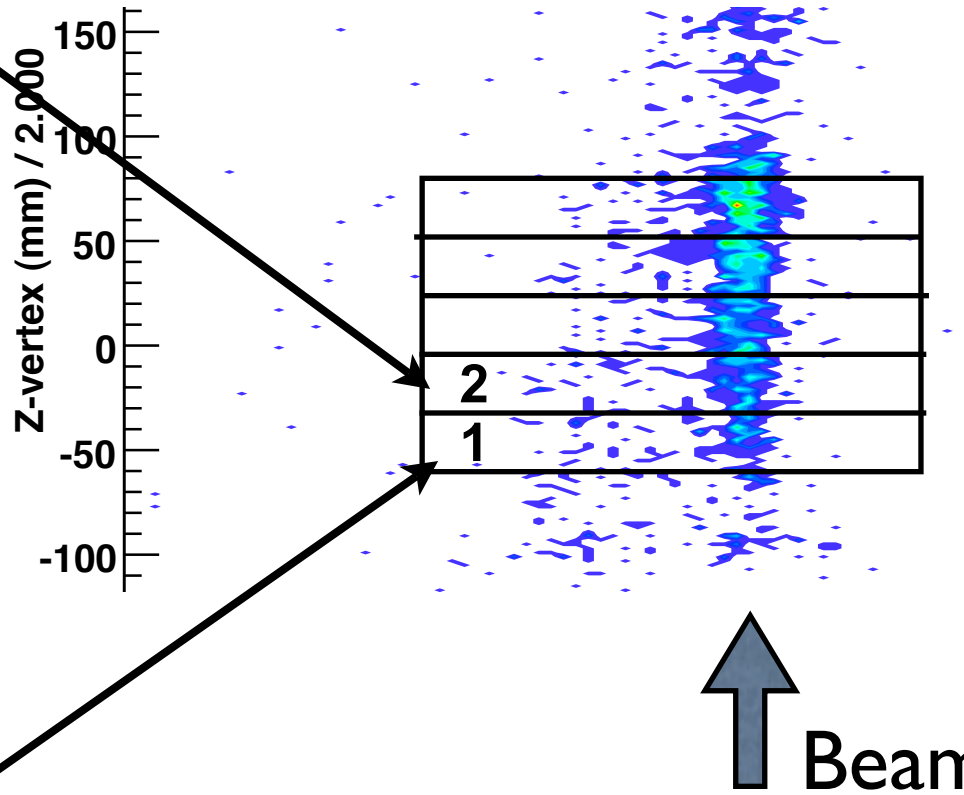

Lα 2

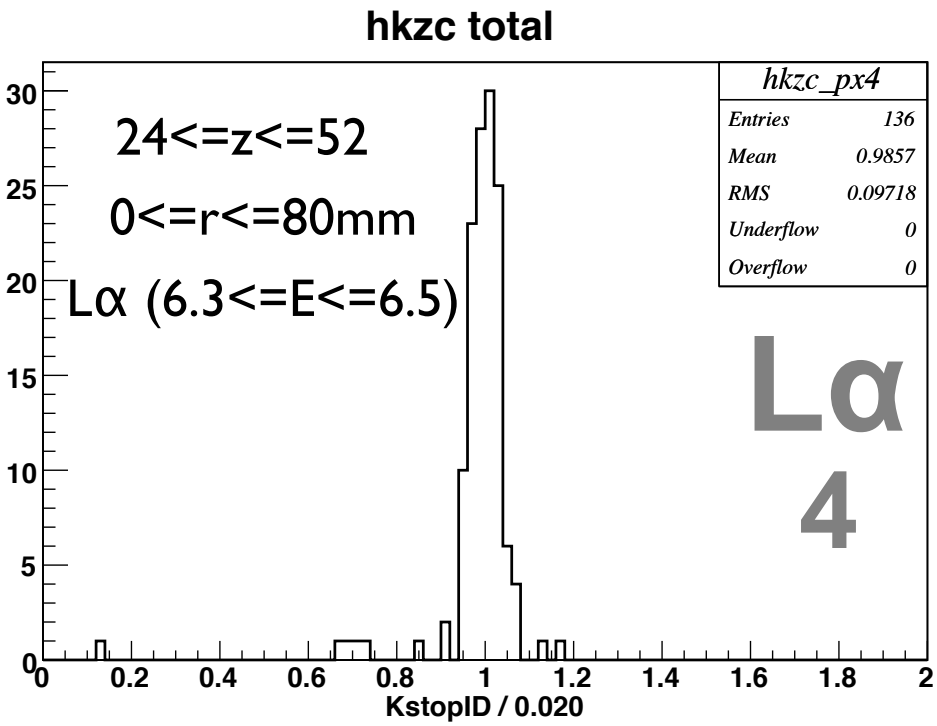


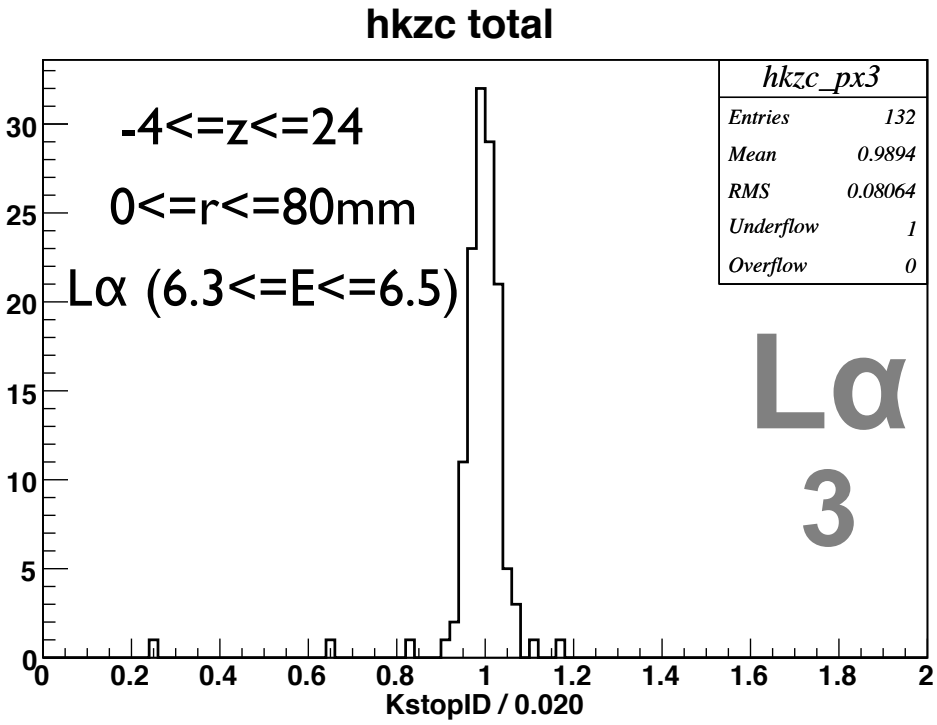

Lα 1

# 1st cycle total

# z dependence

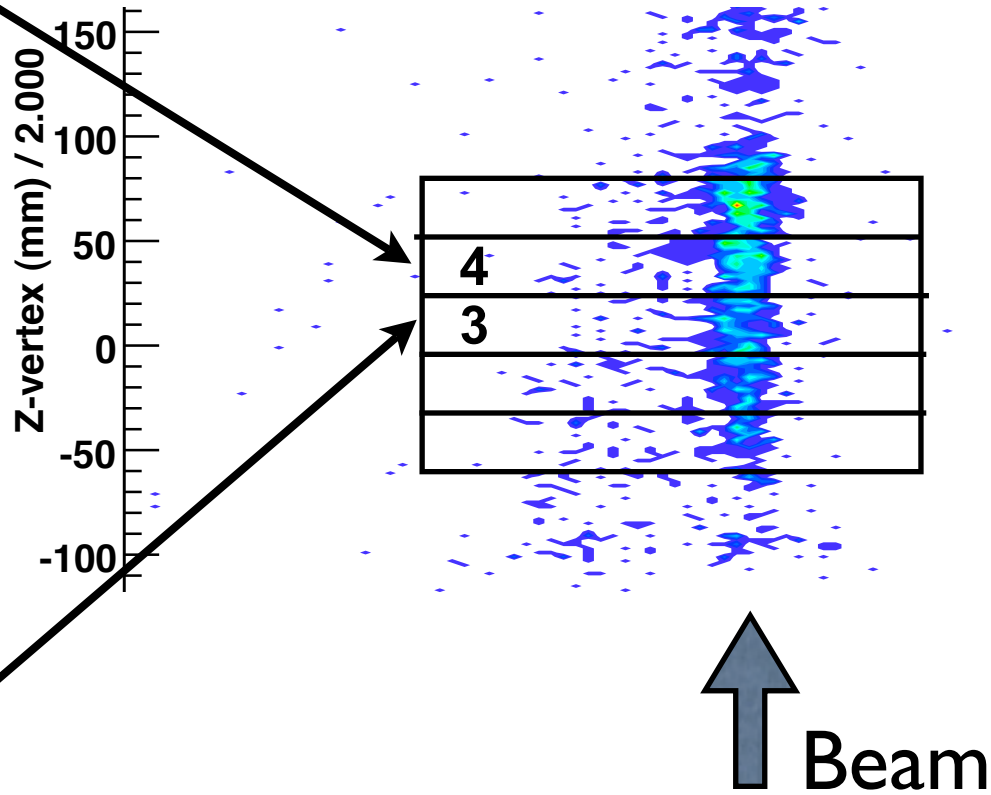




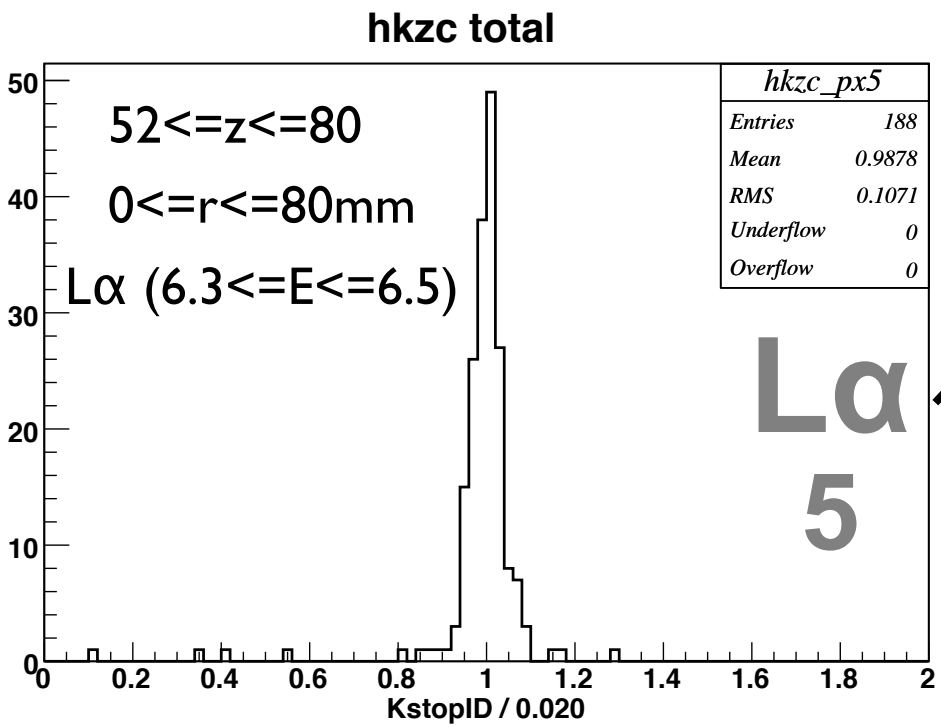

# 1st cycle total

# z dependence

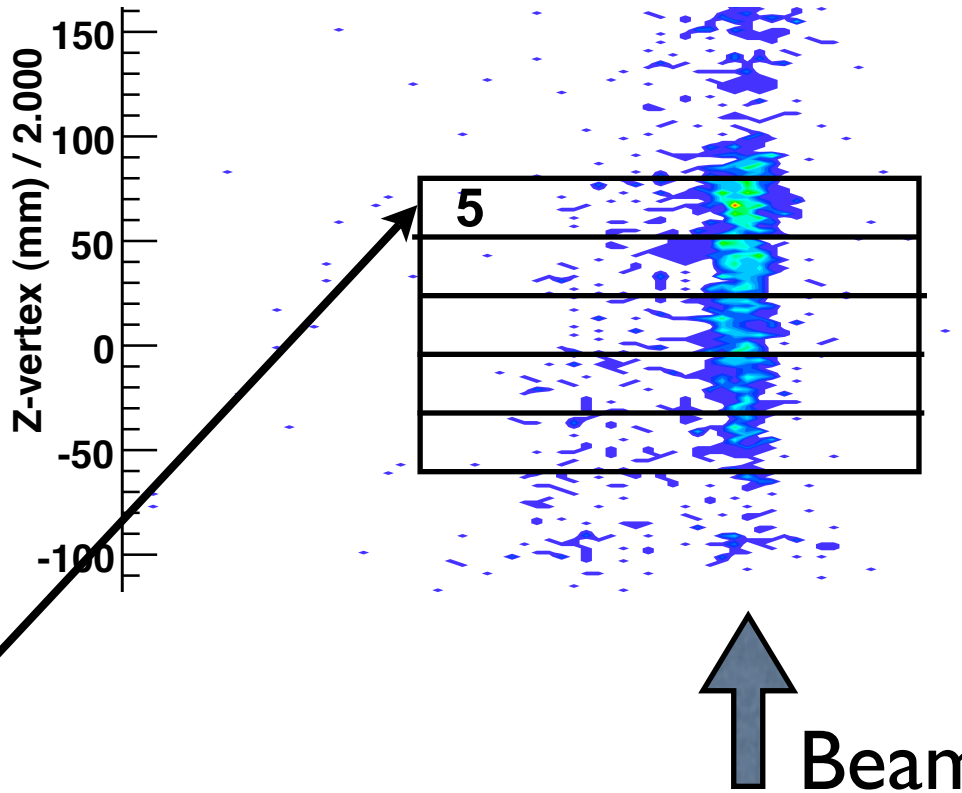


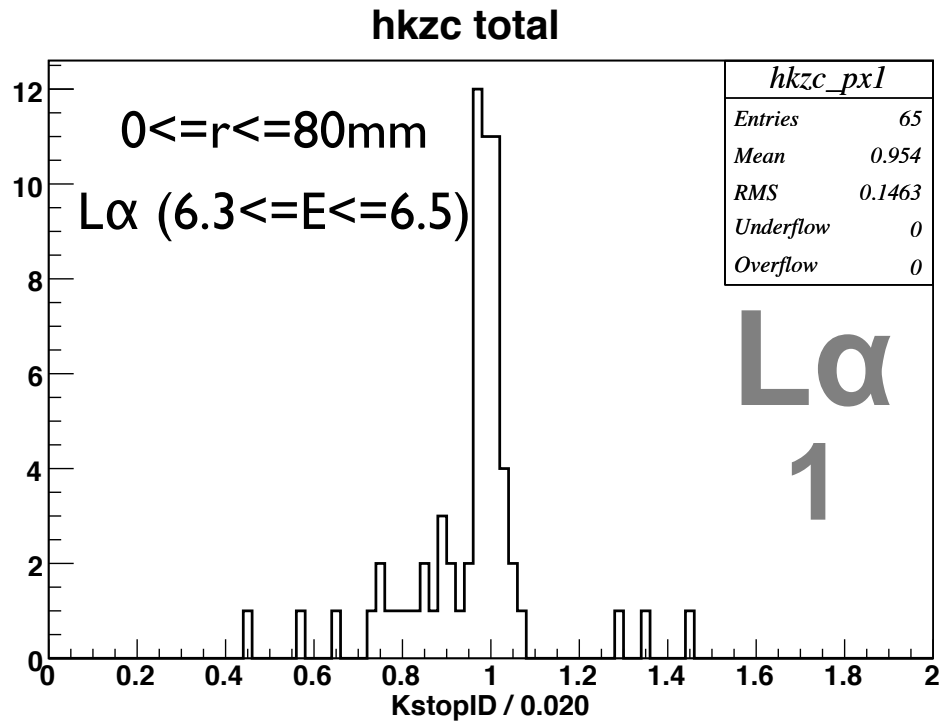
# 1st cycle total

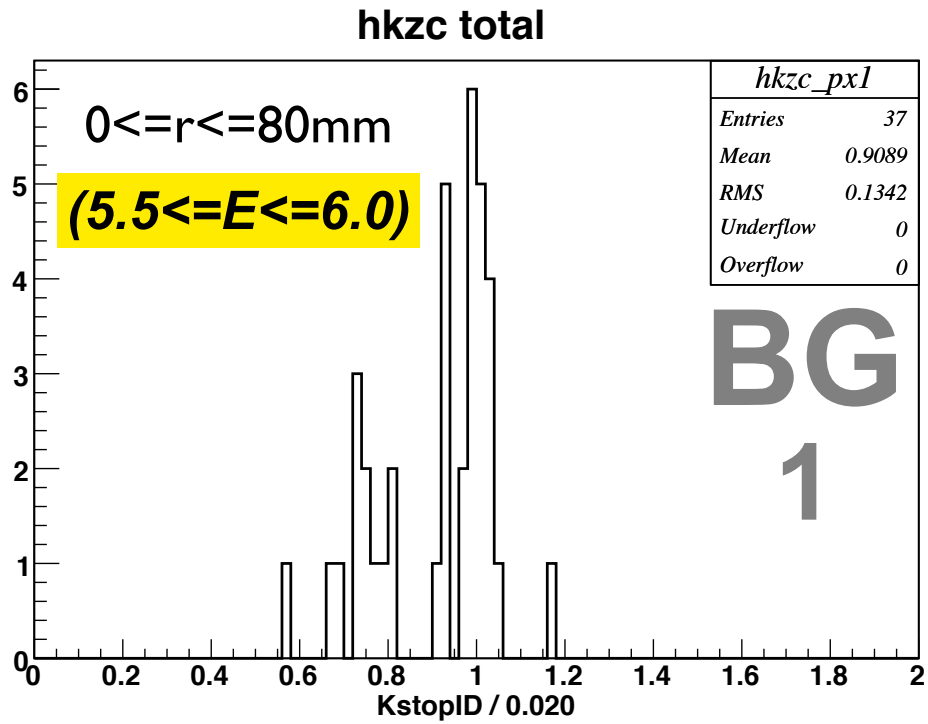
# z dependence

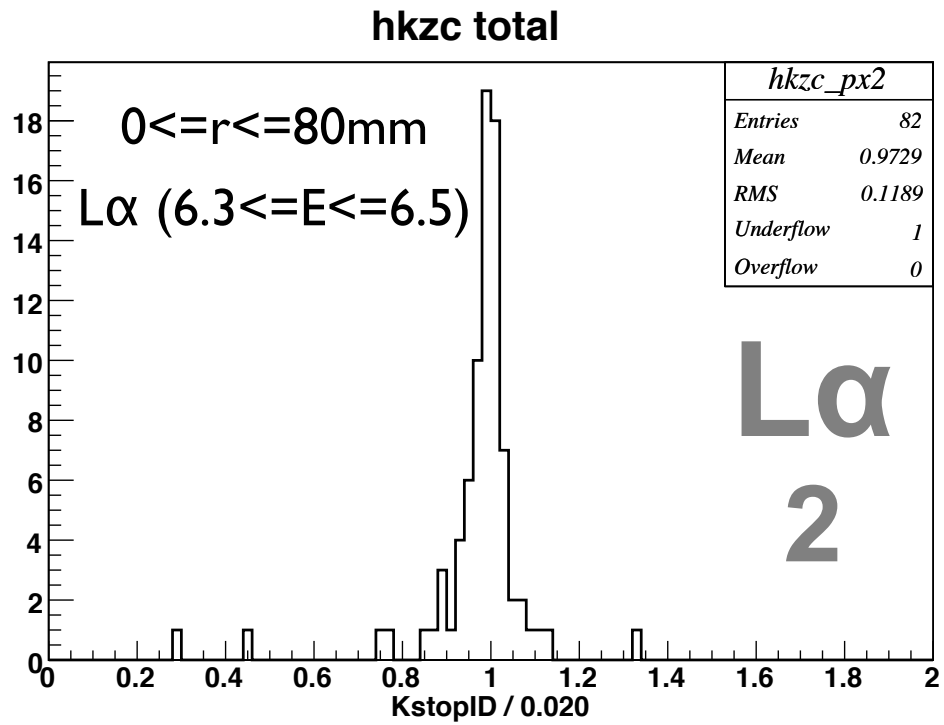


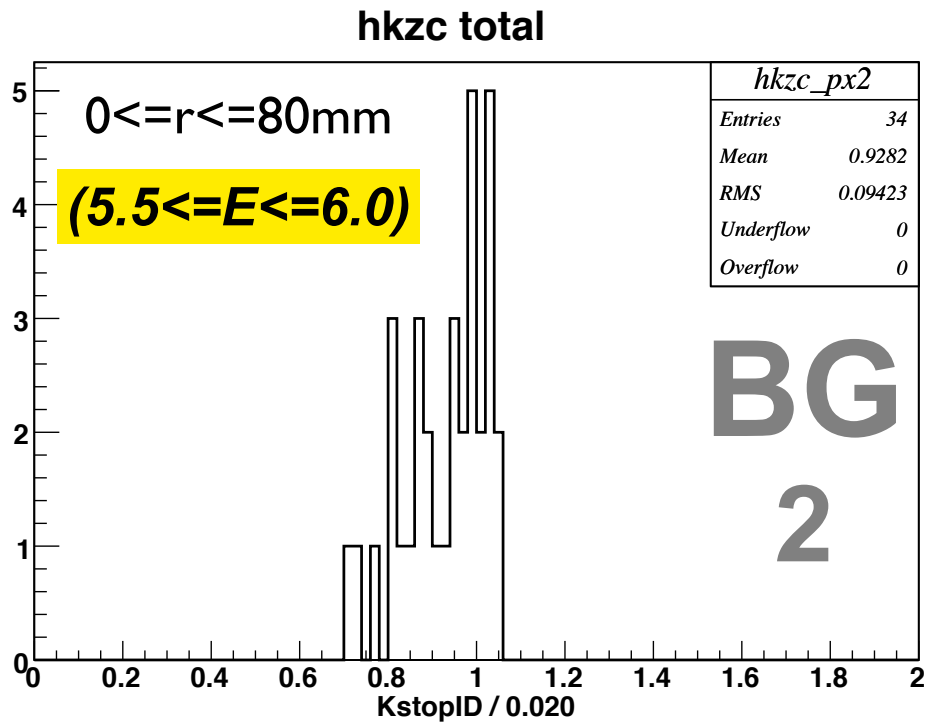

Lα
5

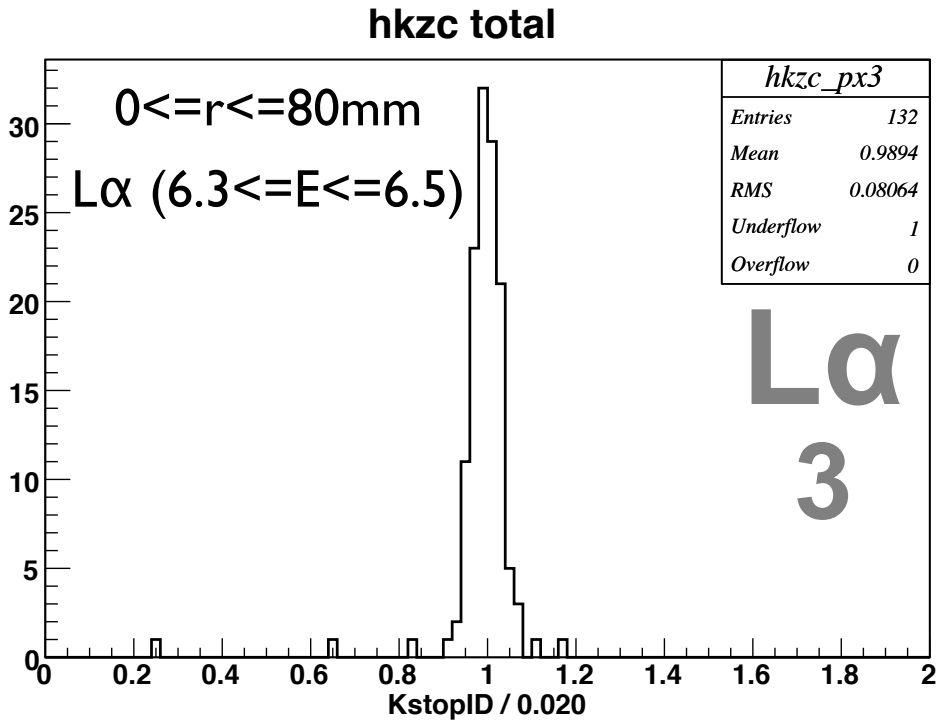


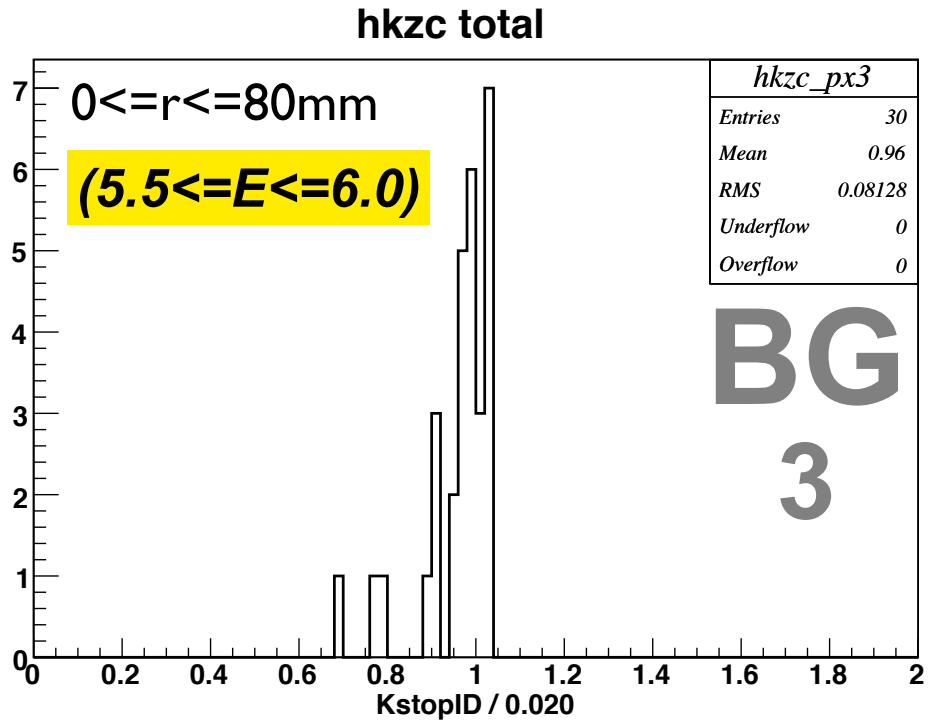

hkzc total
0<=r<=80mm
Lα (6.3<=E<=6.5)
hkzc_px1
Entries 65
Mean 0.954
RMS 0.1463
Underflow 0
Overflow 0
Lα
1
KstopID / 0.020

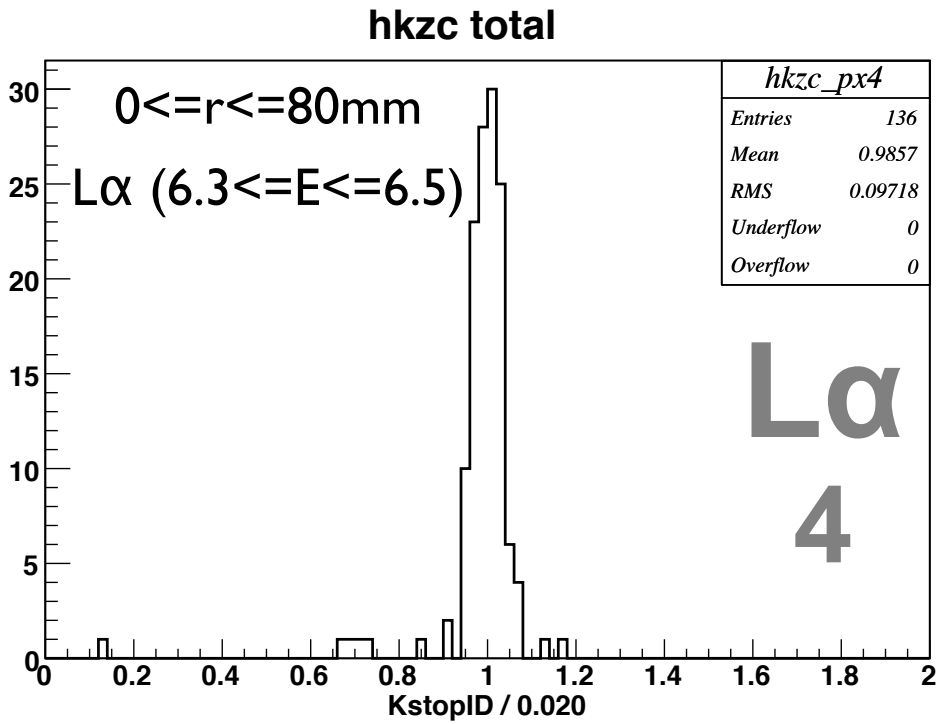

hkzc total
0<=r<=80mm
(5.5<=E<=6.0)
hkzc_px1
Entries 37
Mean 0.9089
RMS 0.1342
Underflow 0
Overflow 0
BG
1
KstopID / 0.020

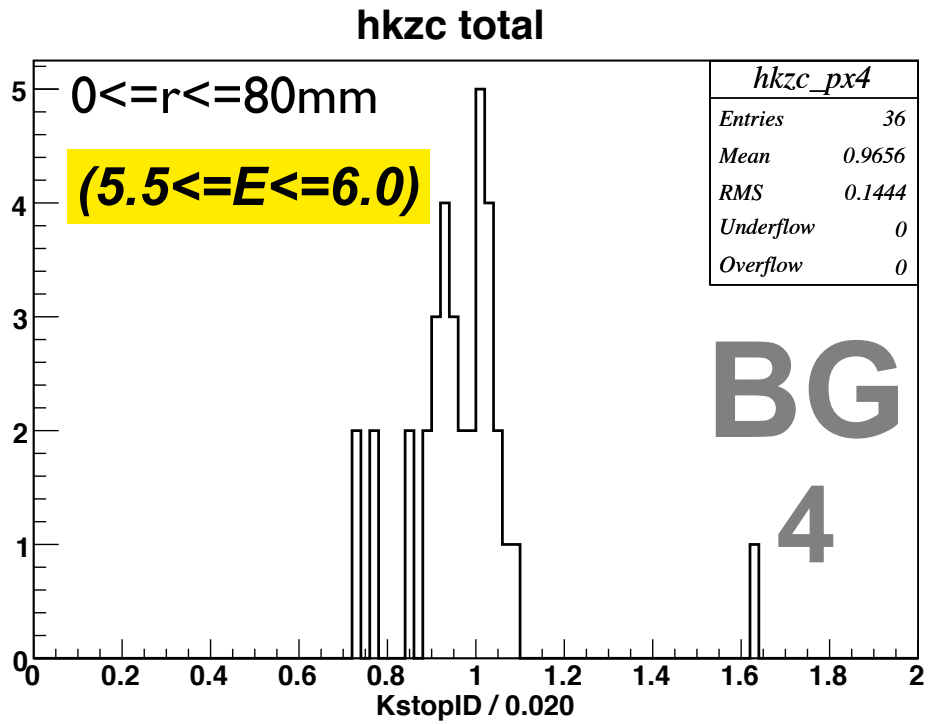

hkzc total
0<=r<=80mm
Lα (6.3<=E<=6.5)
hkzc_px2
Entries 82
Mean 0.9729
RMS 0.1189
Underflow 1
Overflow 0
Lα
2
KstopID / 0.020

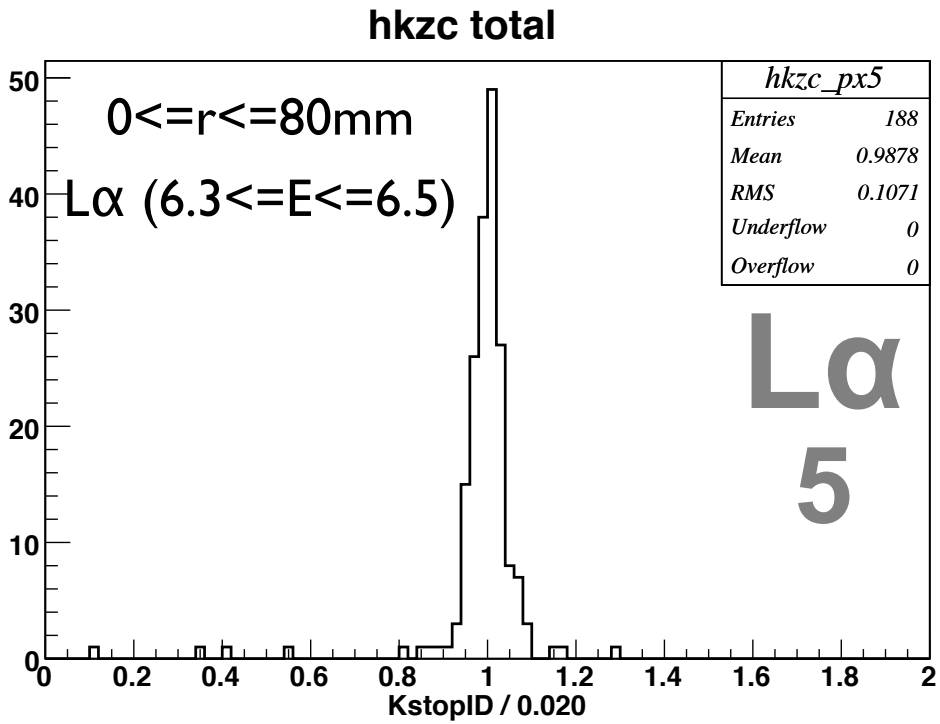

hkzc total
0<=r<=80mm
(5.5<=E<=6.0)
hkzc_px2
Entries 34
Mean 0.9282
RMS 0.09423
Underflow 0
Overflow 0
BG
2
KstopID / 0.020

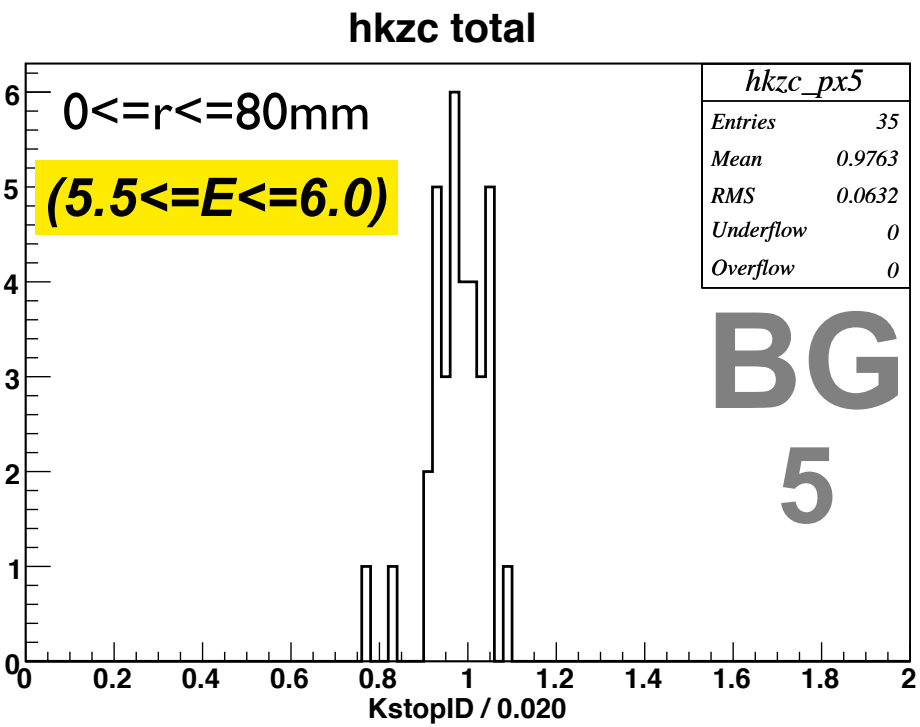

hkzc total
0<=r<=80mm
Lα (6.3<=E<=6.5)
hkzc_px3
Entries 132
Mean 0.9894
RMS 0.08064
Underflow 1
Overflow 0
Lα
3
KstopID / 0.020

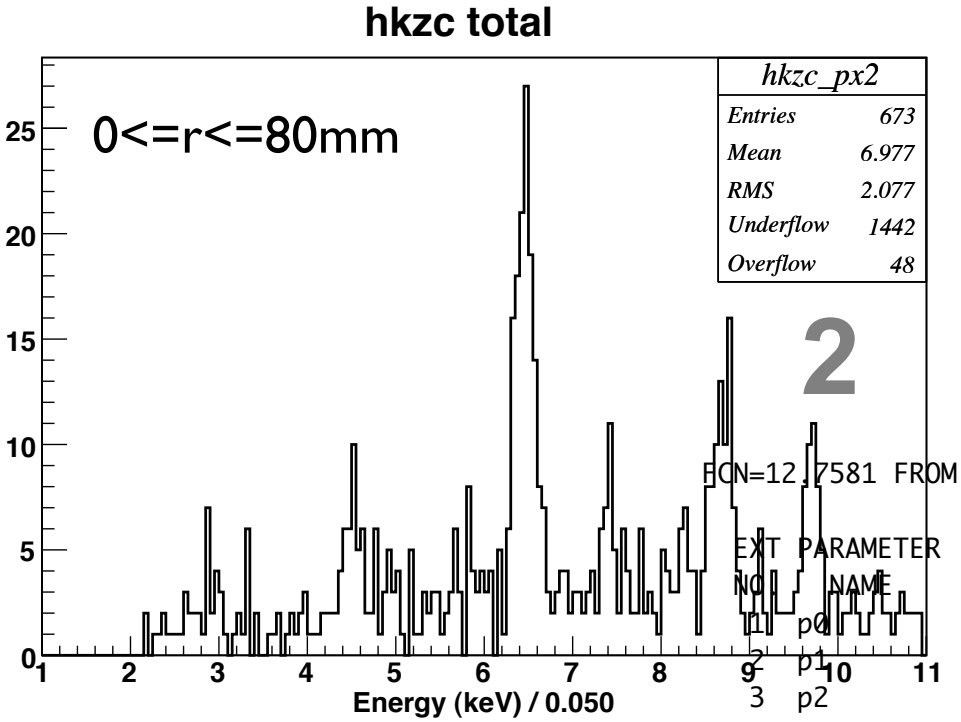

hkzc total
0<=r<=80mm
(5.5<=E<=6.0)
hkzc_px3
Entries 30
Mean 0.96
RMS 0.08128
Underflow 0
Overflow 0
BG
3
KstopID / 0.020


hkzc total
0<=r<=80mm
Lα (6.3<=E<=6.5)
hkzc_px4
Entries 136
Mean 0.9857
RMS 0.09718
Underflow 0
Overflow 0
Lα
4
KstopID / 0.020


hkzc total
0<=r<=80mm
(5.5<=E<=6.0)
hkzc_px4
Entries 36
Mean 0.9656
RMS 0.1444
Underflow 0
Overflow 0
BG
4
KstopID / 0.020


hkzc total
0<=r<=80mm
Lα (6.3<=E<=6.5)
hkzc_px5
Entries 188
Mean 0.9878
RMS 0.1071
Underflow 0
Overflow 0
Lα
5
KstopID / 0.020


hkzc total
0<=r<=80mm
(5.5<=E<=6.0)
hkzc_px5
Entries 35
Mean 0.9763
RMS 0.0632
Underflow 0
Overflow 0
BG
5
KstopID / 0.020



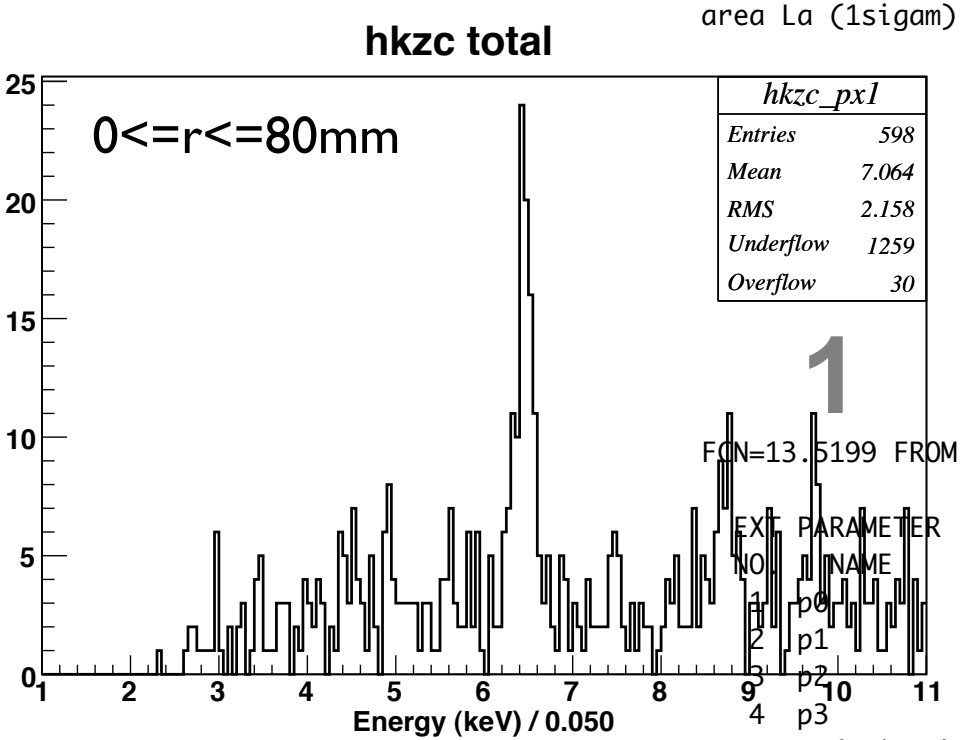

# *Gaussian+const. BG Fit*

La/BG ratio (±1σ) = 73.2/9.1

FCN=12.7581 FROM MINOS STATUS=SUCCESSFUL 262 CALLS 386 TOTAL
EDM=2.4307e-10 STRATEGY= 1 ERROR MATRIX ACCURATE

| EXT PARAMETER NO. | NAME | VALUE | PARABOLIC ERROR | MINOS ERRORS NEGATIVE | POSITIVE |
|---|---|---|---|---|---|
| 1 | p0 | 5.36033e+00 | 6.56210e-01 | -6.51181e-01 | 6.61295e-01 |
| 2 | p1 | 6.46580e+00 | 1.18847e-02 | -1.18814e-02 | 1.19823e-02 |
| 3 | p2 | 9.17063e-02 | 9.47270e-03 | -9.27866e-03 | 9.78004e-03 |
| 4 | p3 | 2.47698e+00 | 5.56323e-01 | -5.64950e-01 | 5.49049e-01 |

area La (1sigam) = 73.189921, area BG = 9.086177



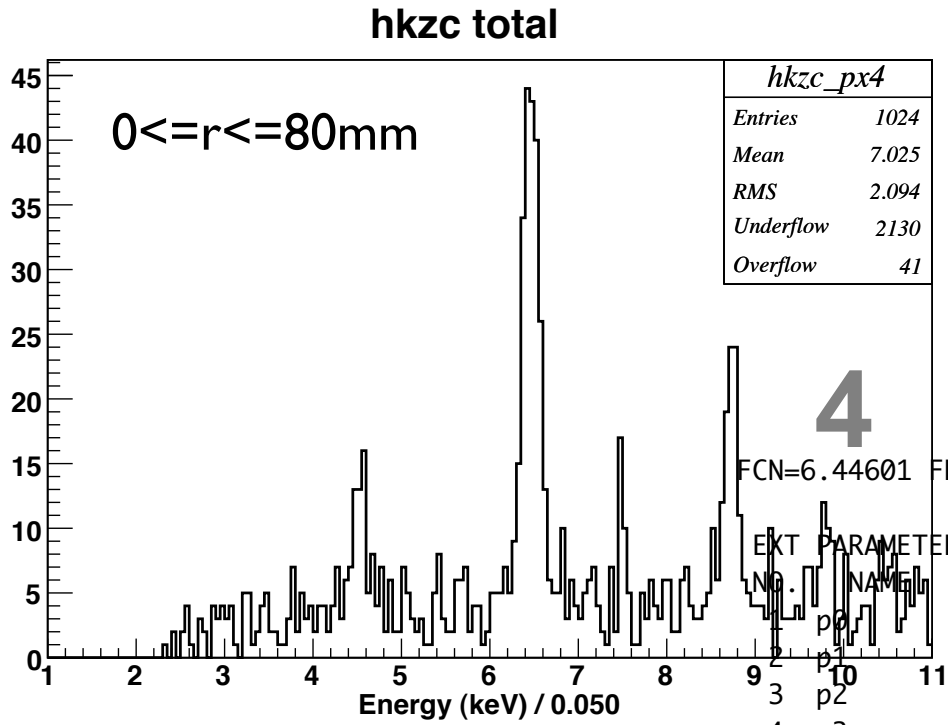

La/BG ratio (±1σ) = 60.6/8.1

FCN=13.5199 FROM MINOS STATUS=SUCCESSFUL 291 CALLS 417 TOTAL
EDM=5.18525e-11 STRATEGY= 1 ERROR MATRIX ACCURATE

| EXT PARAMETER NO. | NAME | VALUE | PARABOLIC ERROR | MINOS ERRORS NEGATIVE | POSITIVE |
|---|---|---|---|---|---|
| 1 | p0 | 4.44058e+00 | 6.23879e-01 | -6.15321e-01 | 6.33683e-01 |
| 2 | p1 | 6.45224e+00 | 1.42262e-02 | -1.45362e-02 | 1.39964e-02 |
| 3 | p2 | 1.01804e-01 | 1.60873e-02 | -1.56085e-02 | 1.68238e-02 |
| 4 | p3 | 1.98274e+00 | 5.37905e-01 | -5.54484e-01 | 5.25714e-01 |

area La (1sigam) = 60.631670, area BG = 8.073987

# *Gaussian+const. BG Fit*

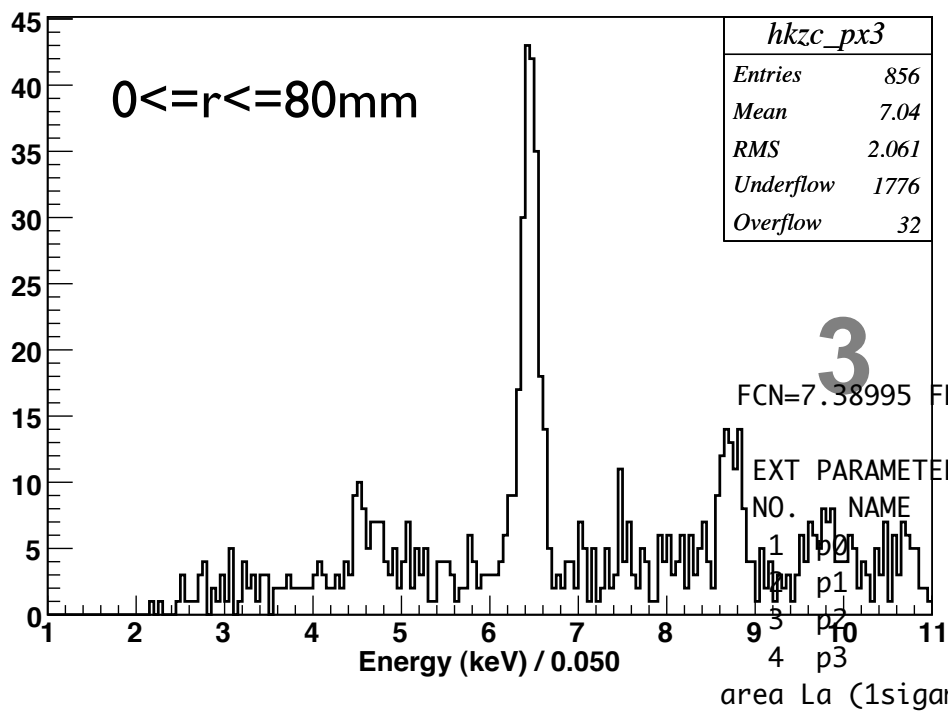



La/BG ratio (±1σ) = 128/17

FCN=6.44601 FROM MINOS STATUS=SUCCESSFUL 191 CALLS 314 TOTAL
EDM=7.87607e-11 STRATEGY= 1 ERROR MATRIX ACCURATE

| EXT PARAMETER NO. | NAME | VALUE | PARABOLIC ERROR | MINOS ERRORS NEGATIVE | POSITIVE |
|---|---|---|---|---|---|
| 1 | p0 | 9.37760e+00 | 8.44930e-01 | -8.41780e-01 | 8.48024e-01 |
| 2 | p1 | 6.46493e+00 | 7.95499e-03 | -7.96873e-03 | 7.97388e-03 |
| 3 | p2 | 8.60568e-02 | 6.94613e-03 | -6.77963e-03 | 7.16655e-03 |
| 4 | p3 | 4.80011e+00 | 6.96448e-01 | -7.01335e-01 | 6.92111e-01 |

area La (1sigam) = 128.041688, area BG = 16.523265

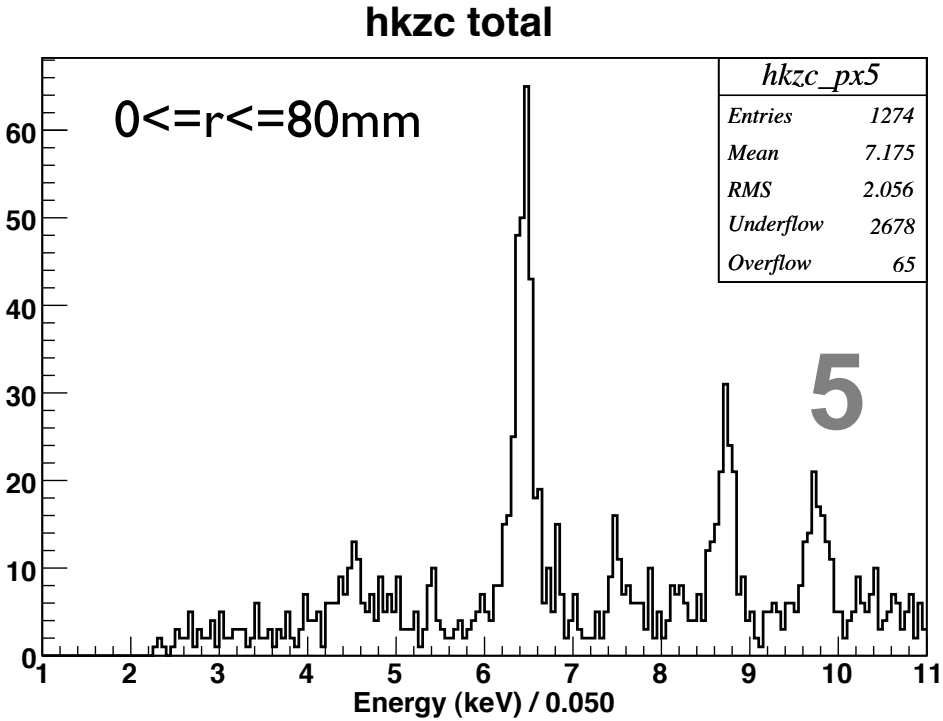



La/BG ratio (±1σ) = 130/11

FCN=7.38995 FROM MINOS STATUS=SUCCESSFUL 206 CALLS 332 TOTAL
EDM=1.47923e-10 STRATEGY= 1 ERROR MATRIX ACCURATE

| EXT PARAMETER NO. | NAME | VALUE | PARABOLIC ERROR | MINOS ERRORS NEGATIVE | POSITIVE |
|---|---|---|---|---|---|
| 1 | p0 | 9.49937e+00 | 8.11251e-01 | -8.08734e-01 | 8.13765e-01 |
| 2 | p1 | 6.45369e+00 | 8.11740e-03 | -8.17311e-03 | 8.10231e-03 |
| 3 | p2 | 9.34485e-02 | 8.00053e-03 | -7.80148e-03 | 8.26087e-03 |
| 4 | p3 | 2.88114e+00 | 5.72028e-01 | -5.77520e-01 | 5.67352e-01 |

area La (1sigam) = 129.704403, area BG = 10.769519

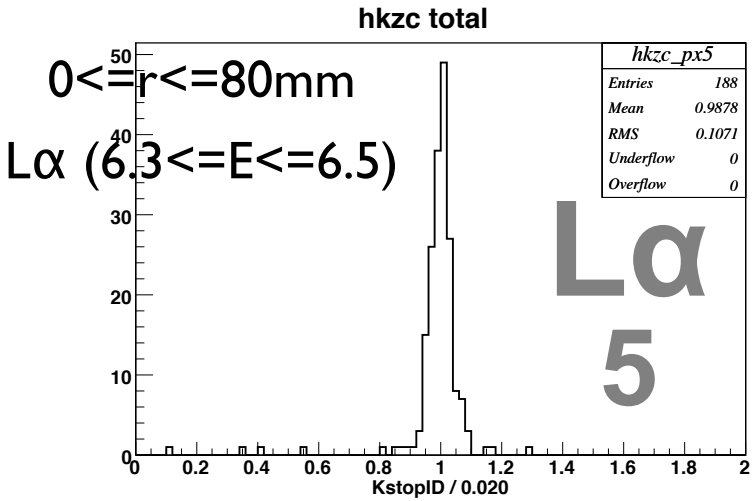


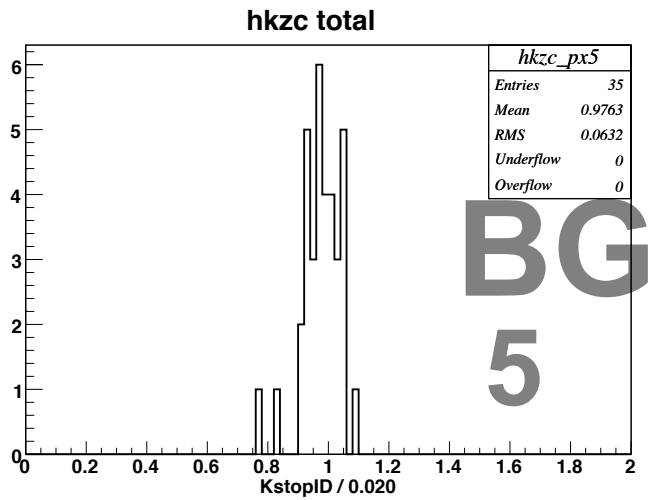

## *Gaussian+const. BG Fit*

La/BG ratio (±1σ) = 169/19

```
FCN=26.3711 FROM MINOS     STATUS=SUCCESSFUL    212 CALLS         336 TOTAL
                     EDM=2.57529e-10    STRATEGY= 1      ERROR MATRIX ACCURATE
  EXT PARAMETER                   PARABOLIC         MINOS ERRORS
  NO.   NAME      VALUE            ERROR       NEGATIVE      POSITIVE
   1  p0           1.23704e+01   9.72914e-01  -9.68263e-01   9.77727e-01
   2  p1           6.44132e+00   7.48991e-03  -7.56572e-03   7.44700e-03
   3  p2           9.57585e-02   8.75432e-03  -8.39629e-03   9.16627e-03
   4  p3           4.96106e+00   7.58992e-01  -7.67449e-01   7.51838e-01
area La (1sigam) = 168.905563,  area BG = 19.002536
```

Normalize the BG
KstopID spectra by these numbers



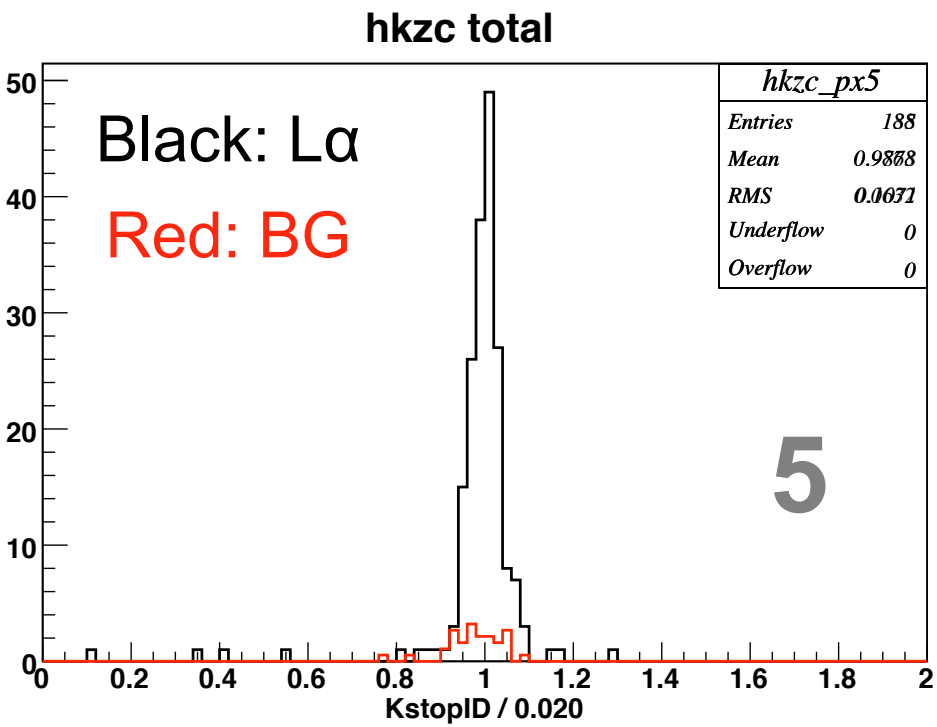

0<=r<=80mm

***(5.5<=E<=6.0)***

La/BG ratio (±1σ) = 169/19

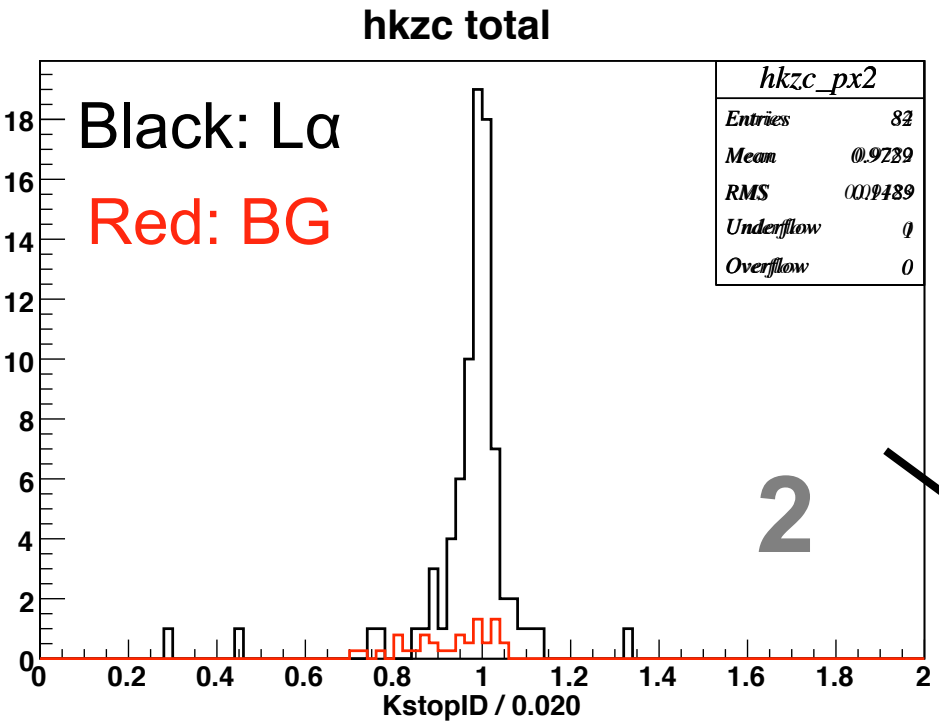
→ number of BG is 19

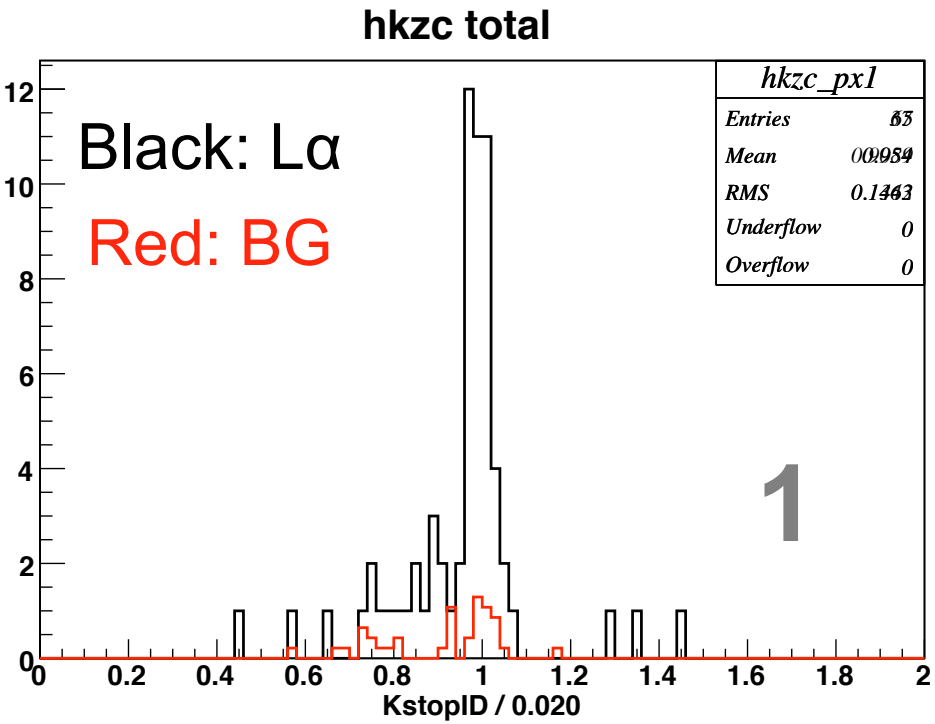
→ number of entry is 35




scale: ×19/35

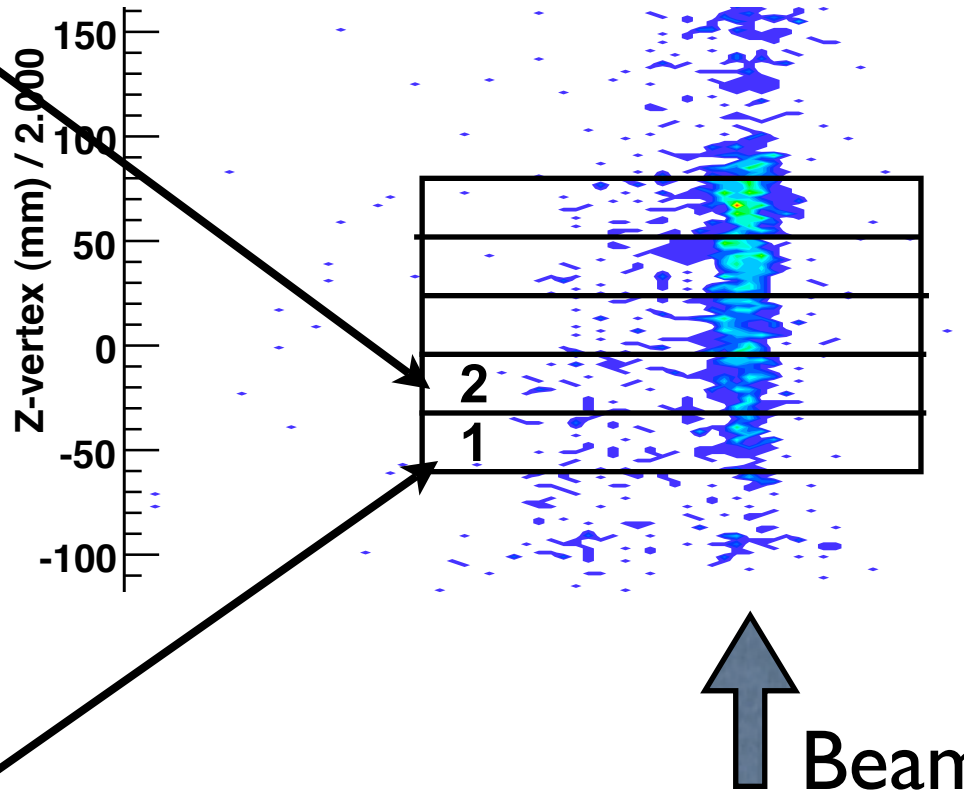
assuming the BG shape is same

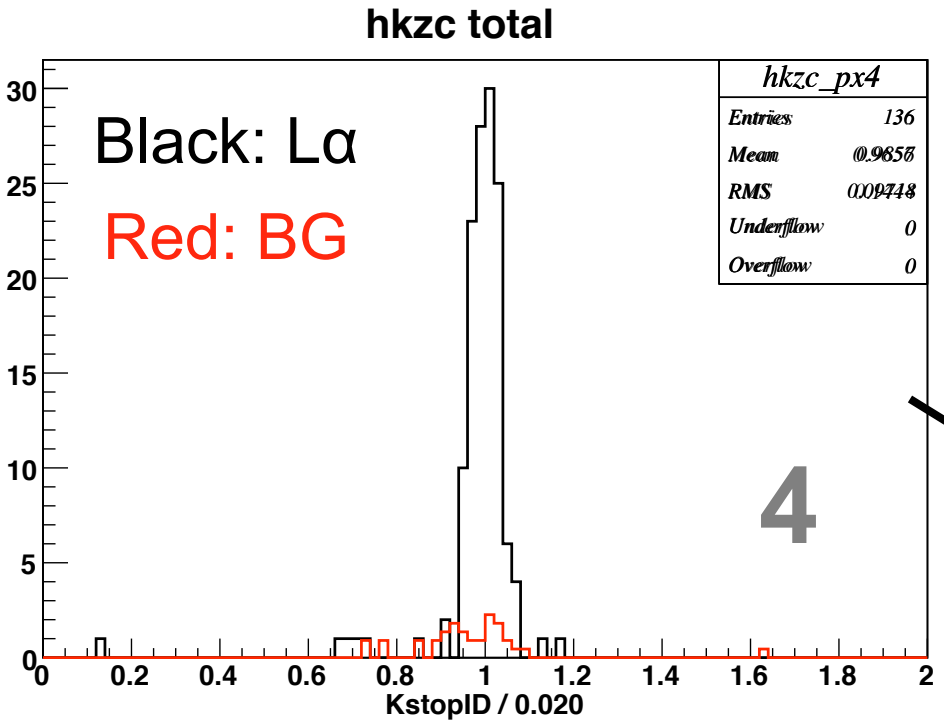


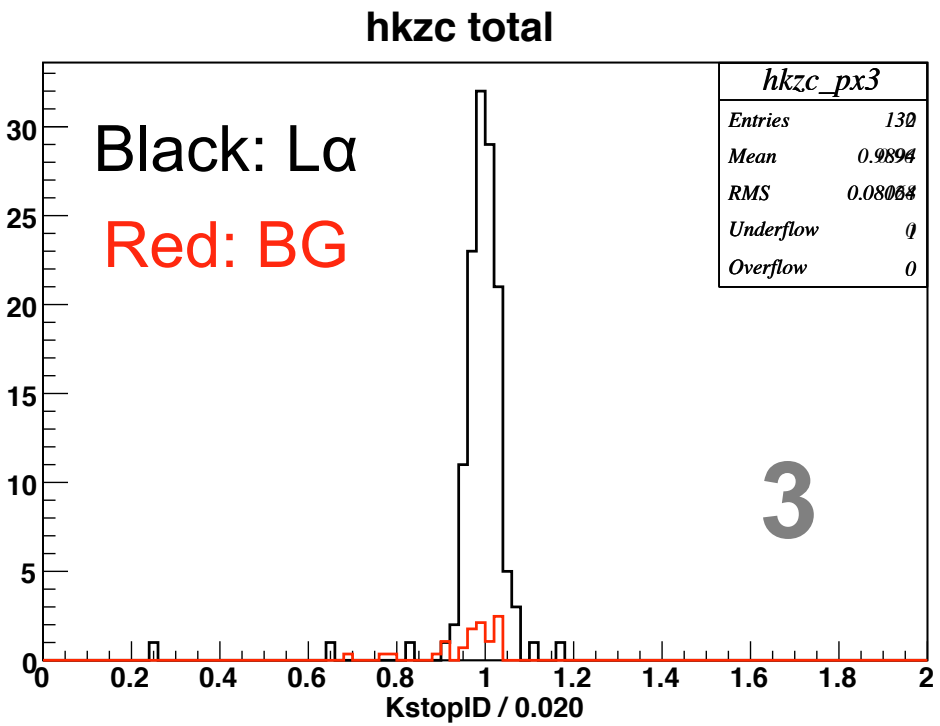




# 1st cycle total

# z dependence

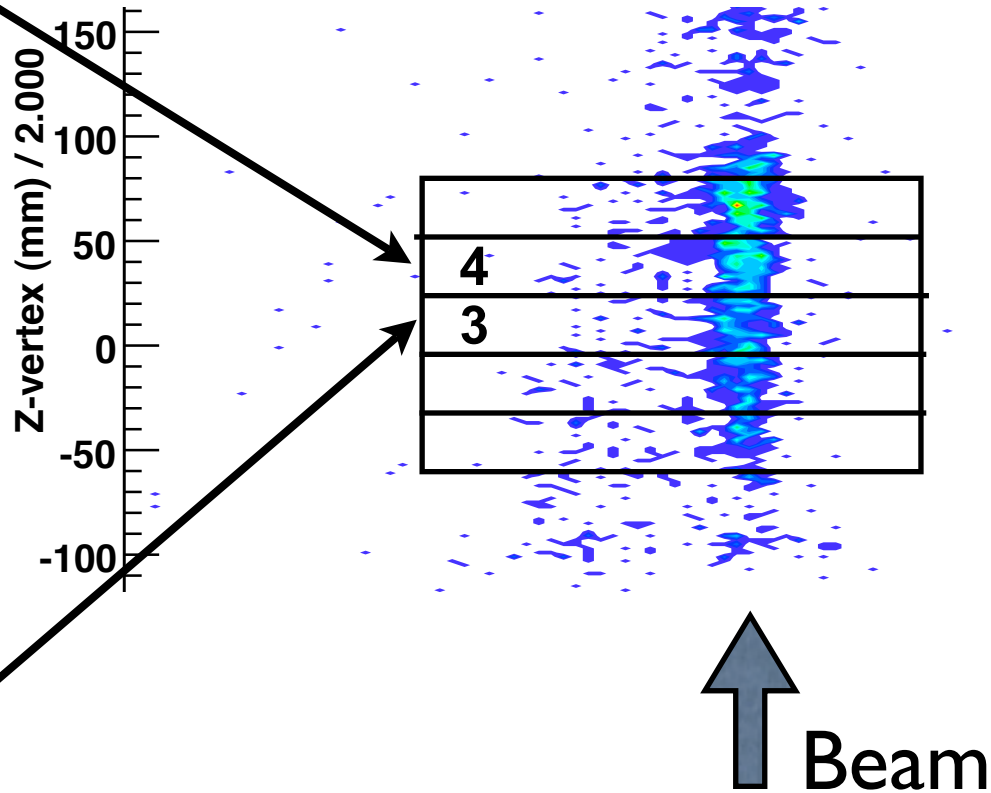




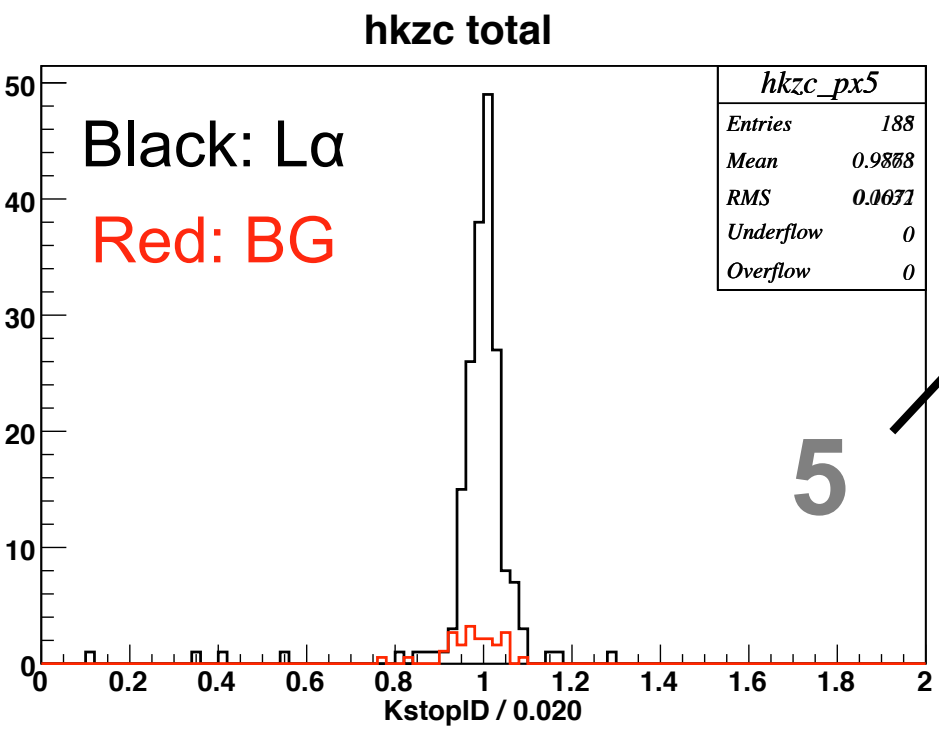

# 1st cycle total

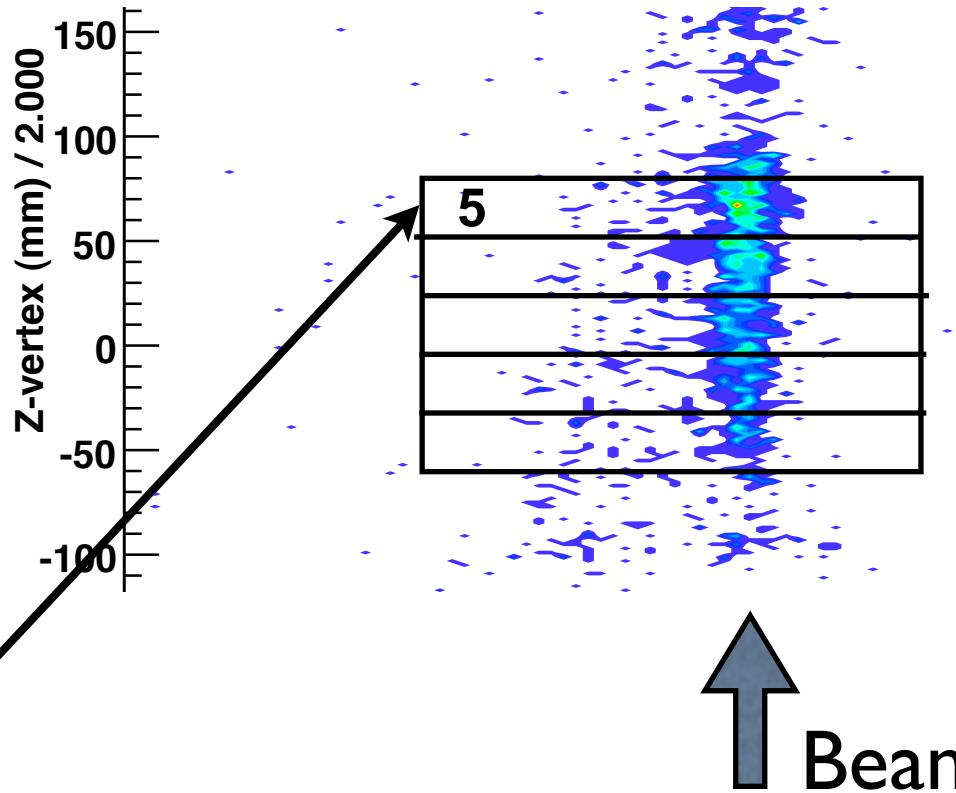
# z dependence



# 1st cycle total

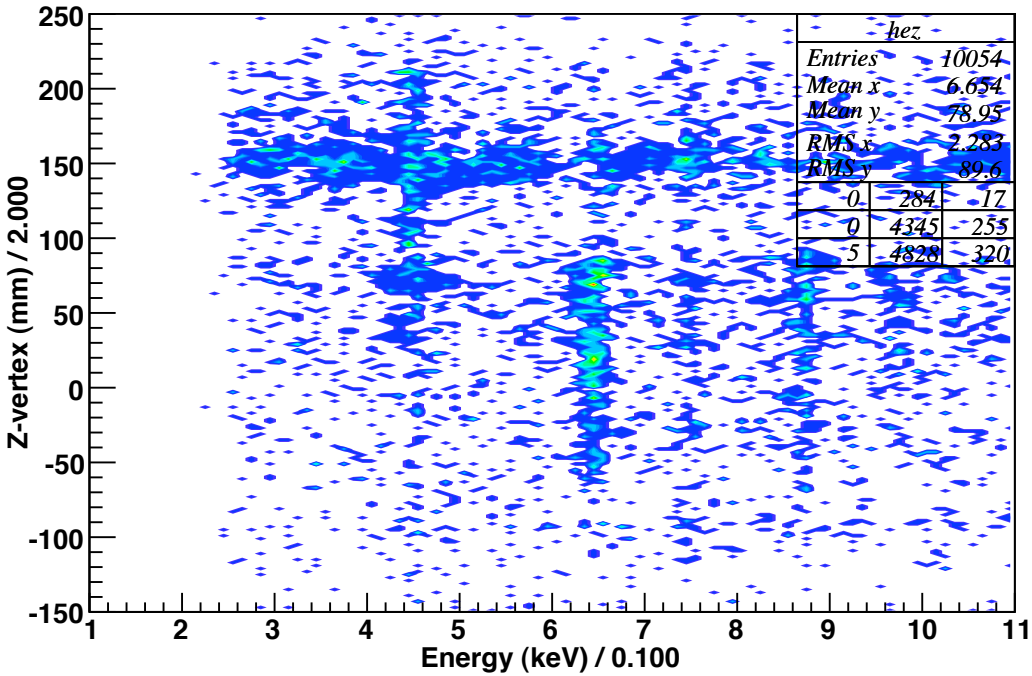
# z dependence



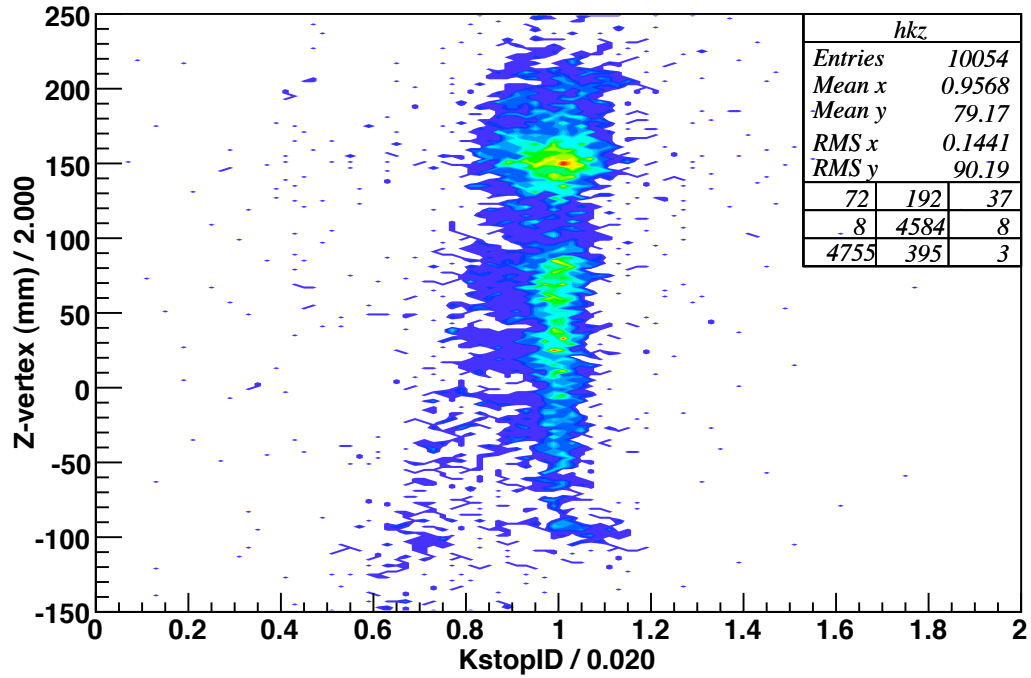



# other SDDs contour plots

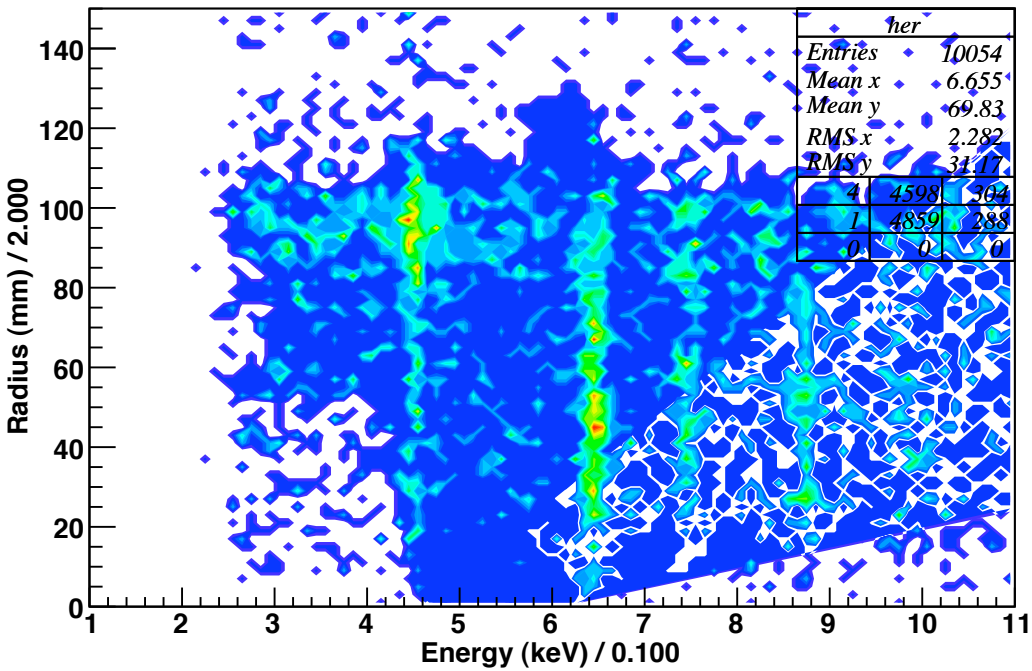
## hez sdd4



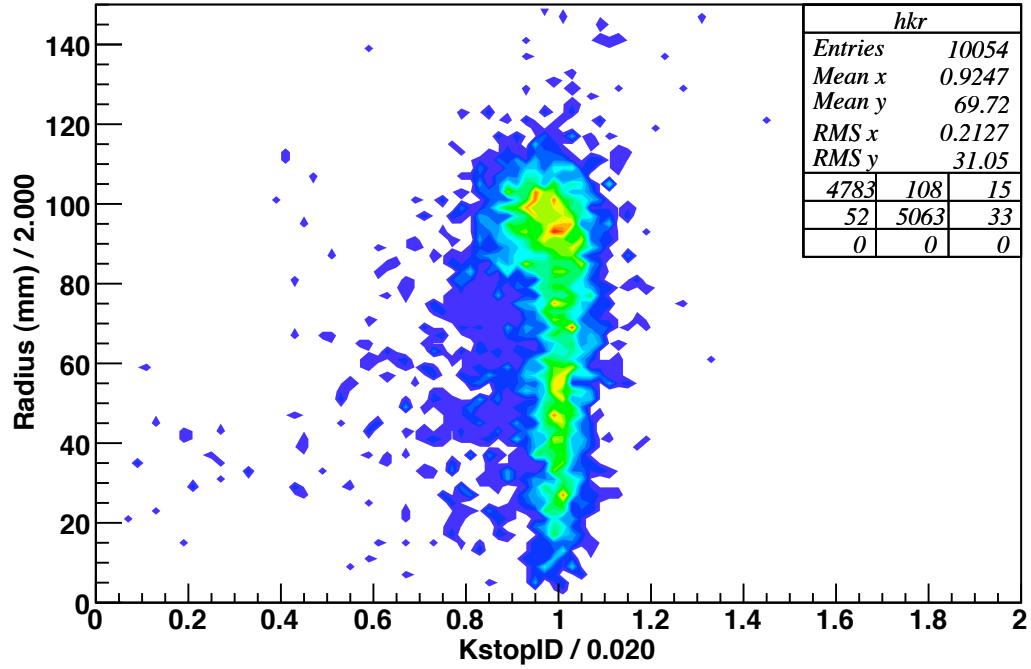

## hkz sdd4

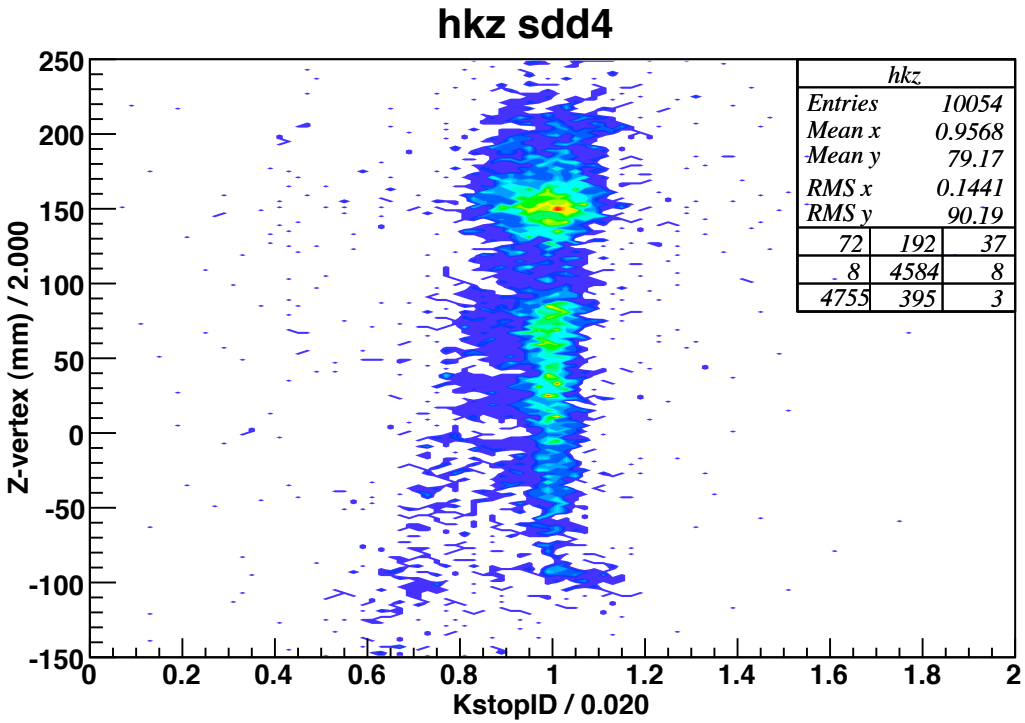


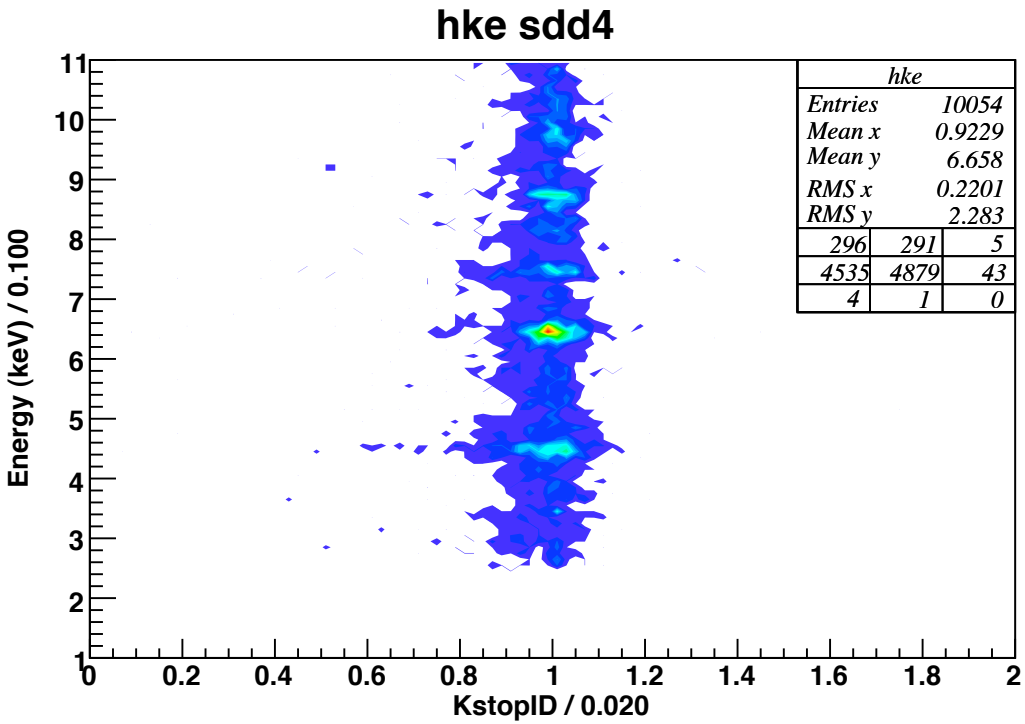

## her sdd4



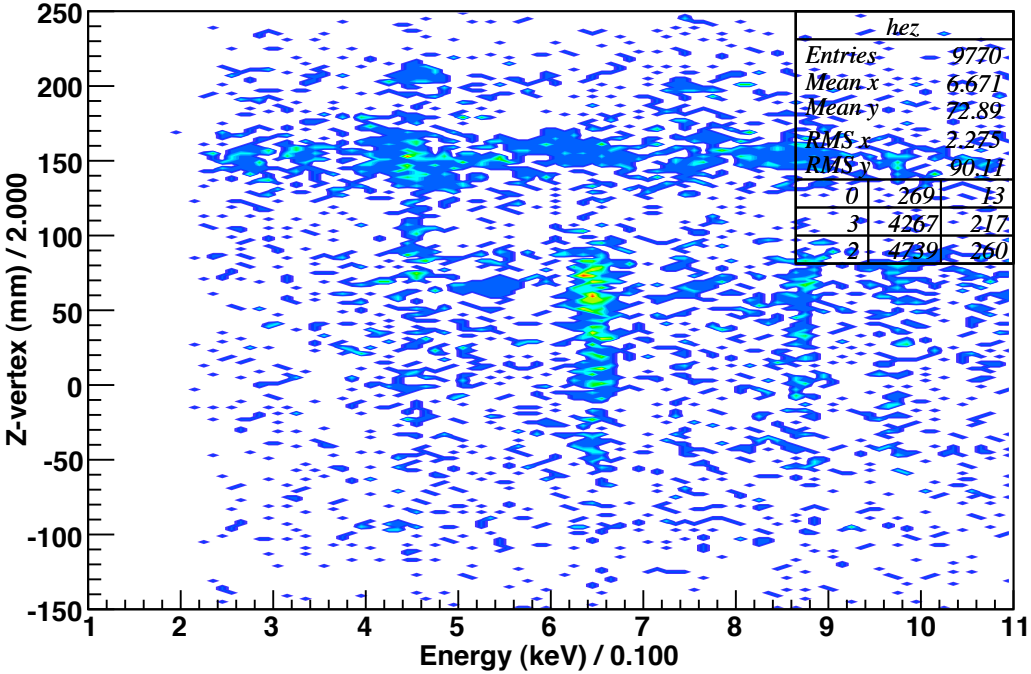

## hkr sdd4



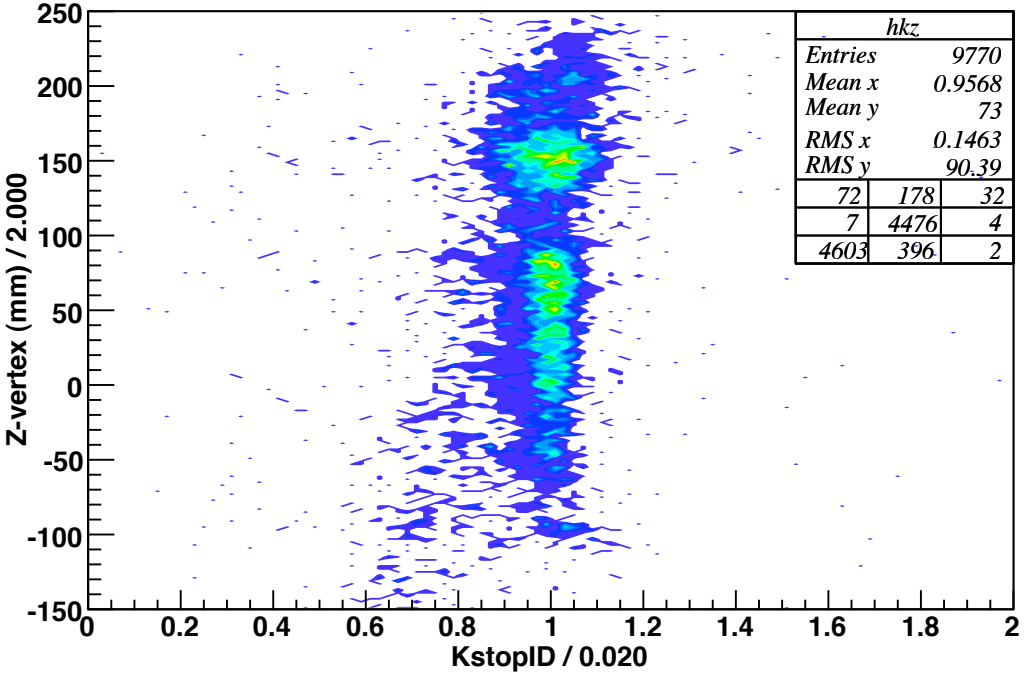

hkz sdd4
hkz
Entries 10054
Mean x 0.9568
Mean y 79.17
RMS x 0.1441
RMS y 90.19
72 192 37
8 4584 8
4755 395 3
Z-vertex (mm) / 2.000
KstopID / 0.020


hke sdd4
hke
Entries 10054
Mean x 0.9229
Mean y 6.658
RMS x 0.2201
RMS y 2.283
296 291 5
4535 4879 43
4 1 0
Energy (keV) / 0.100
KstopID / 0.020

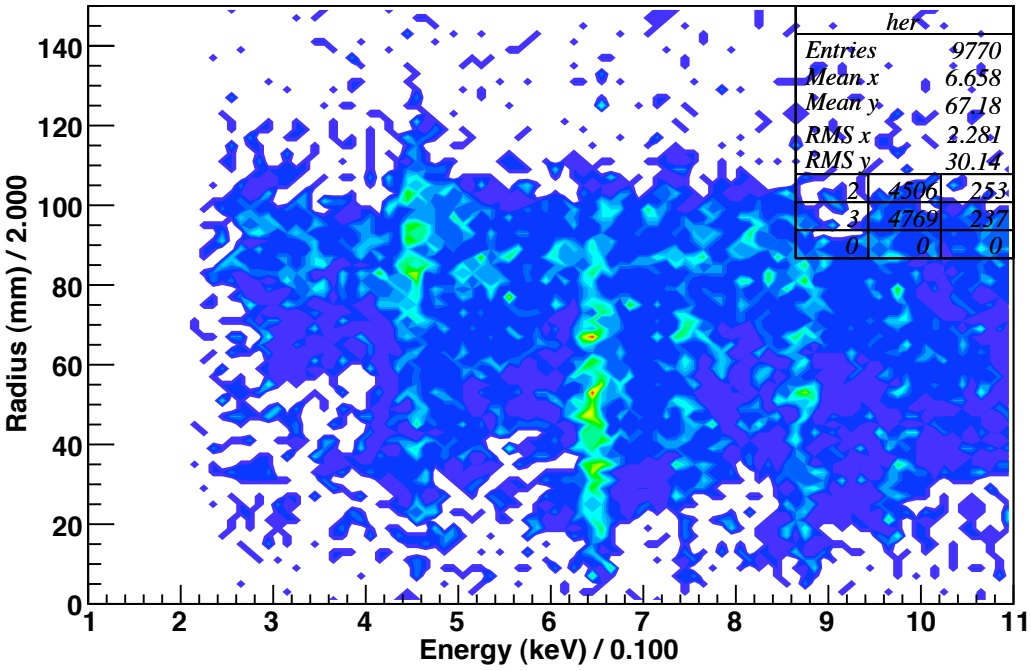
## hez sdd5



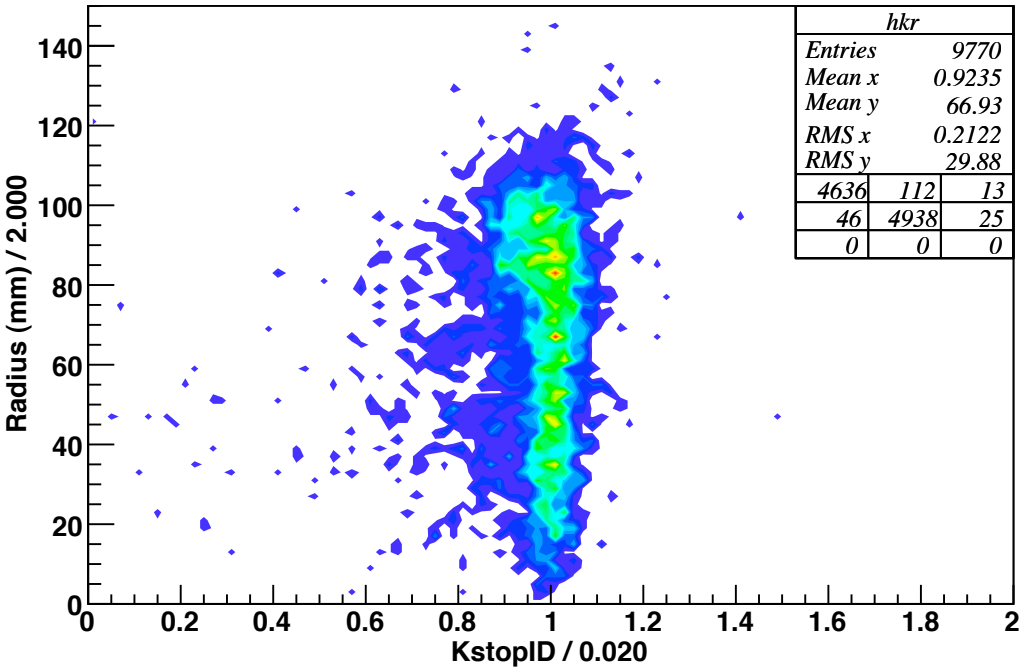

## hkz sdd5

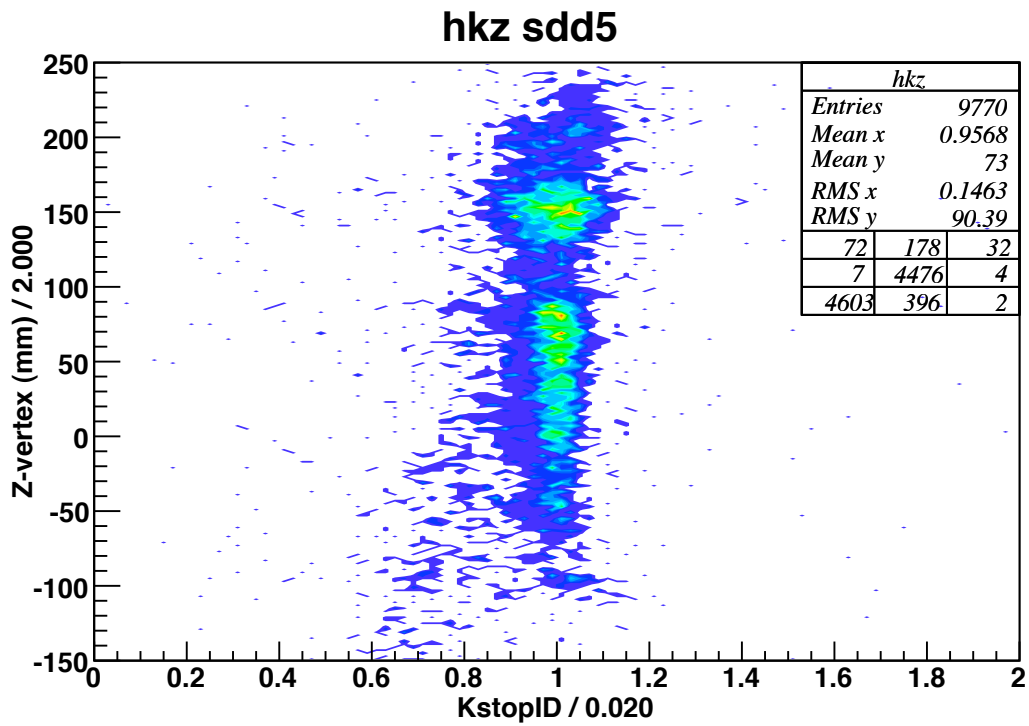


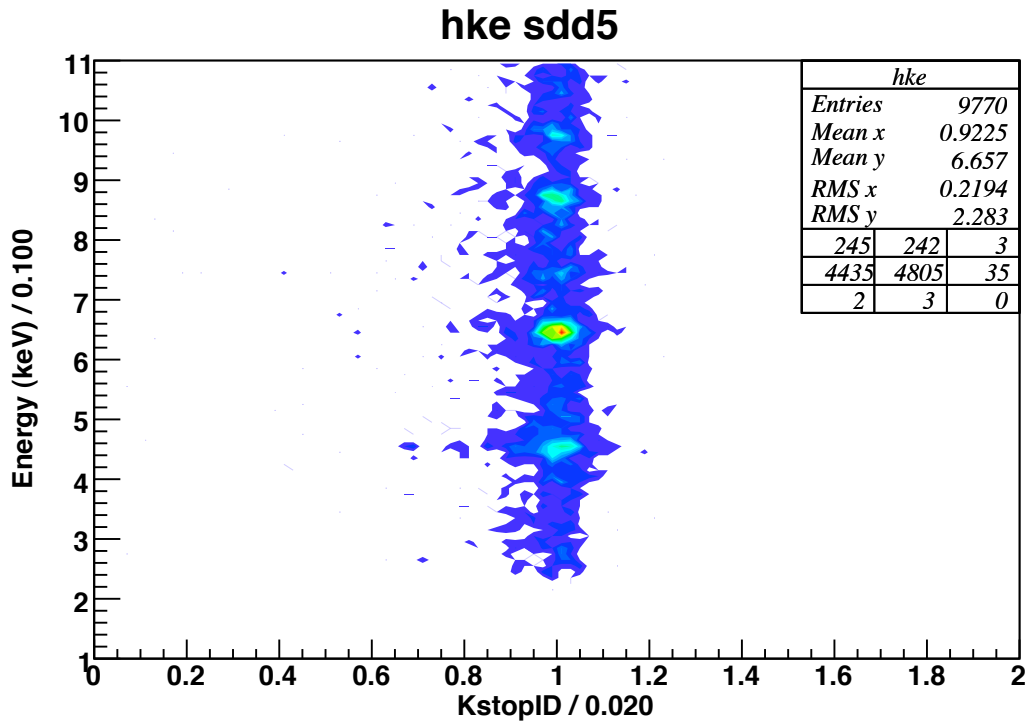

## her sdd5




## hkr sdd5




hkz sdd5
hkz
Entries 9770
Mean x 0.9568
Mean y 73
RMS x 0.1463
RMS y 90.39
72 178 32
7 4476 4
4603 396 2
Z-vertex (mm) / 2.000
KstopID / 0.020


hke sdd5
hke
Entries 9770
Mean x 0.9225
Mean y 6.657
RMS x 0.2194
RMS y 2.283
245 242 3
4435 4805 35
2 3 0
Energy (keV) / 0.100
KstopID / 0.020