

INTT cluster size in beam test @ ELPH

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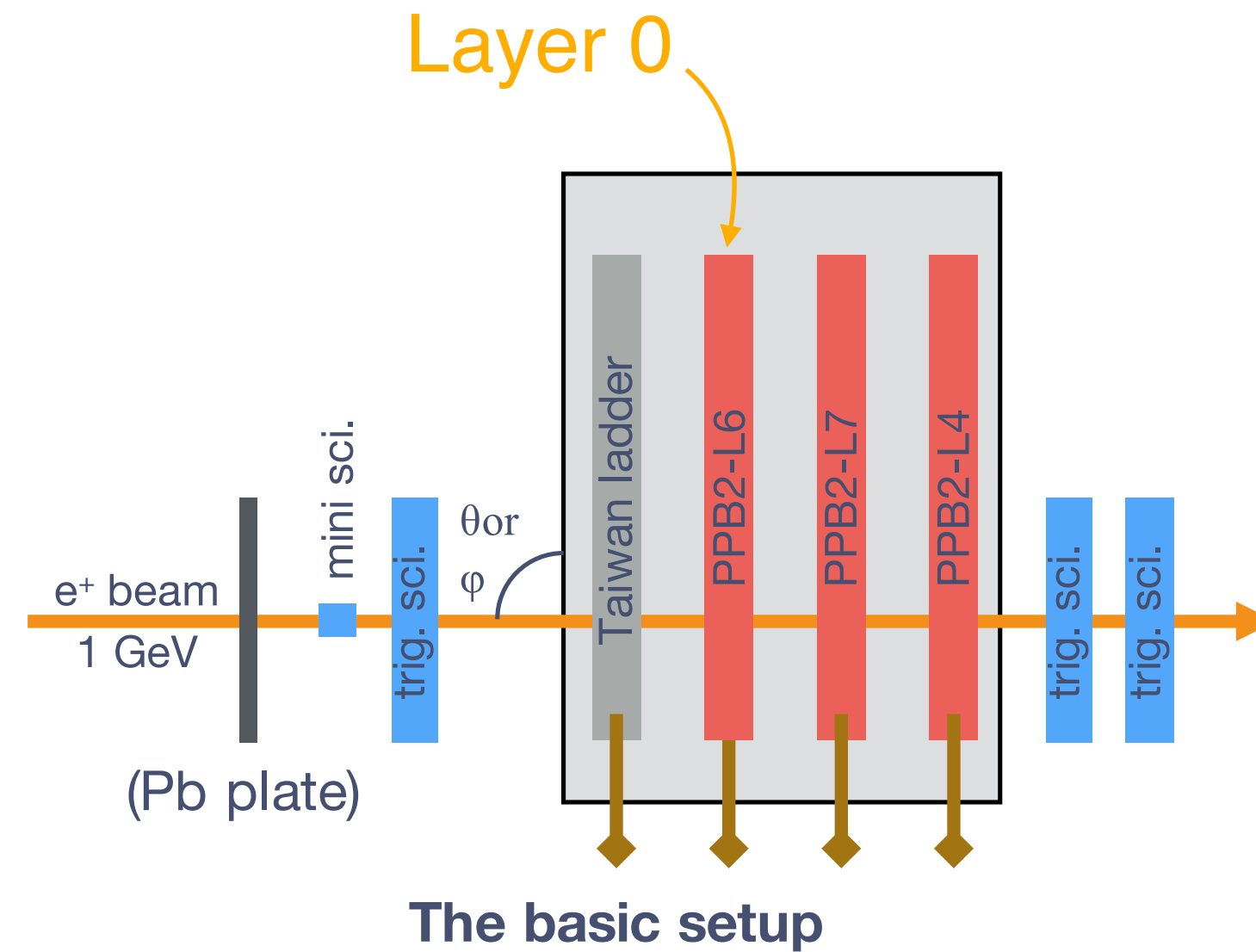
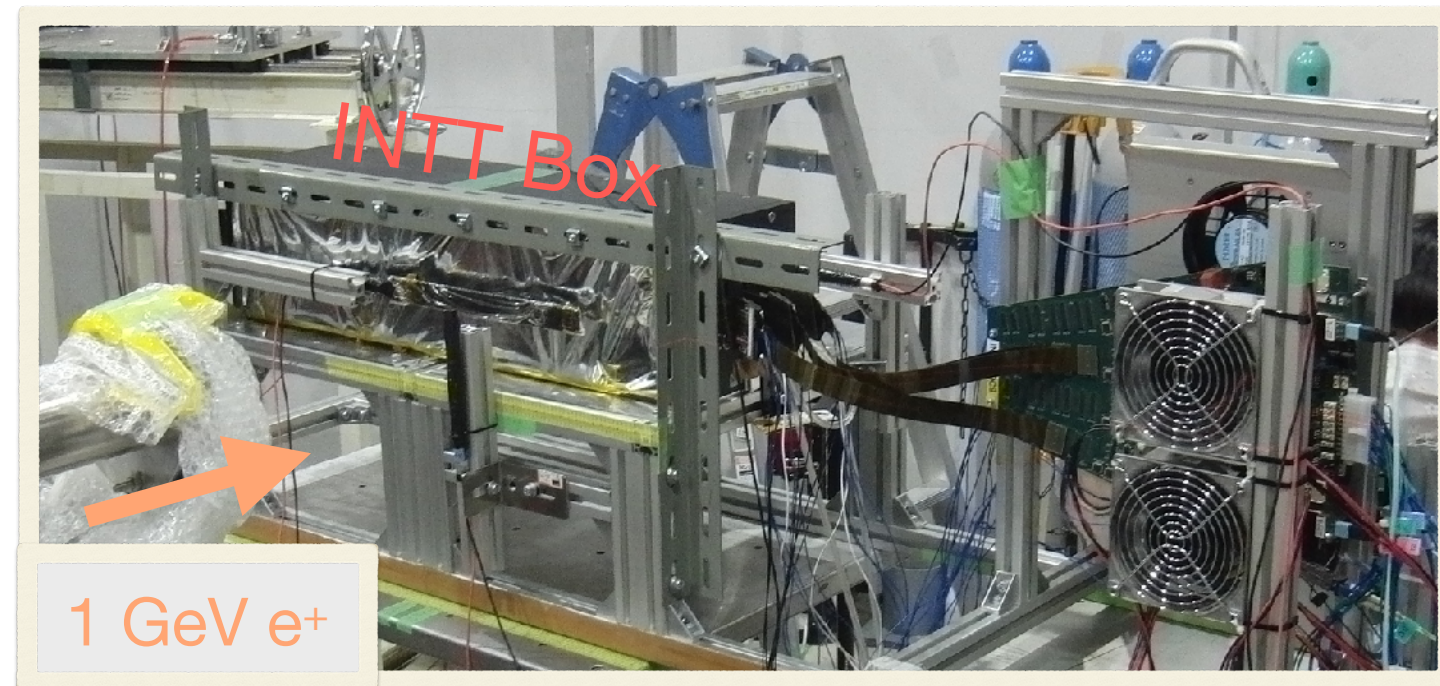
March 20th, 2024
dN/d η meeting



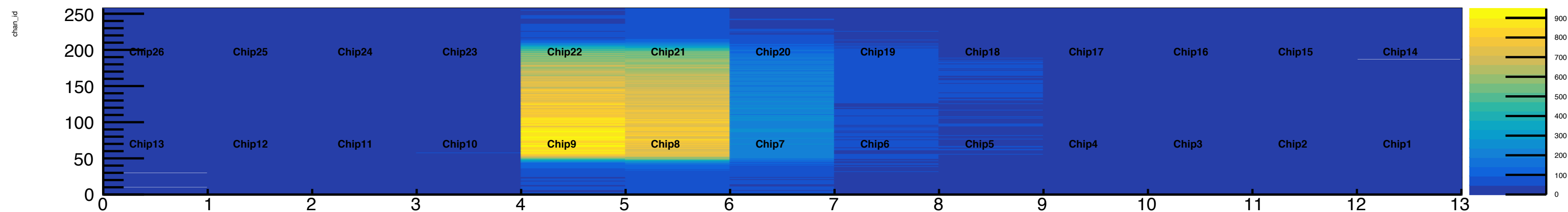
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INTT Beam Test @ ELPH

- Beam : Positron beam with the peak energy of ~ 800 MeV
- Configuration : 3 layers of INTT ladders + 2 scintillators (trigger)
- Bias voltage : 50 V



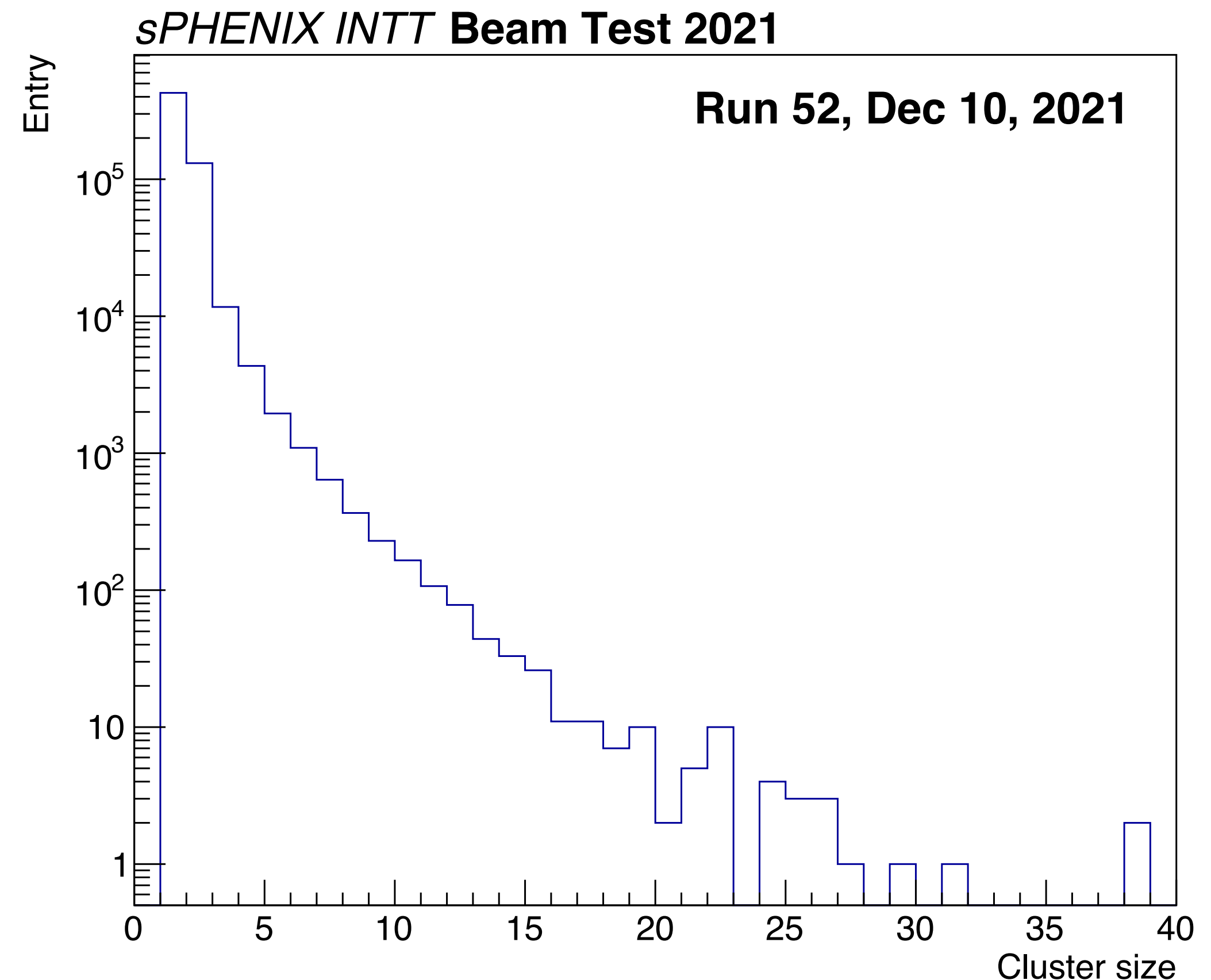
Run 52 Hit map



Cluster size distribution - inclusive

- Directory: SDCC:/sphenix/user/ChengWei/INTT/ELPH_BeamTest2021
- The raw data post clustering : **cluster_information_offset-0.0000_adcinfo_NoCamac.root**
- The histograms of cluster-size distributions: **cluster_size.root**
- **Cluster ϕ shown only, cluster Z size was fixed at 1**

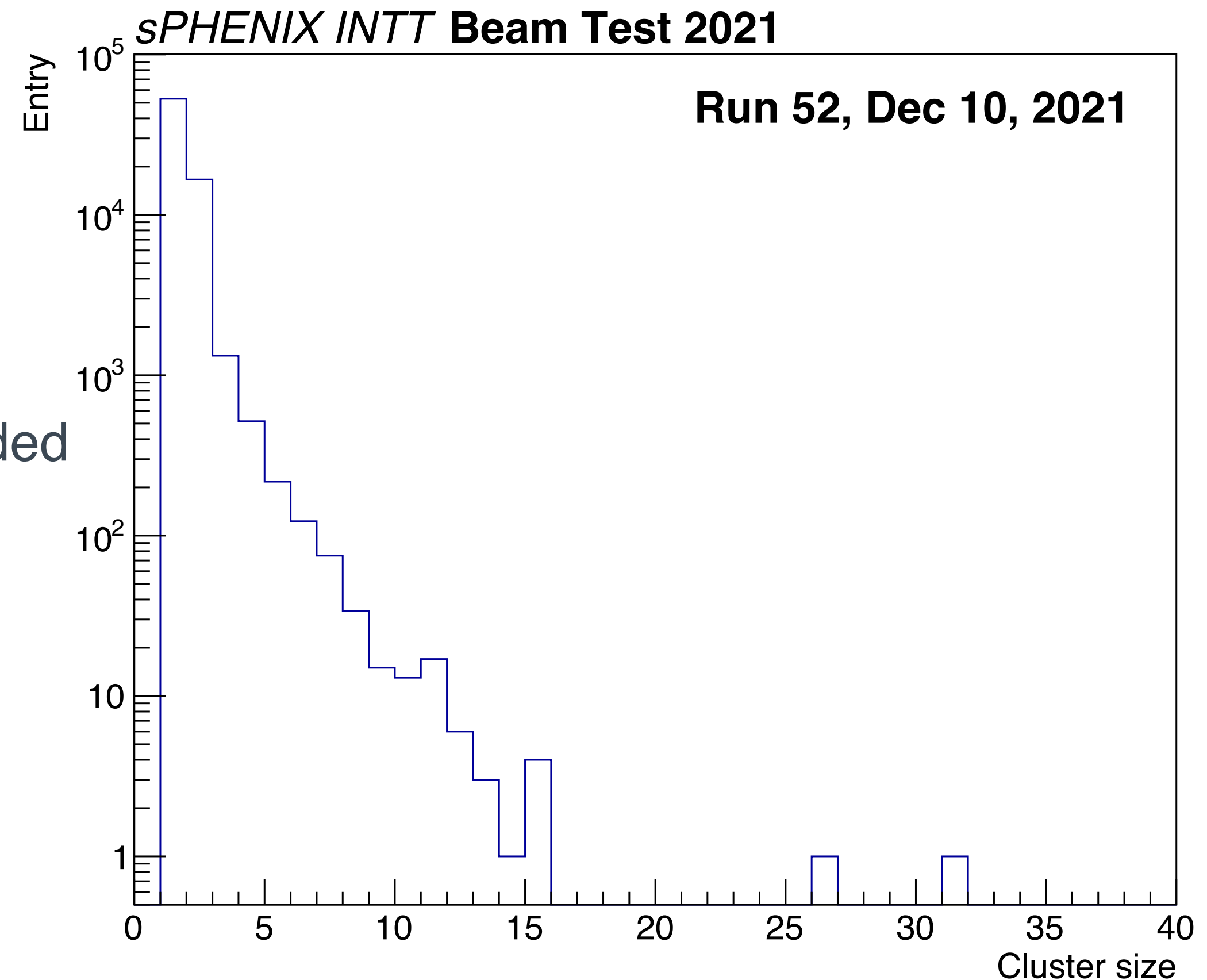
- The “**inclusive_clu_size**” in the cluster_size.root
- Inclusive, all the clusters were considered



Cluster size distribution - single column

- Directory: SDCC:/sphenix/user/ChengWei/INTT/ELPH_BeamTest2021
- The raw data post clustering : **cluster_information_offset-0.0000_adcinfo_NoCamac.root**
- The histograms of cluster-size distributions: **cluster_size.root**
- **Cluster ϕ shown only, cluster Z size was fixed at 1**

- The “**layer0_col8_clu_size**” in the cluster_size.root
- The clusters with **layerID 0** and **columnID 8** were included



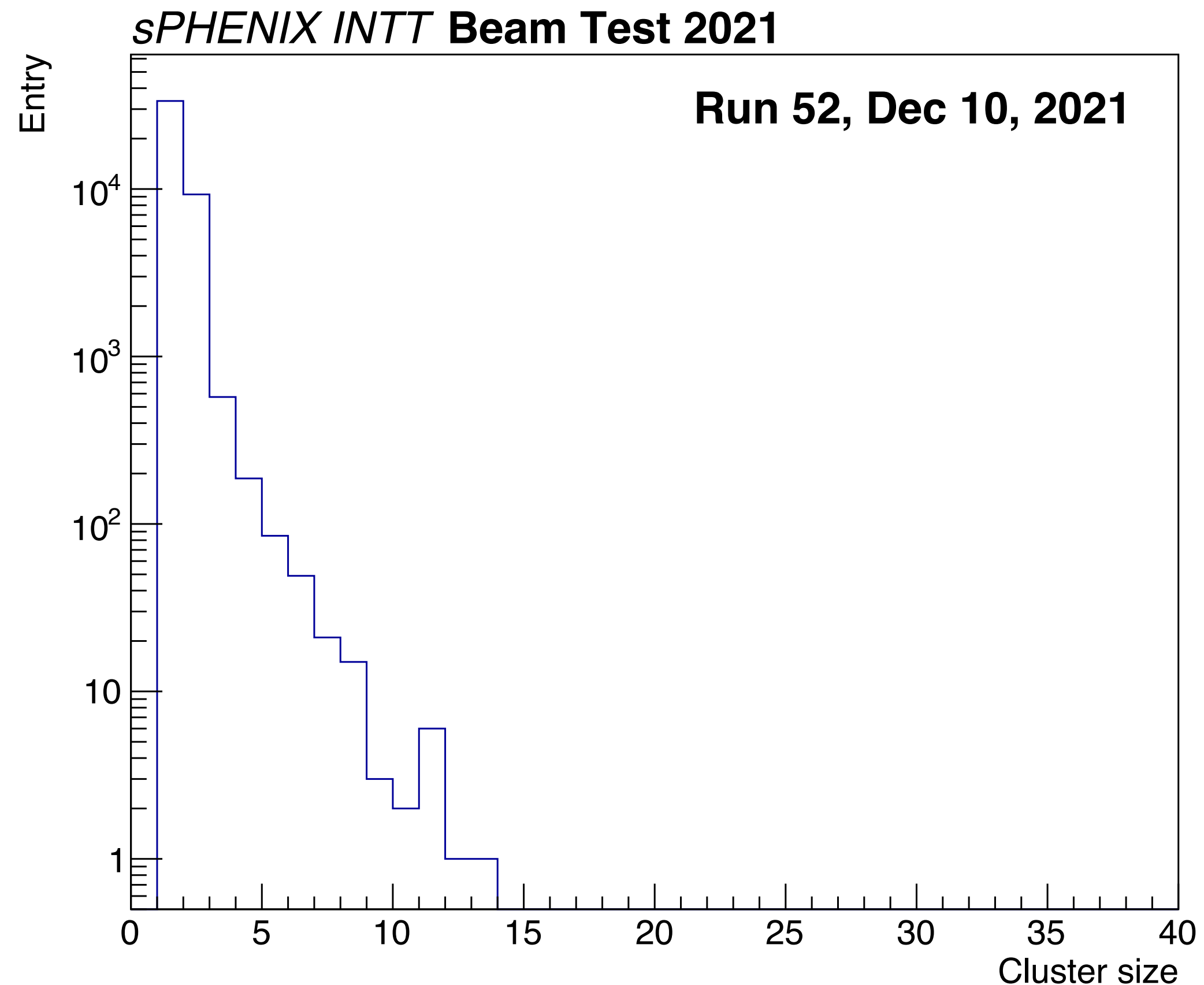
Cluster size distribution - tight

- Directory: SDCC:/sphenix/user/ChengWei/INTT/ELPH_BeamTest2021
- The raw data post clustering : **cluster_information_offset-0.0000_adcinfo_NoCamac.root**
- The histograms of cluster-size distributions: **cluster_size.root**
- **Cluster ϕ shown only, cluster Z size was fixed at 1**

- The “**tight_layer0_col8_clu_size**” in the cluster_size.root
- Requirement:
 - Single cluster in each layer
 - All the clusters in column 8
 - The clusters with **layerID 0** were filled

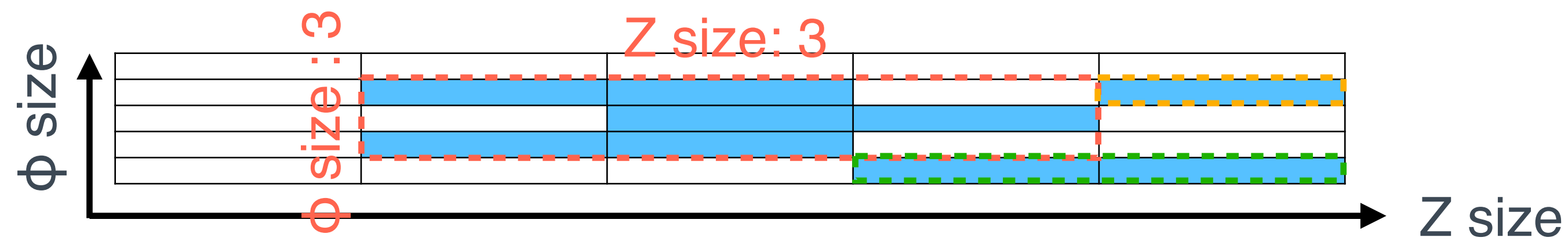
The selections picked up the clusters with z size = 1 even if we enable the cluster-z-size clustering

May be better to use this one to do the comparison, same selections can be applied in F4A INTT G4



Cluster size distribution - inclusive

- Directory: SDCC:/sphenix/user/ChengWei/INTT/ELPH_BeamTest2021
- The raw data post clustering : **cluster2D_information_offset-0.0000_adcinfo_NoCamac.root**
- The histograms of cluster-size distributions: **cluster2D_size.root**
- **2D clustering, Z size was not fixed at 1 (require exact adjacent hit in Z)**

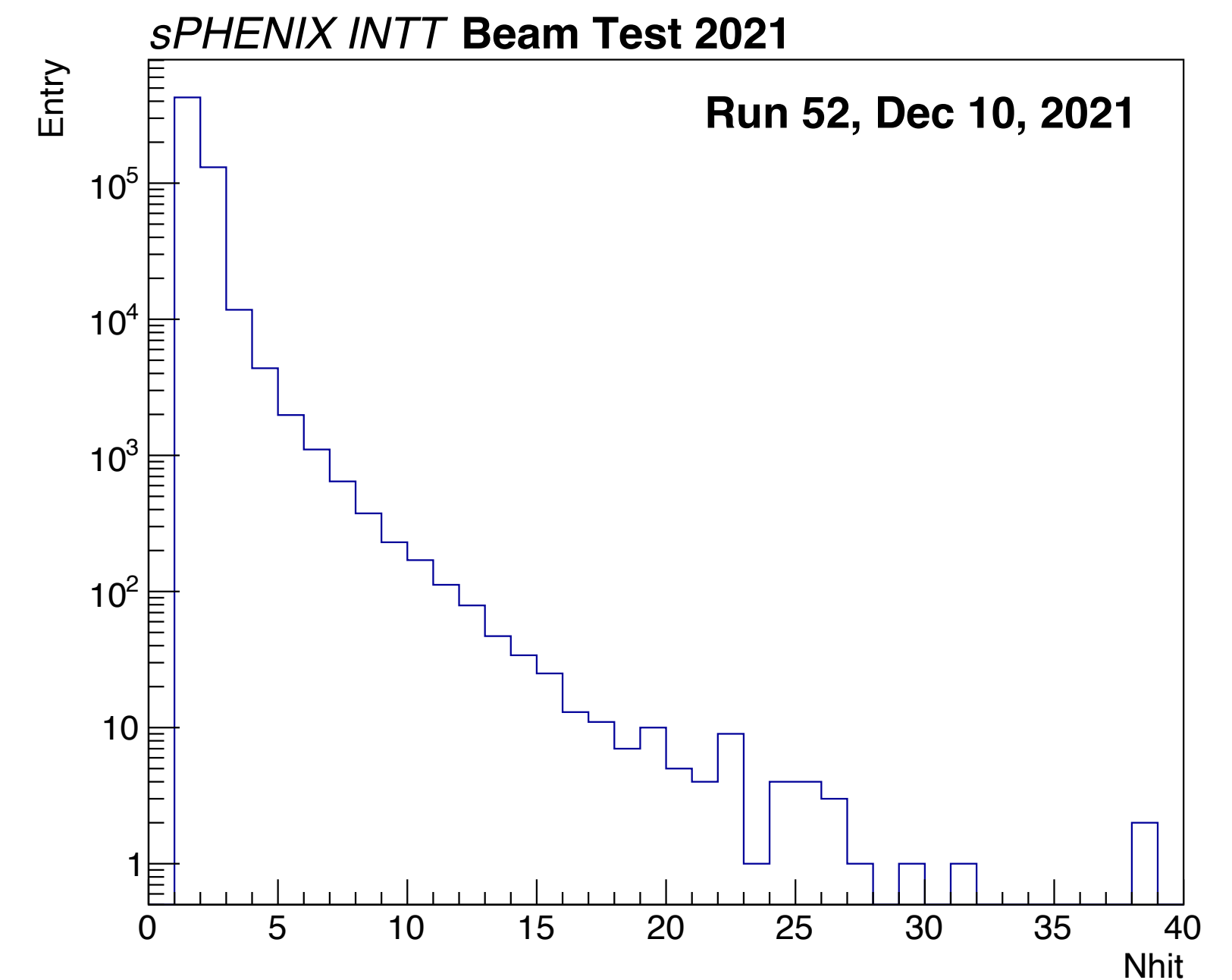
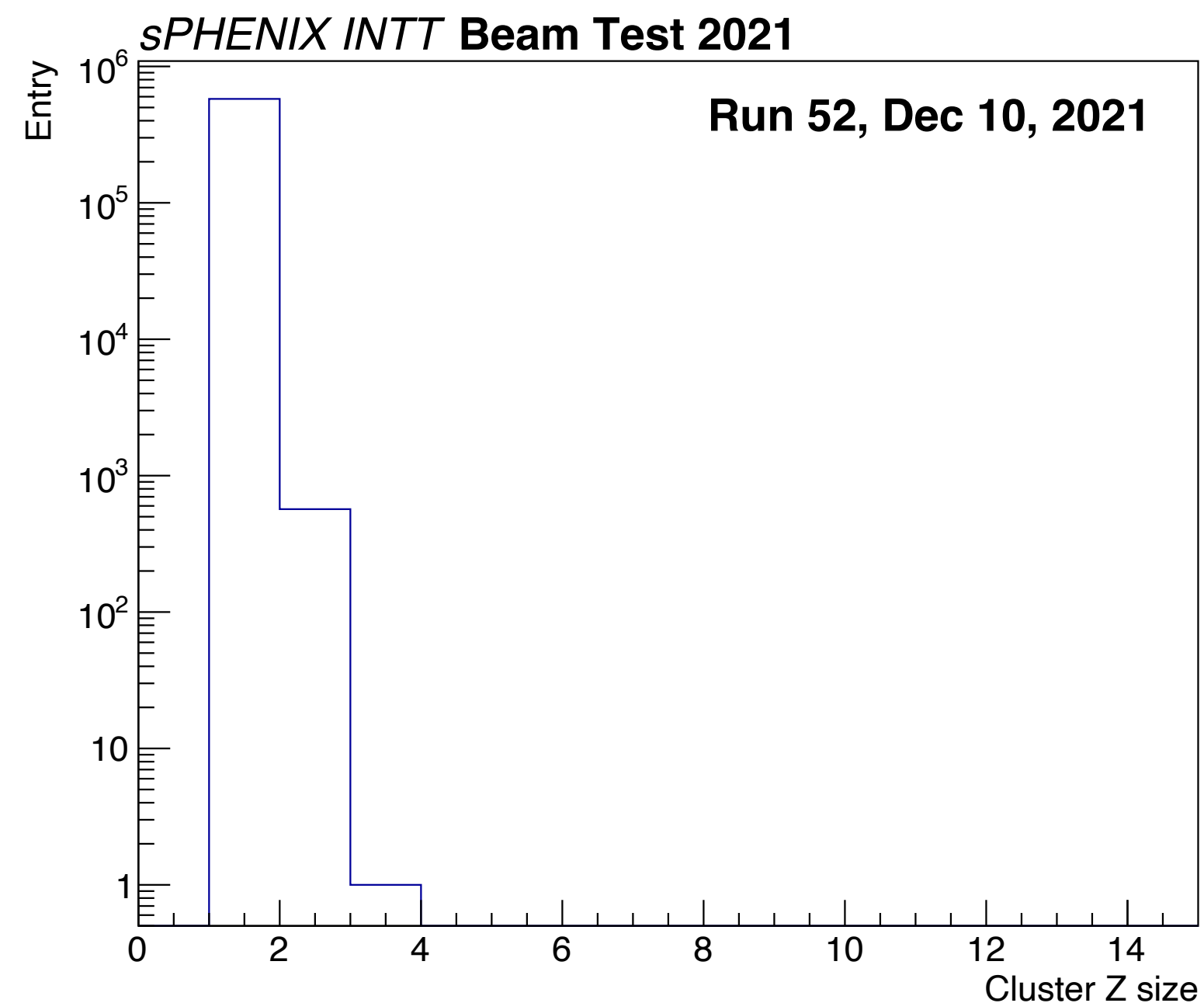
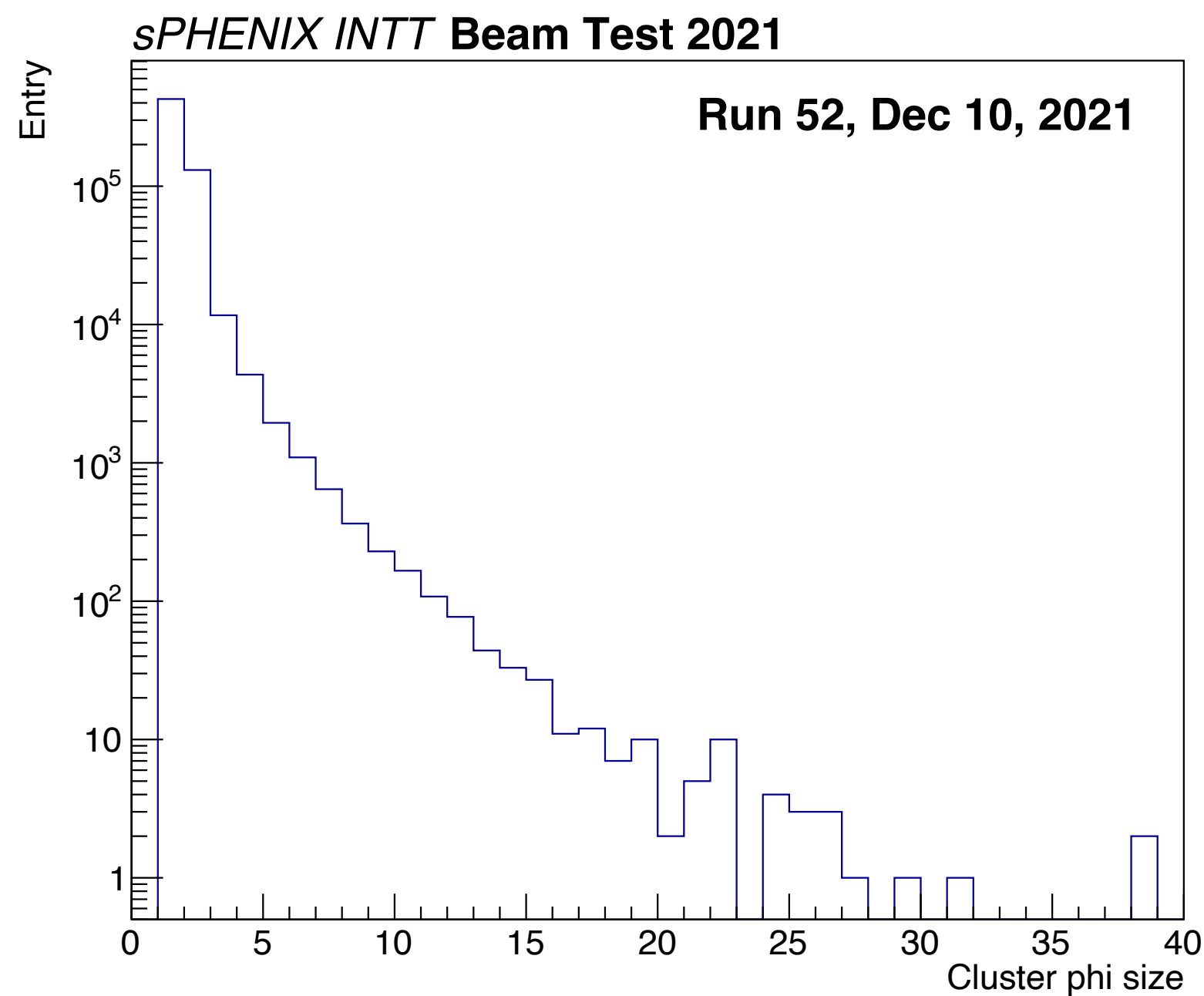


In the cartoon, 3 clusters in total

Clu 1: Z size 3, ϕ size 3, Nhit 6

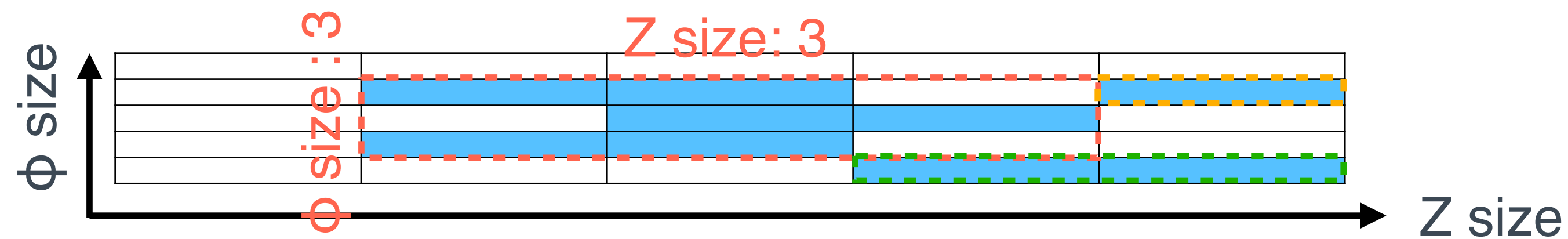
Clu 2: Z size 2, ϕ size 1, Nhit 2

Clu 3: Z size 1, ϕ size 1, Nhit 1



Cluster size distribution - tight

- Directory: SDCC:/sphenix/user/ChengWei/INTT/ELPH_BeamTest2021
- The raw data post clustering : **cluster2D_information_offset-0.0000_adcinfo_NoCamac.root**
- The histograms of cluster-size distributions: **cluster2D_size.root**
- **2D clustering, Z size was not fixed at 1 (require exact adjacent hit in Z)**
- **Require the event with total NClus 3, and single cluster in each layer**

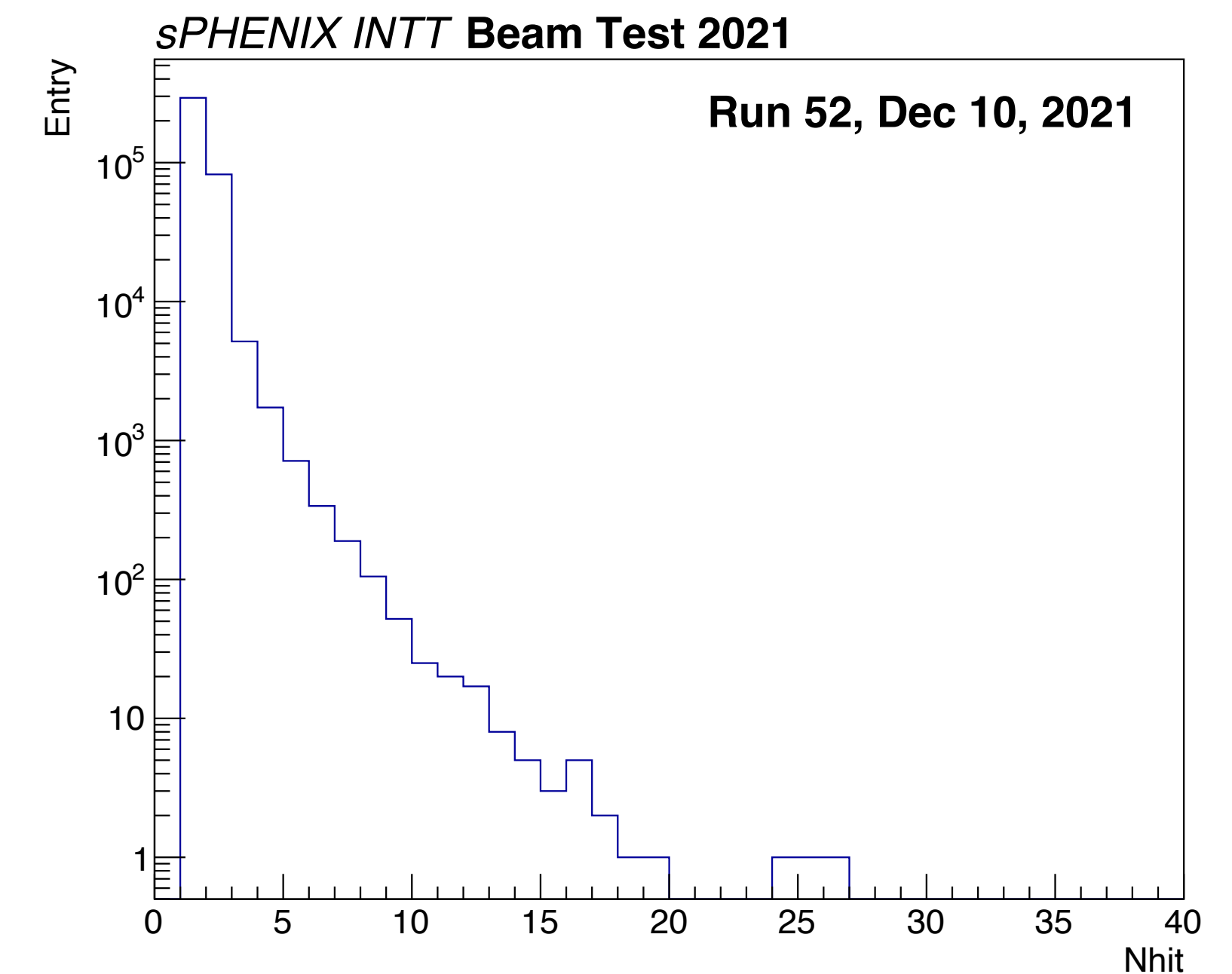
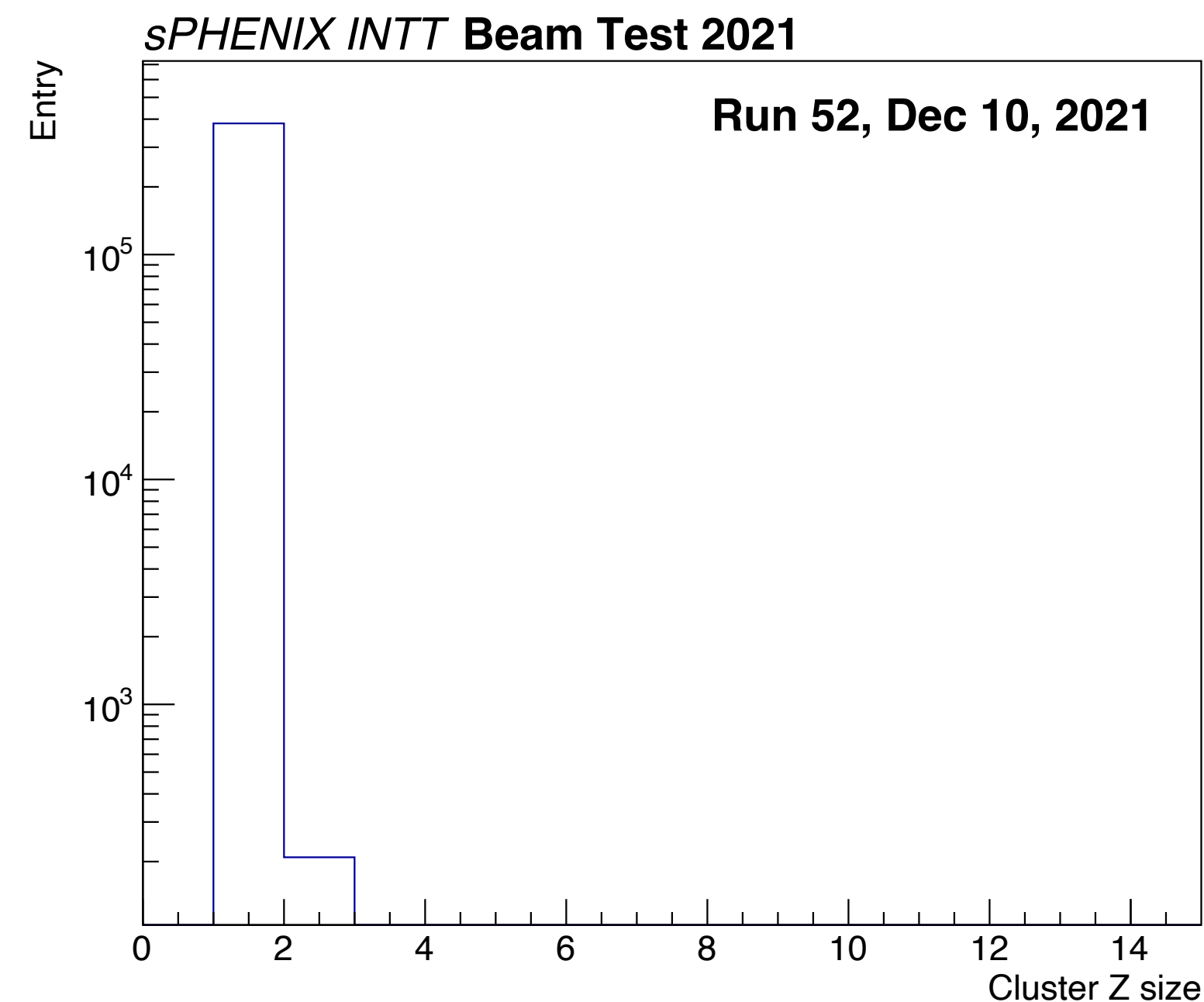
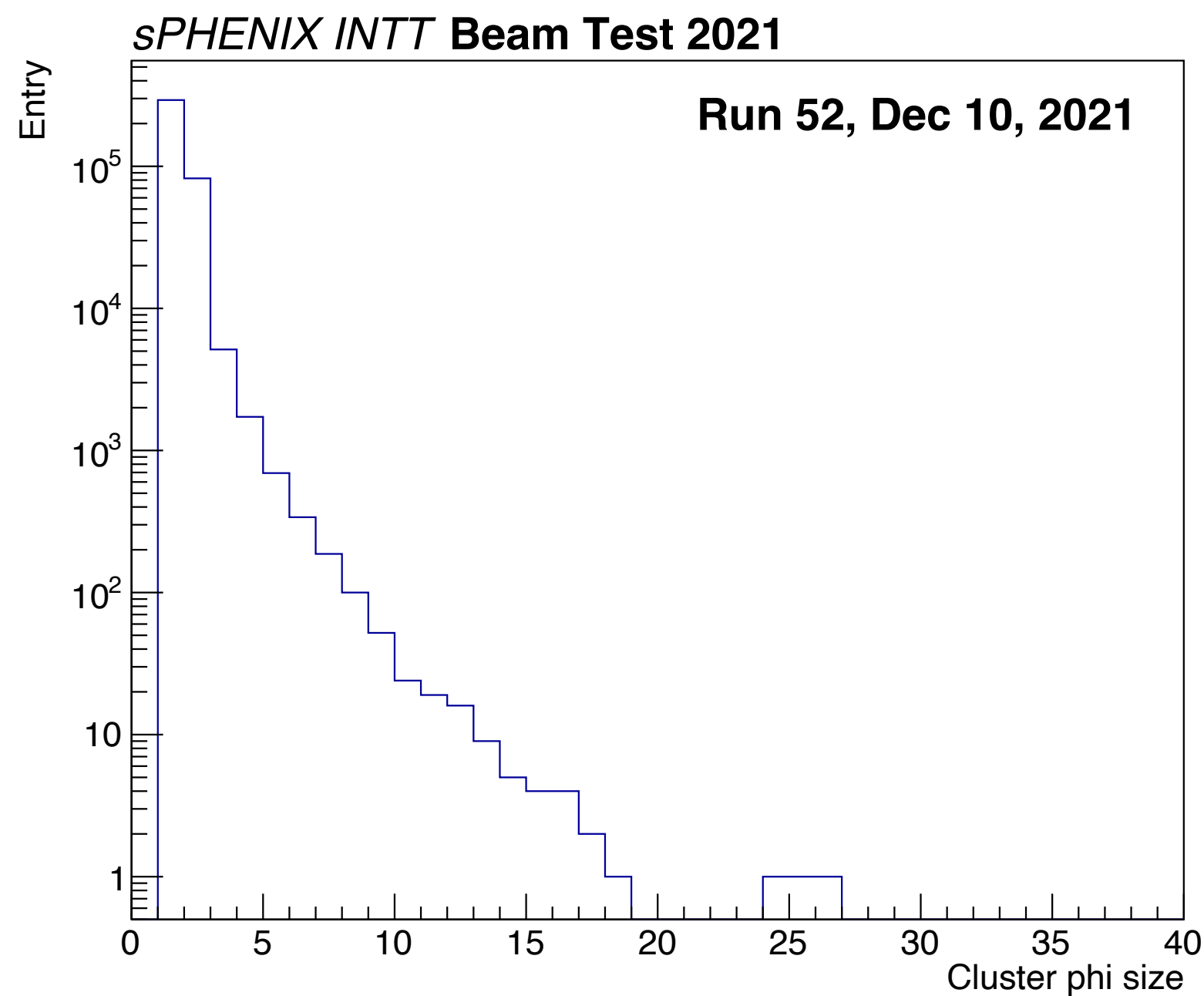


In the cartoon, 3 clusters in total

Clu 1: Z size 3, ϕ size 3, Nhit 6

Clu 2: Z size 2, ϕ size 1, Nhit 2

Clu 3: Z size 1, ϕ size 1, Nhit 1



detector-level raw data

```
root [16] tree_both->Scan("module:chan_id:chip_id","eID==835028")
*****
*   Row   * Instance *   module *   chan_id *   chip_id *
*****
*  40854 *         0 *         1 *         74 *         20 *
*  40854 *         1 *         1 *        121 *         21 *
*  40854 *         2 *         6 *        116 *         21 *
*  40854 *         3 *         5 *        119 *         19 *
*  40854 *         4 *         5 *        118 *         20 *
*  40854 *         5 *         5 *        119 *         20 *
*  40854 *         6 *         5 *        119 *         21 *
*****
```

module 1 → layer 0
module 6 → layer 1
module 5 → layer 2

post-clustering

```
Attaching file cluster2D_information_offset-0.0000_adcinfo_NoCamac.root as _file0...
(TFile *) 0x55b147832790
root [1] .ls
TFile**      cluster2D_information_offset-0.0000_adcinfo_NoCamac.root
TFile*       cluster2D_information_offset-0.0000_adcinfo_NoCamac.root
KEY: TTree   cluster_info;1 cluster_info
root [5] cluster_info->Scan("","eID==835028")
*****
*   Row   * Instance *   eID.eID *   layer *   Nhit *   Zsize *   Phisize *
*****
*  38479 *         0 *   835028 *         0 *         1 *         1 *         1 *
*  38479 *         1 *   835028 *         0 *         1 *         1 *         1 *
*  38479 *         2 *   835028 *         1 *         1 *         1 *         1 *
*  38479 *         3 *   835028 *         2 *         4 *         3 *         2 *
*****
==> 4 selected entries
```


Back up