Analysis Plan during INTT workshop

Analysis topic

Detection efficiency of INTT with p+p using vertex

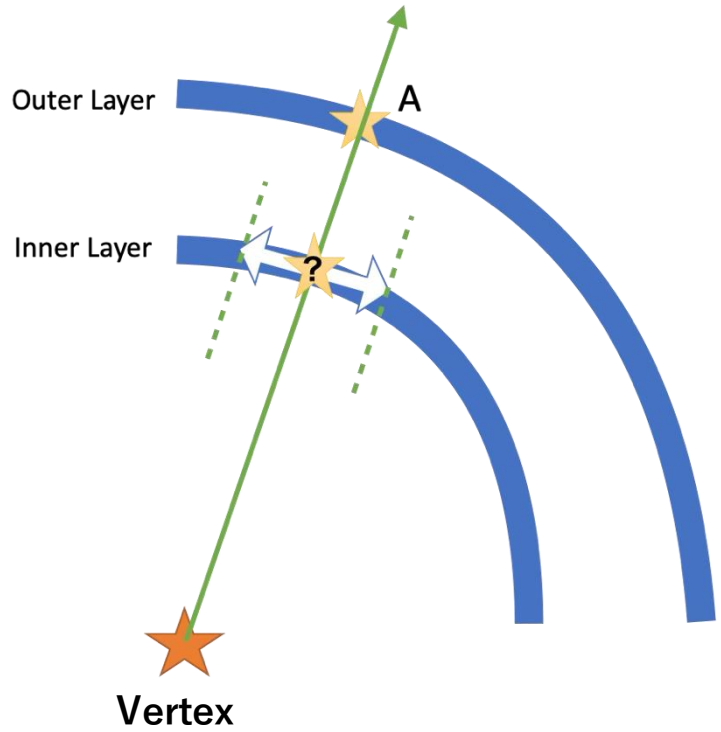
Goal for the workshop

-Estimating detection efficiency of INTT with vertex using simulation.
-Getting information about how to deside vertex position
-Establishing the method to connect the information between vertex and cluster

Method

1. Find the coordinates A of the cluster in the Outer Layer
2. Connect the collision point and A with the cluster and determine the range expected for the Inner cluster
3. If there are clusters within the expected range and if there are no clusters within the expected range, count the number of clusters in each case as N_{Yes} and N_{No} respectively.

$$\varepsilon = N_{yes}/(N_{yes} + N_{No})$$



Analysis Plan during INTT workshop

Analysis topic

Detection efficiency of INTT with p+p using vertex

Goal for the workshop

-Estimating detection efficiency of INTT with vertex using simulation. Almost

-Getting information about how to deside vertex position <-skip

~~-Establishing the method to connect the information between vertex and cluster~~ done

Method

1. Find the coordinates A of the cluster in the Outer Layer
2. Connect the collision point and A with the cluster and determine the range expected for the Inner cluster
3. If there are clusters within the expected range and if there are no clusters within the expected range, count the number of clusters in each case as N_{Yes} and N_{No} respectively.

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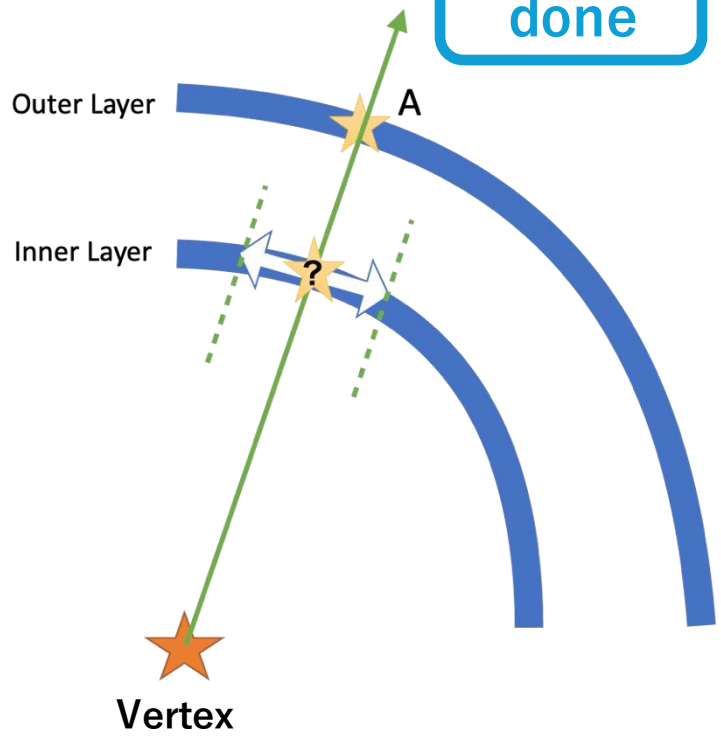
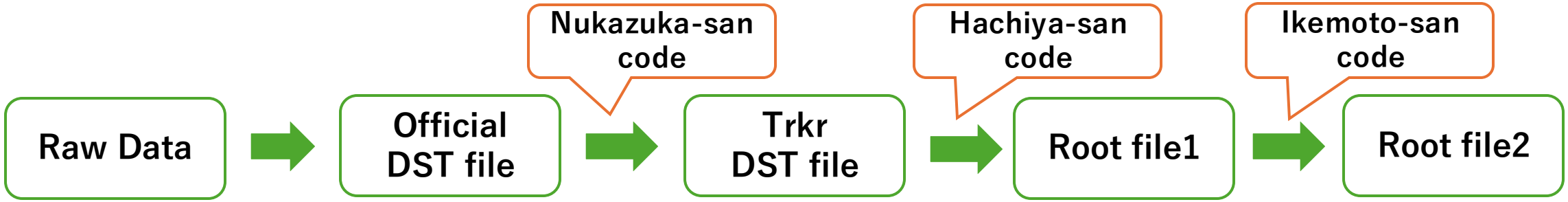


Connect the information between vertex and cluster

Prosedure (Decide z-Vertex)

- Cut events with two or fewer tracks
- Φ cut



- BCO peak filter
- Hot ch removal
- DAC conversion
- Clone-hit removal

TNtuple ntp_clus

nclus
nclus2
bco_full
evt
size
adc
X
Y
Z
lay
Lad
Sen
Lx
Ly
phisize
zsize
zv

Temp_tree_

evt_temp_
d_phi_
d_theta
phi_in
dca_x
dca_y
.
.
.
.
.
.
.
.

No information of cluster

Connect the information between vertex and cluster

Event_base ⟺ Cluster_base

Root file2

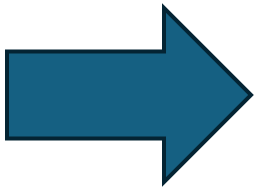
Temp_tree_

evt_temp_
d_phi_
d_theta
phi_in
dca_x
dca_y
dca_z
.
.
.
.
.
.
.
.

Root file1

TNtuple ntp_clus

nclus
nclus2
bco_full
evt
size
adc
X
Y
Z
lay
Lad
Sen
Lx
Ly
phisize
zsize
zv



New Root file1

Event_base Tree

- Evt
- Size <vector>
- ADC <vector>
- Layer<vector>
- X<vector>
- Y<vector>
- Z<vector>

Event condition

(vx.size() > 4 && vx.size() < 500)

→Matching number of events!

Result

Root file1

```
*Br    0 :nclus     : Float_t
*Br    1 :nclus2    : Float_t
*Br    2 :bco_full  : Float_t
*Br    3 :evt       : Float_t
*Br    4 :size      : Float_t
*Br    5 :adc       : Float_t
*Br    6 :x         : Float_t
*Br    7 :y         : Float_t
*Br    8 :z         : Float_t
*Br    9 :lay       : Float_t
*Br   10 :lad       : Float_t
*Br   11 :sen       : Float_t
*Br   12 :x_vtx     : Float_t
*Br   13 :y_vtx     : Float_t
*Br   14 :z_vtx     : Float_t
```

Change type of tree
&
Event cut

(vx.size() > 4 || vx.size() < 500)

New Root file1

```
*Br    0 :evt      : evt/I
*Br    1 :x        : vector<float>
*Br    2 :y        : vector<float>
*Br    3 :z        : vector<float>
*Br    4 :lay      : vector<int>
*Br    5 :lad      : vector<int>
*Br    6 :sen      : vector<int>
```

Estimating detection efficiency of INTT with vertex using simulation

1. Do simulation of p+p with zerofield
2. Make DST file
3. Run Hachiya-san code to make rootfile(include ntp_clus)
4. Run Ikemoto-san code to make rootfile(include vtx info)
5. Connect the information between vertex and cluster
6. Run my code to estimate detection efficiency

Estimating detection efficiency of INTT with vertex using simulation

1. ~~Do simulation of p+p with zerofield~~
2. ~~Make DST file~~
3. Run Hachiya-san code to make rootfile(include ntp_clus)
4. ~~Run Ikemoto-san code to make rootfile(include vtx info)~~
5. ~~Connect the information between vertex and cluster~~
6. Run my code to estimate detection efficiency

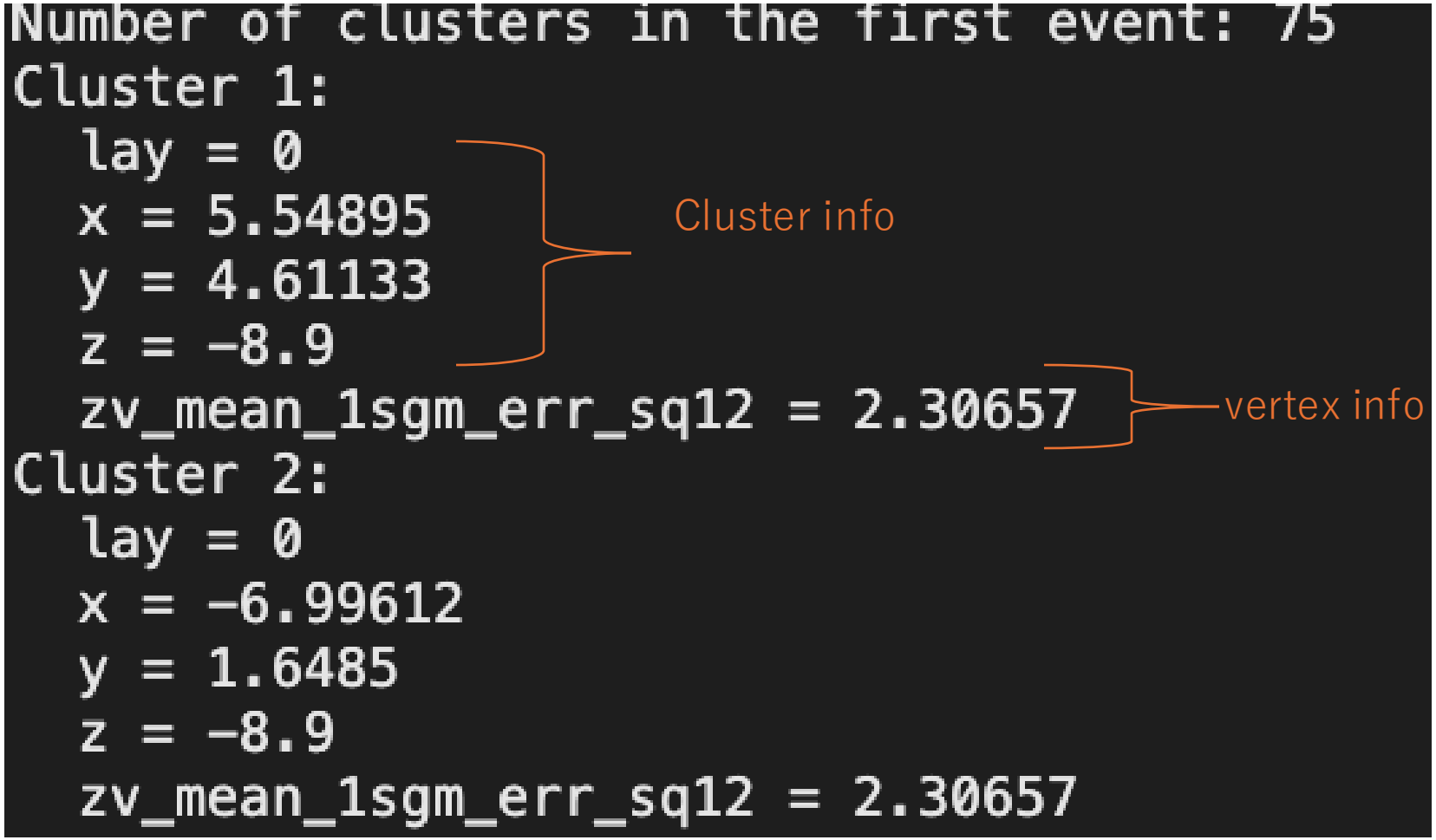
~~Success myself after learning~~

Estimating detection efficiency of INTT with vertex using simulation

1. ~~Do simulation of p+p with zerofield~~
2. ~~Make DST file~~
3. Run Hachiya-san code to make rootfile(include ntp_clus) → I couldn't make rootfile myself
4. ~~Run Ikemoto-san code to make rootfile(include vtx info)~~
5. ~~Connect the information between vertex and cluster~~
6. Run my code to estimate detection efficiency
   → Not yet...

——— Success myself after learning

Run my code to estimate detection efficiency



Summary

- Developed the method to connect two root file
- I can get almost all information about estimating detection efficiency of INTT with vertex using simulation.

Next step

- Learning how to decide vertex position
- Based on the information, I will estimate detection efficiency of INTT with vertex using simulation **soon**.