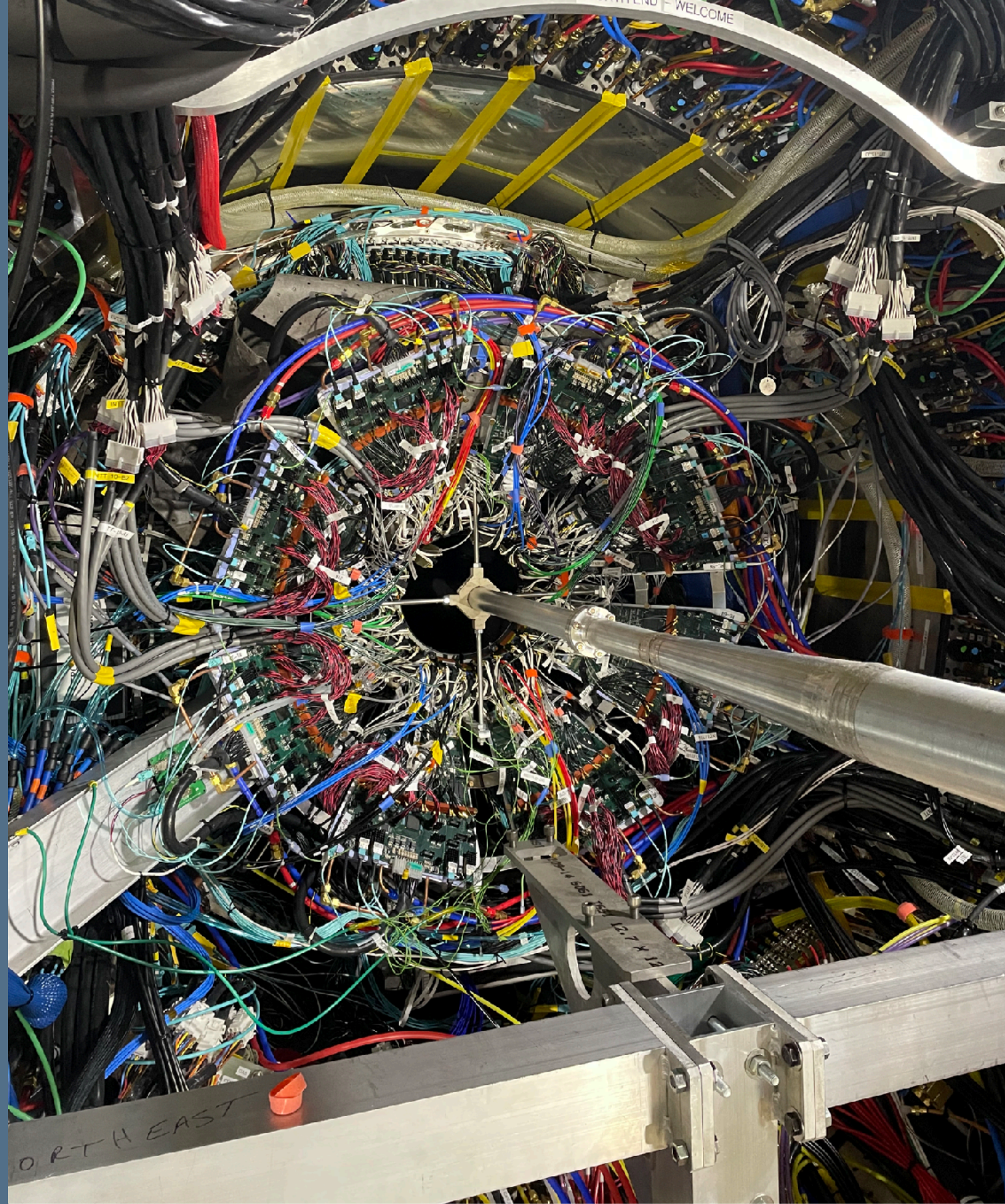


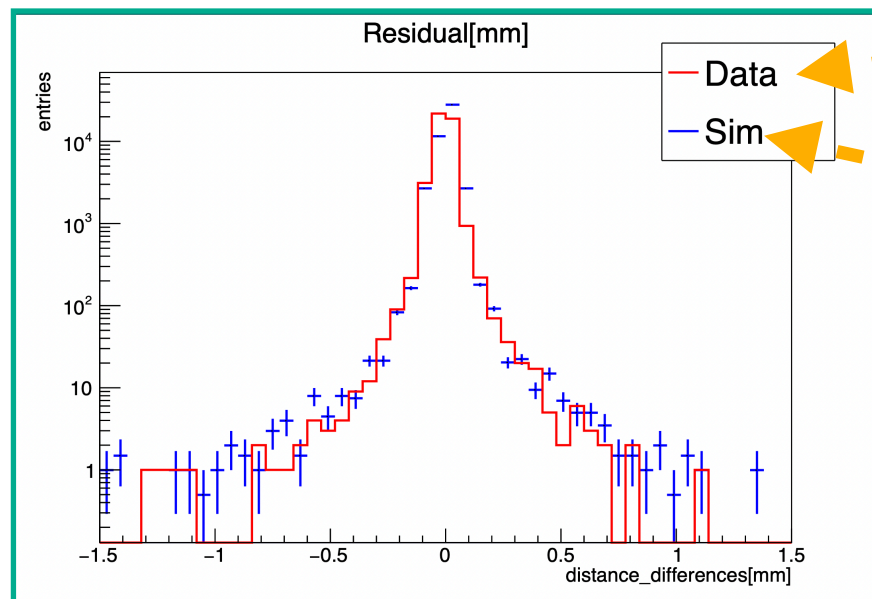
sPEHNIX INTT - Beam Test Analysis

Cheng-Wei Shih, Chia-Ming Kuo
National Central University



Distribution comparison

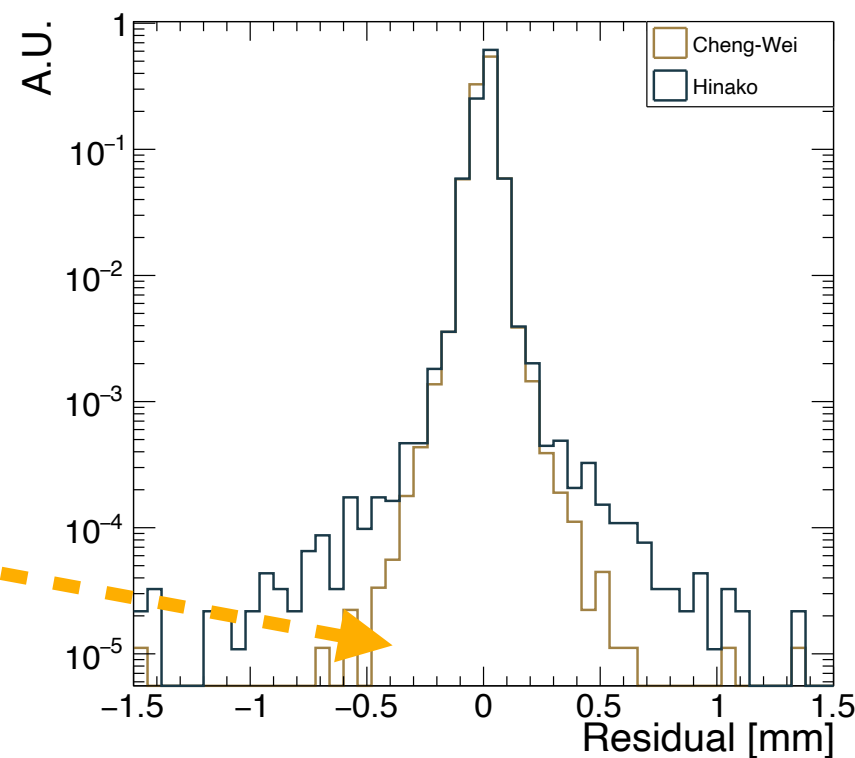
Reminder : Hinako's presentation



Data : from run52 U8, tight selection

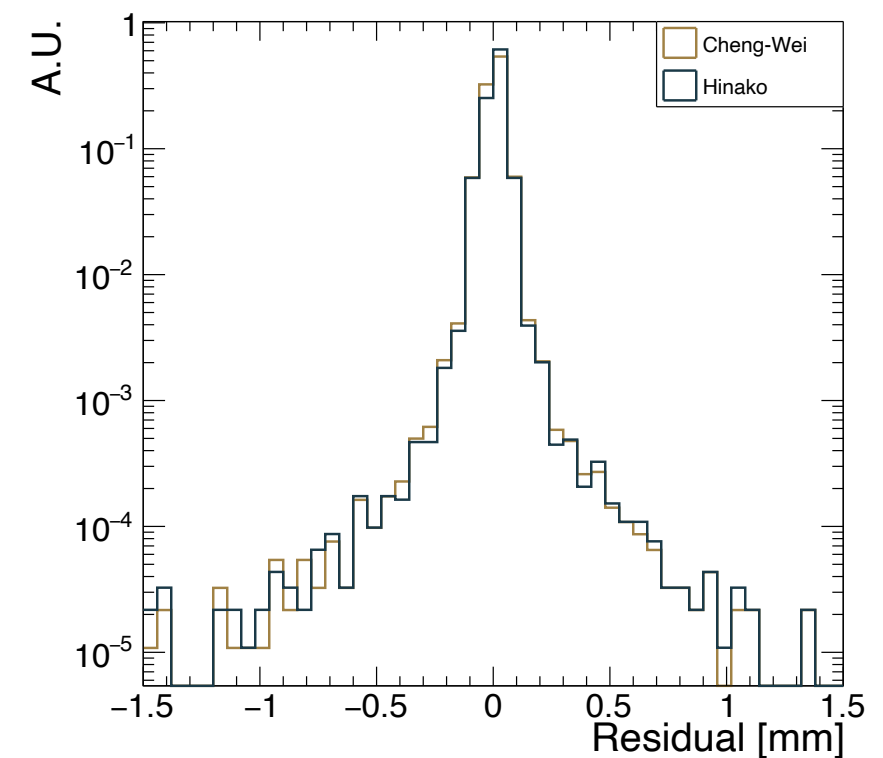
MC : generated by Hinako, loose selection

Same MC root file (generated by Hinako)
Different selection



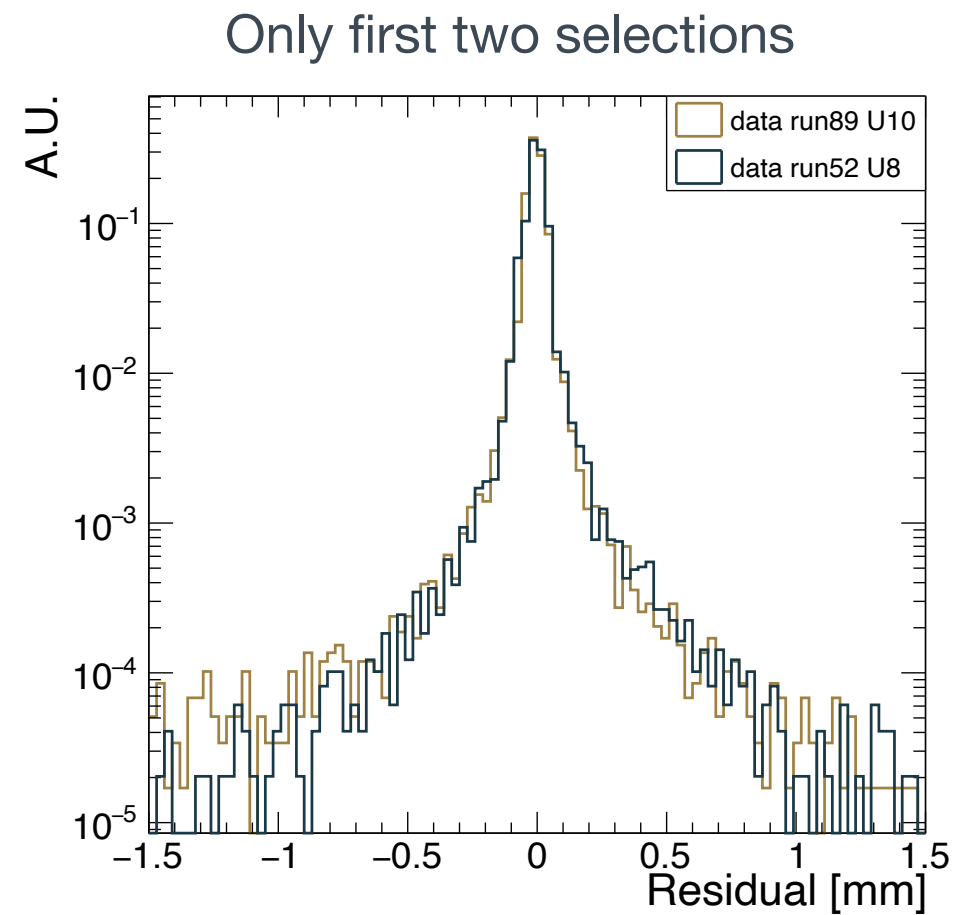
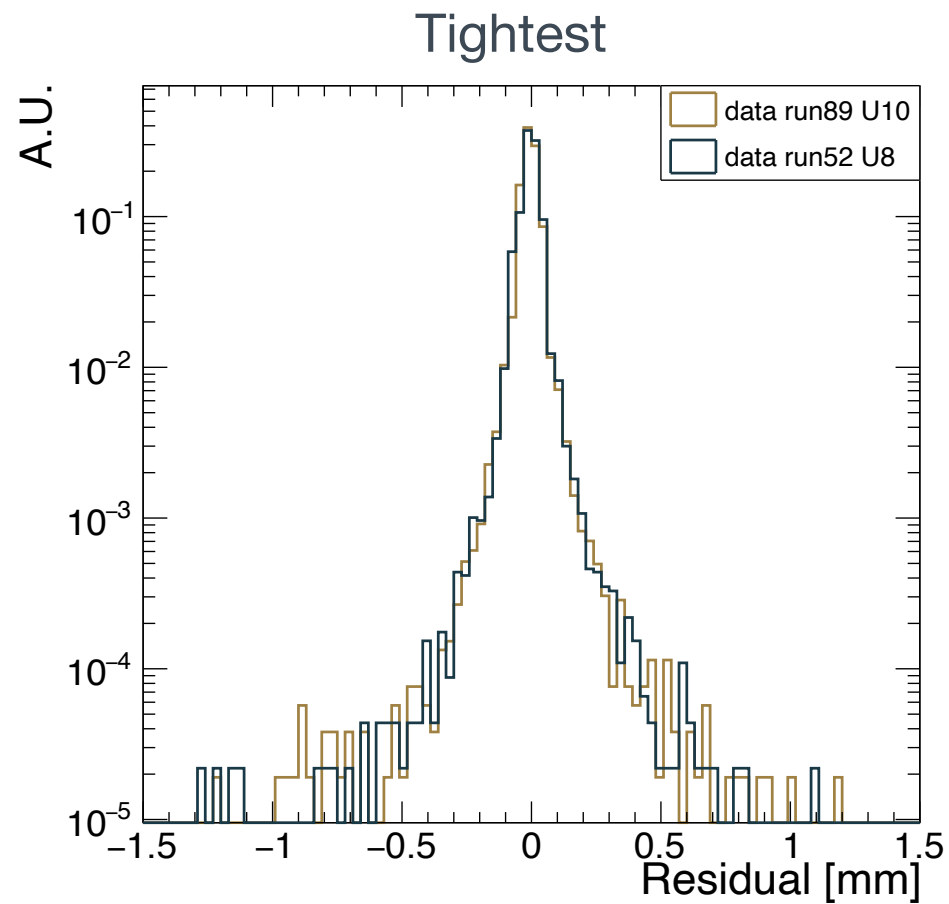
Selection as tight as
the hit effi. study

Try to loose my selection and
make the comparison



The difference is due to different selections, not the normalization method

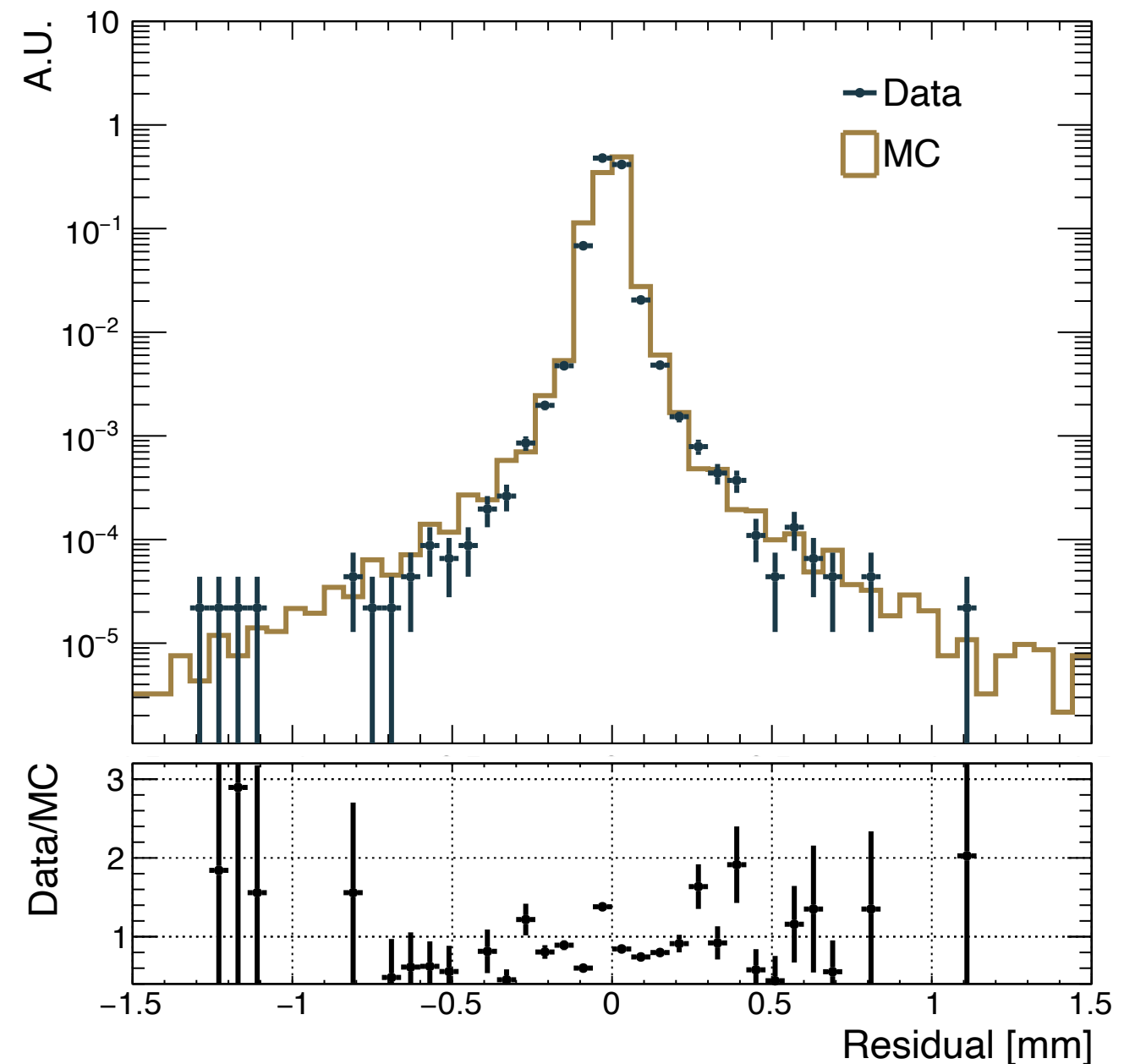
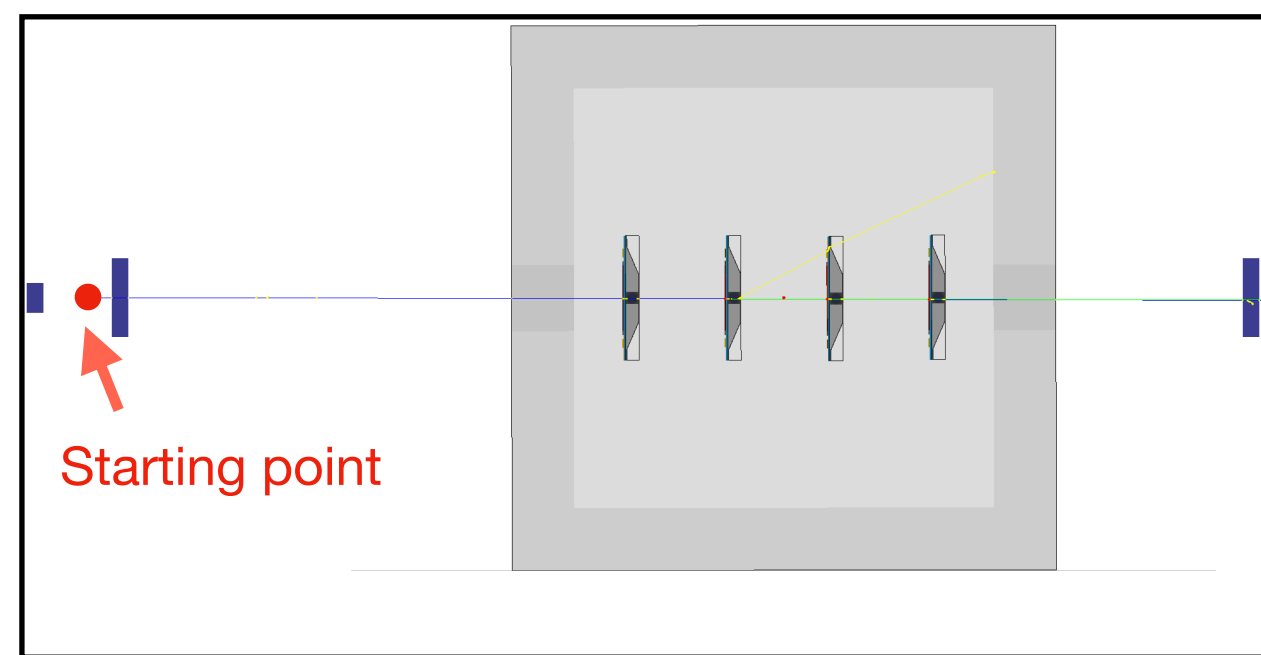
Is run52 special ?



Seems NO

Residual dist. data & MC comparison

- Data : run52 U8, tight track selection
- MC : loose track selection
 - Two scintillators required
 - Fixed beam pos
 - Applied L1 offset, rotation



Backup

Hit efficiency, run52 U8

```
event counting 1 : 172560 all
event counting 2 : 70452 adjacent chip, no cluster
event counting 3 : 49300 single cluster
event counting 4 : 49300 standalone cluster requirement
event counting 5 : 48684 cluster adc
event counting 6 : 48684 cluster size combine
event counting 7 : 48646 l0 cluster edge exclusion
event counting 8 : 48584 l2 cluster edge exclusion
event counting 9 : 45807 slope cut
event counting 10 : 123 no hits in middle layer
event counting 11 : 45498 have good cluster in middle
event counting 12 : 186 no good cluster in middle
FCN=1495.57 FROM MIGRAD STATUS=CONVERGED 227 CALLS 228 TOTAL
EDM=5.40624e-07 STRATEGY= 1 ERROR MATRIX UNCERTAINTY 2.5 per cent

EXT PARAMETER
NO. NAME VALUE ERROR STEP FIRST
1 p0 1.84759e+04 1.29302e+02 -2.50631e+00 -3.67054e-06
2 p1 9.28608e-01 4.94431e-03 -7.40863e-05 -3.73106e-01
3 p2 -2.76579e-03 1.47440e-04 2.64265e-06 -4.63458e-01
4 p3 2.55931e-02 2.13441e-04 1.43452e-06 -2.85425e+00
5 p4 6.79501e-02 1.61165e-03 -1.70194e-05 1.94216e+00

Info in <TCanvas::Print>: pdf file /data4/chengwei/Geant4/INTT_simulation/G4/for_CW/DUT_efficiency
===== we are making the detection efficiency plot =====
size of vec 1 : 45807
size of vec 2 : 45807
Info in <TCanvas::Print>: pdf file /data4/chengwei/Geant4/INTT_simulation/G4/for_CW/DUT_efficiency
===== used parameters =====
the distance of 1st and 3rd ladder : 59.104
the INTT_strip_width : 0.078
the lower_initial : -9.945
the upper_initial : 0.039
study chip : 8
l1 alignment correction : -0.2975

the residual tolerance : 0.234
tge slope cut : 0.01
the slope correction : 0.001712
the cluster size requirement : 0
the cluster size requirement combined : 1
the cluster adc value requirement : 22.5
the clusters allowed in adjacent layers : 1
the edge exclusion : 5

===== used parameters =====
===== Detection efficiency =====
# of 111 : 45498
# of 101 : 309
Efficiency : 0.993254
Efficiency by TEfficiency
99.32543 +0.03824 -0.04045
===== Detection efficiency =====
```

```
cut within range : 0.298 effi : 0.995001
cut within range : 0.3 effi : 0.995001
cut within range : 0.302 effi : 0.995023
cut within range : 0.304 effi : 0.995044
cut_scan : 1 avg : 0.992625 stddev : 0.00189867
cut_scan : 1 max : 0.995044 min : 0.988255
avg - golden : -0.000629709

SU for slope :
size of the file : 150
SU for slope :
cut within range : 0.0088 effi : 0.993728
cut within range : 0.009 effi : 0.993498
cut within range : 0.0092 effi : 0.993505
cut within range : 0.0094 effi : 0.993465
cut within range : 0.0096 effi : 0.993403
cut within range : 0.0098 effi : 0.993271
cut within range : 0.01 effi : 0.993254
cut within range : 0.0102 effi : 0.993084
cut within range : 0.0104 effi : 0.993045
cut within range : 0.0106 effi : 0.993048
cut within range : 0.0108 effi : 0.992987
cut within range : 0.011 effi : 0.99285
cut within range : 0.0112 effi : 0.992811
cut_scan : 2 avg : 0.993227 stddev : 0.000281629
cut_scan : 2 max : 0.993728 min : 0.992811
avg - golden : -2.73883e-05

SU for edge_exclusion :
size of the file : 71
SU for edge_exclusion :
cut within range : 0 effi : 0.993193
cut within range : 1 effi : 0.993192
cut within range : 2 effi : 0.993213
cut within range : 3 effi : 0.993255
cut within range : 4 effi : 0.993255
cut within range : 5 effi : 0.993254
cut within range : 6 effi : 0.993275
cut within range : 7 effi : 0.993296
cut within range : 8 effi : 0.993295
cut within range : 9 effi : 0.993294
cut within range : 10 effi : 0.993315
cut_scan : 3 avg : 0.993258 stddev : 4.27492e-05
cut_scan : 3 max : 0.993315 min : 0.993192
avg - golden : 3.77154e-06

SU_1 (avg) : 0.000630315
SU_2 up : 0.00185286
SU_2 down : 0.00501927
for SU, should times 100
```


Hit efficiency, run89 U10



```
event counting 1 : 203188 all
event counting 2 : 93315 adjacent chip, no cluster
event counting 3 : 59147 single cluster
event counting 4 : 59147 standalone cluster requirement
event counting 5 : 58352 cluster adc
event counting 6 : 58352 cluster size combine
event counting 7 : 57566 10 cluster edge exclusion
event counting 8 : 56120 12 cluster edge exclusion
event counting 9 : 52718 slope cut
event counting 10 : 223 no hits in middle layer
event counting 11 : 52290 have good cluster in middle
event counting 12 : 205 no good cluster in middle
FCN=341.185 FROM MIGRAD 265 STATUS=CONVERGED 208 CALLS 209 TOTAL
2020-0...12:50:05 EDM=6.88477e-09 STRATEGY= 1 ERROR MATRIX UNCERTAINTY 0.6 per cent

EXT PARAMETER
NO. NAME VALUE ERROR STEP FIRST
1 p0 2.13207e+04 1.21411e+02 5.07080e-03 5.91649e-07
2 p1 9.72198e-01 1.69079e-03 -3.49169e-06 1.48490e-01
3 p2 -6.17667e-03 1.32149e-04 -2.55655e-09 2.26374e-01
4 p3 2.75061e-02 1.32185e-04 -1.84162e-07 -7.00487e-01
5 p4 9.10135e-02 2.05417e-03 -3.98965e-06 -6.05079e-02

Info in <TCanvas::Print>: pdf file /data4/chengwei/Geant4/INTT_simulation/G4/for_CW/DUT_efficiency/run89_data_NoCamac_align/DUT_r
===== we are making the detection efficiency plot =====
size of vec 1 : 52718
size of vec 2 : 52718
Info in <TCanvas::Print>: pdf file /data4/chengwei/Geant4/INTT_simulation/G4/for_CW/DUT_efficiency/run89_data_NoCamac_align/Effi
===== used parameters =====
the distance of 1st and 3rd ladder : 59.104
the INTT_strip_width : 0.078
the lower_initial : -9.945
the upper_initial : 0.039
study chip : 10
l1 alignment correction : -0.2926

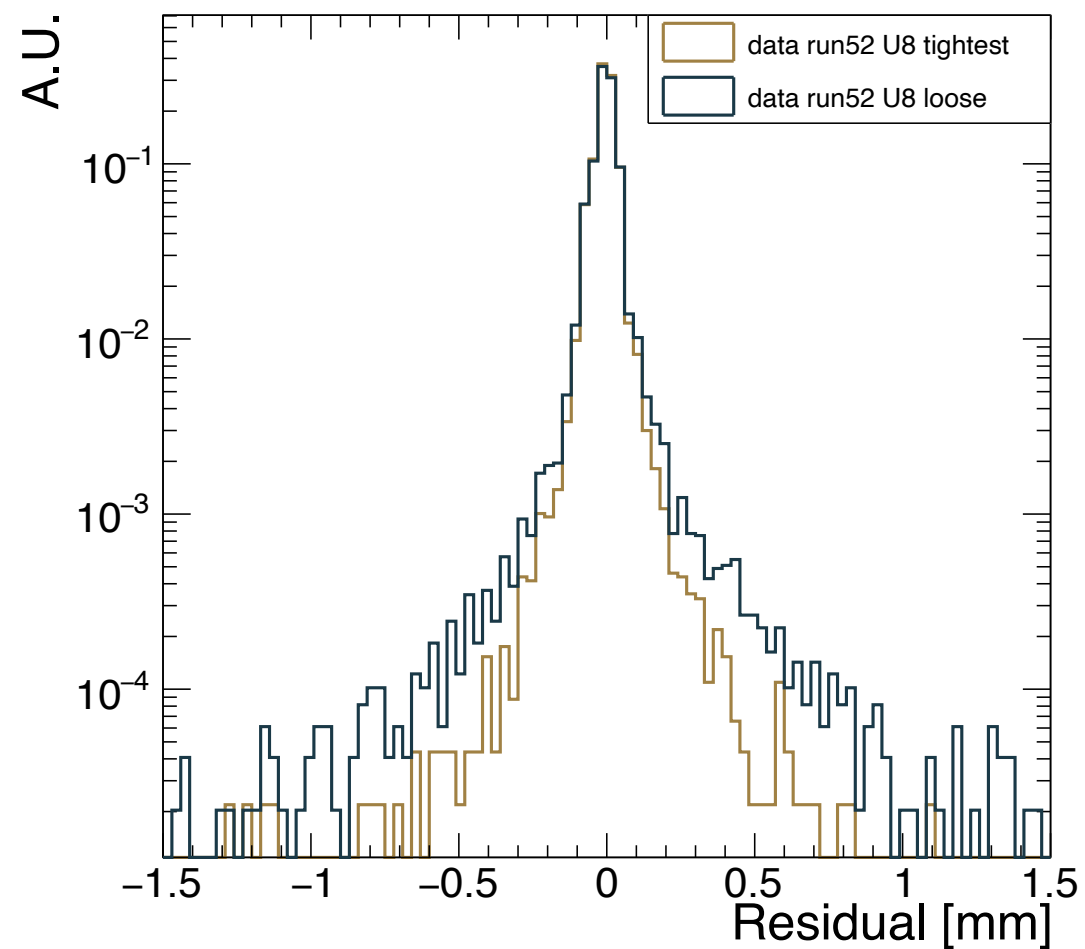
the residual tolerance : 0.234
tge slope cut : 0.01
the slope correction : 0.00474917
the cluster size requirement : 0
the cluster size requirement combined : 1
the cluster adc value requirement : 22.5
the clusters allowed in adjacent layers : 1
the edge exclusion : 5

===== used parameters =====
===== result =====
# of 111 : 52290
# of 101 : 428
Efficiency : 0.991881
Efficiency by TEfficiency
99.18813 +0.03908 -0.04099
===== Detection efficiency =====
```

SU_1 (avg) : 0.000448979
SU_2 up : 0.00179389
SU_2 down : 0.00509568
for SU, should times 100

Residual distribution, run52 vs run89

both data run52 U8, different selection



both data run89 U10, different selection

