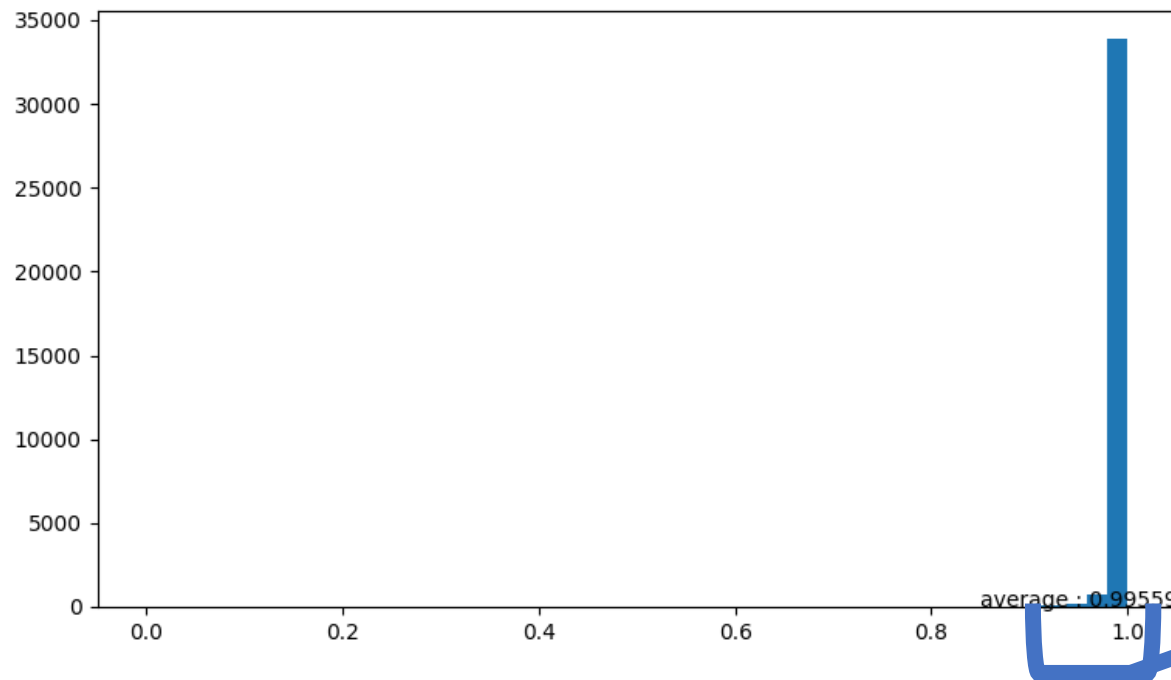


Physics Software 2/8

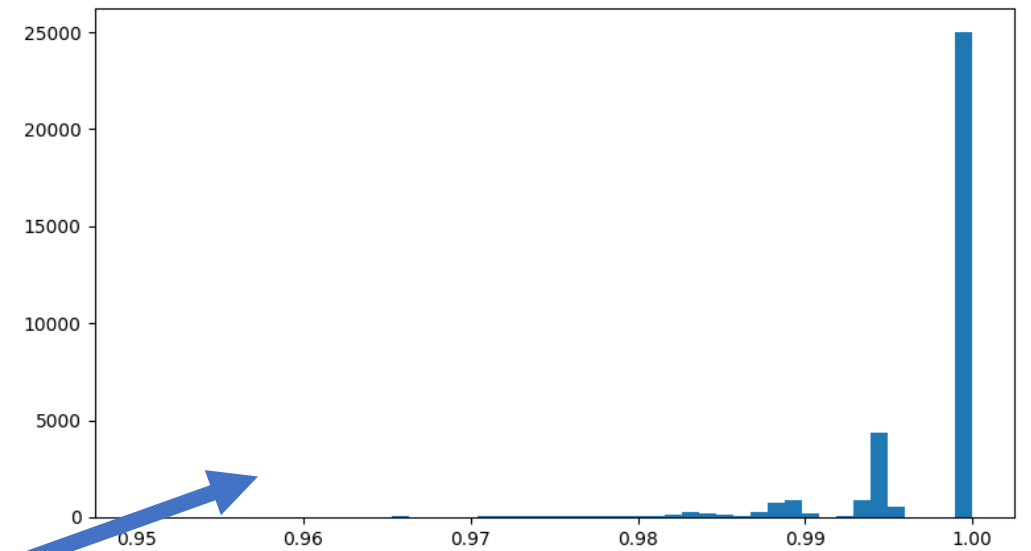
Shusaku Tsumura

Evaluation

- Accuracy = $\frac{\text{Number of hits with predicted label correctly}}{\text{Number of hits with true label}}$
- Opening angle = 0.5 rad (the largest one)



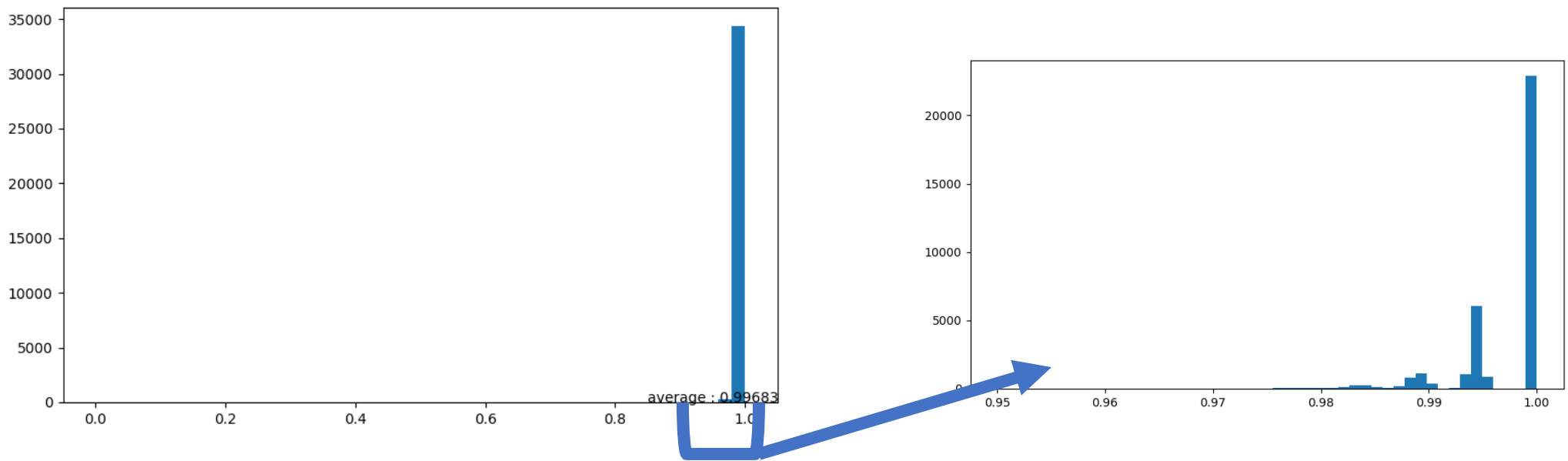
Average = 99.56%



Evaluation

Opening angle = 0.4 rad

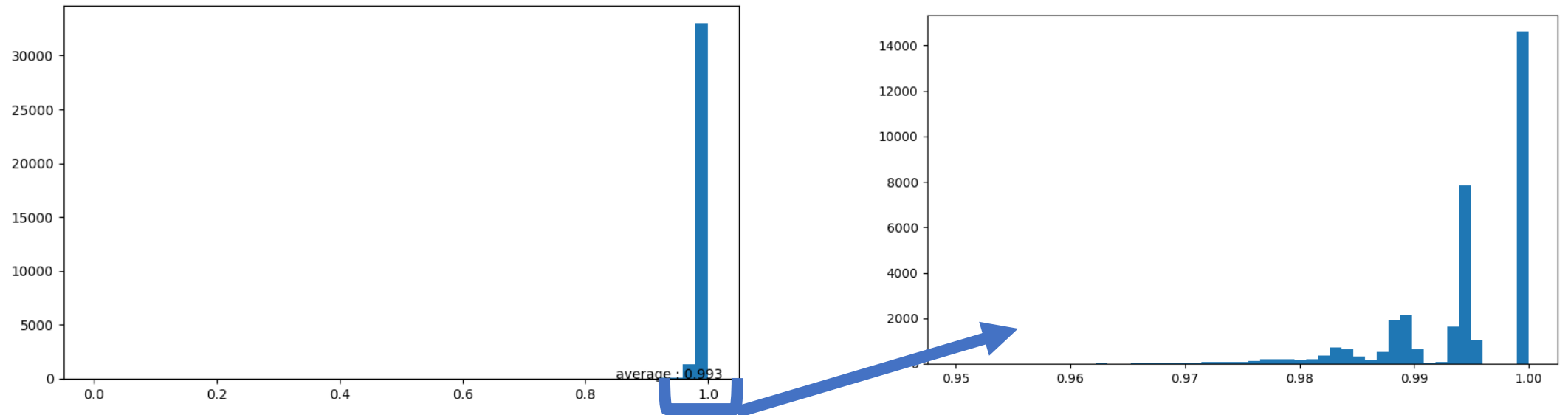
Average = 99.68%



Evaluation

Opening angle = 0.3 rad

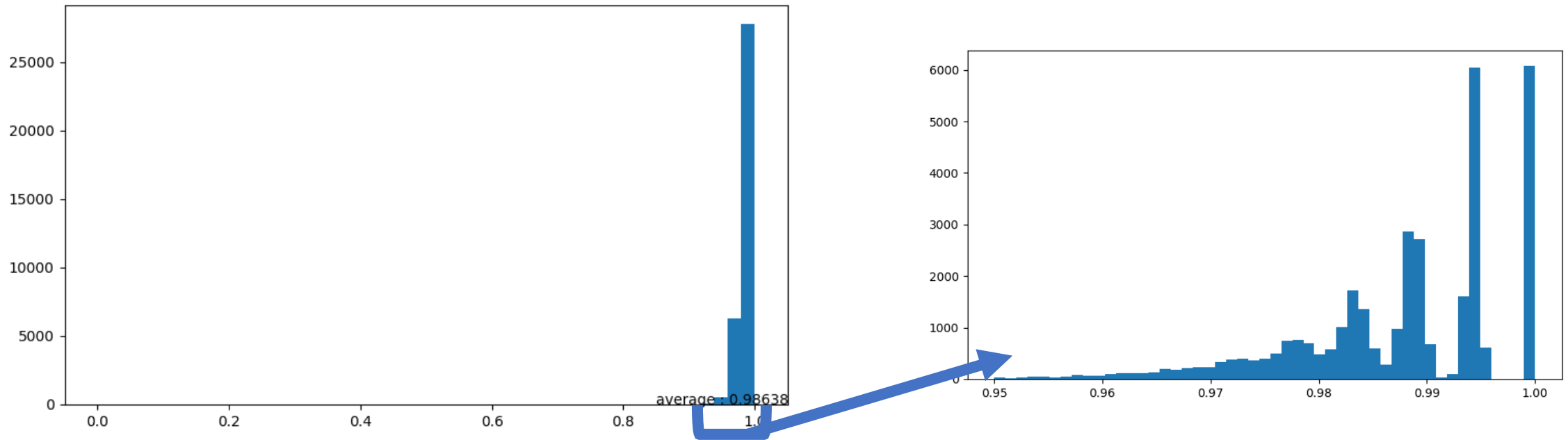
Average = 99.30%



Evaluation

Opening angle = 0.2 rad

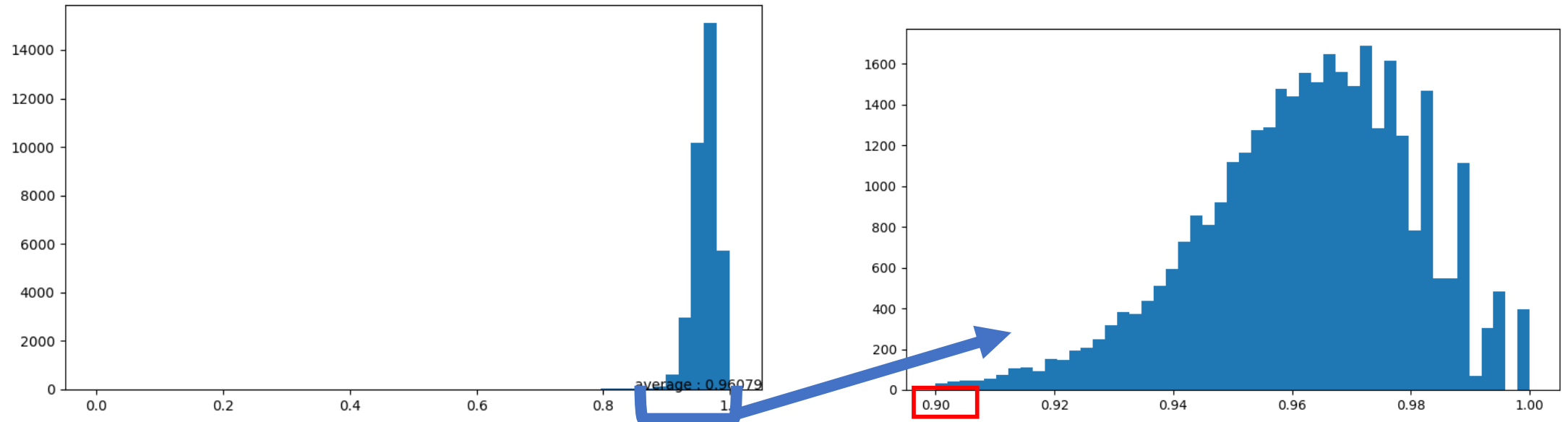
Average = 98.64%



Evaluation

Opening angle = 0.1 rad (the smallest one)

Average = 96.08%

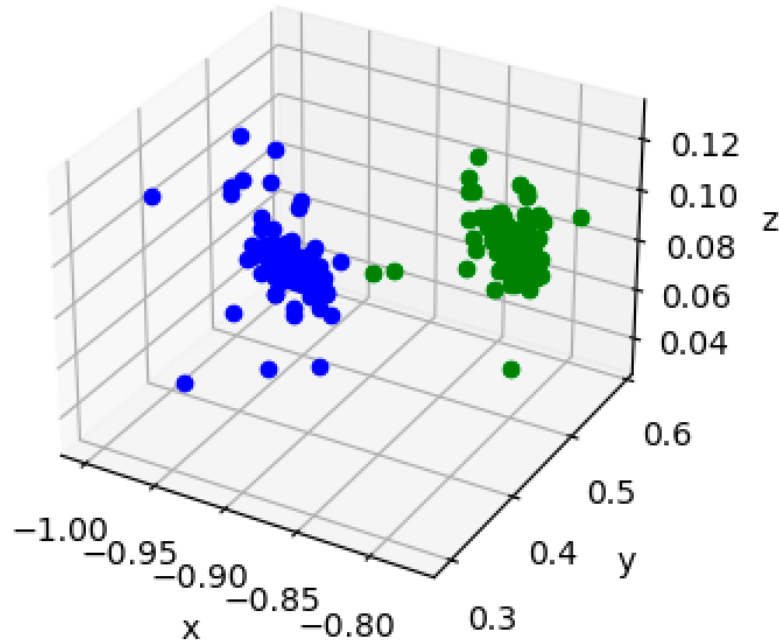


backup

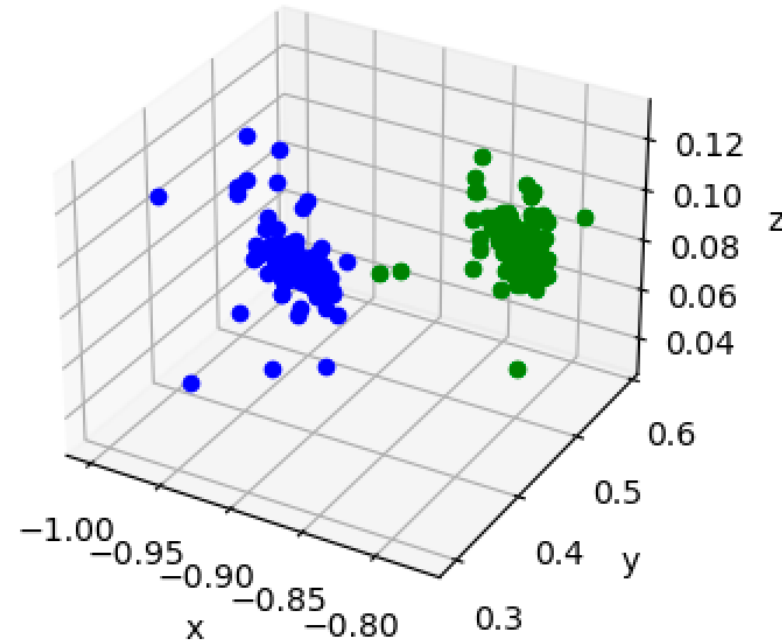
Comparison between prediction and true label

Good example :

predicted label

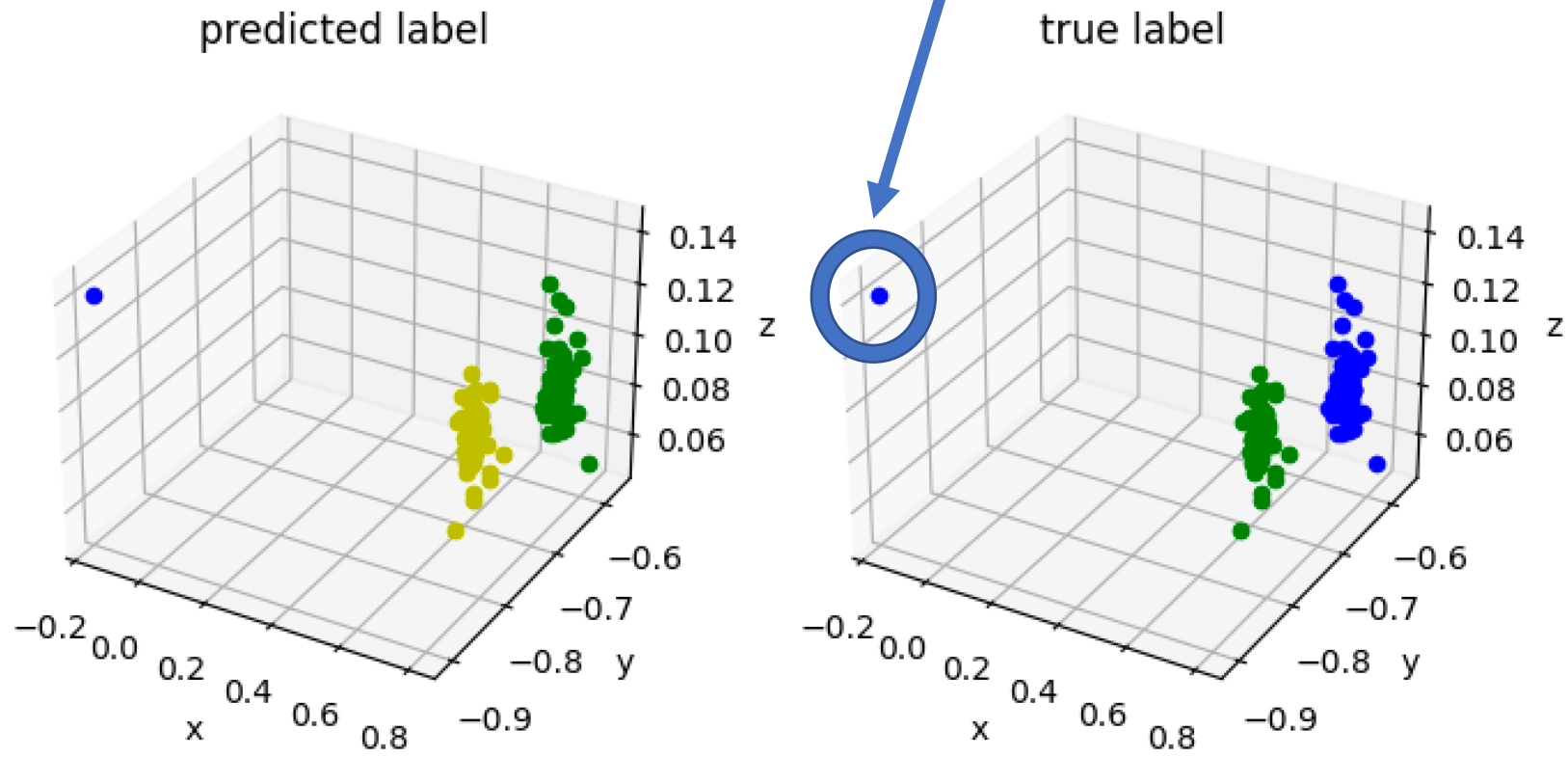


true label



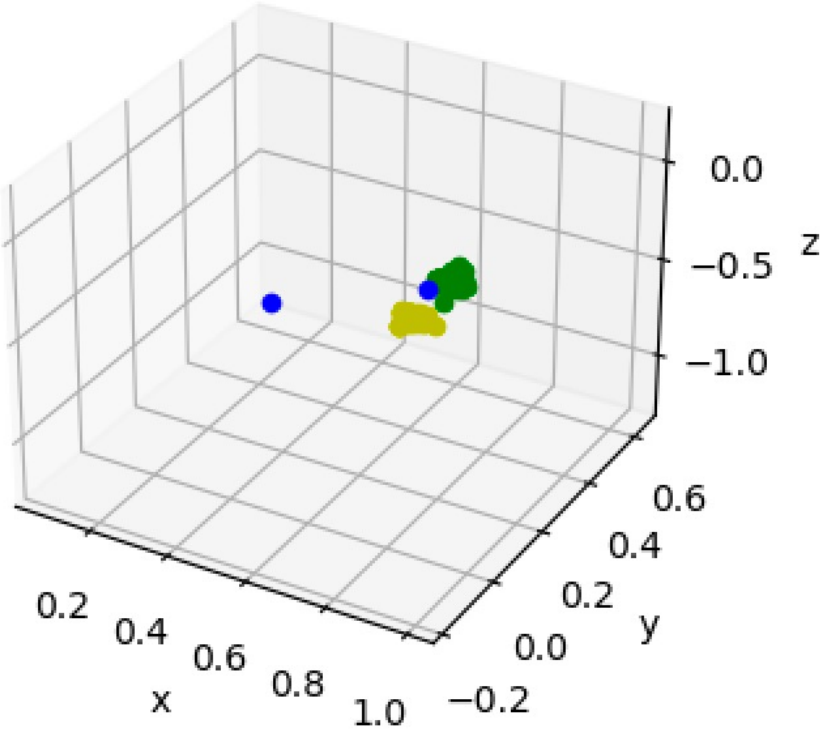
Comparison between prediction and true label

The case in which there is a distant hit

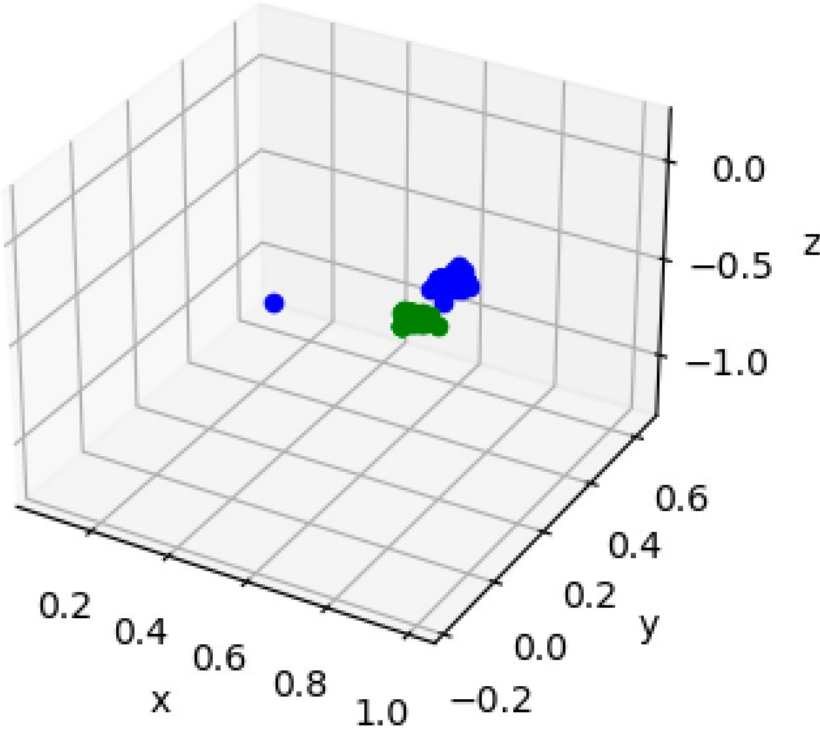


Comparison between prediction and true label

predicted label

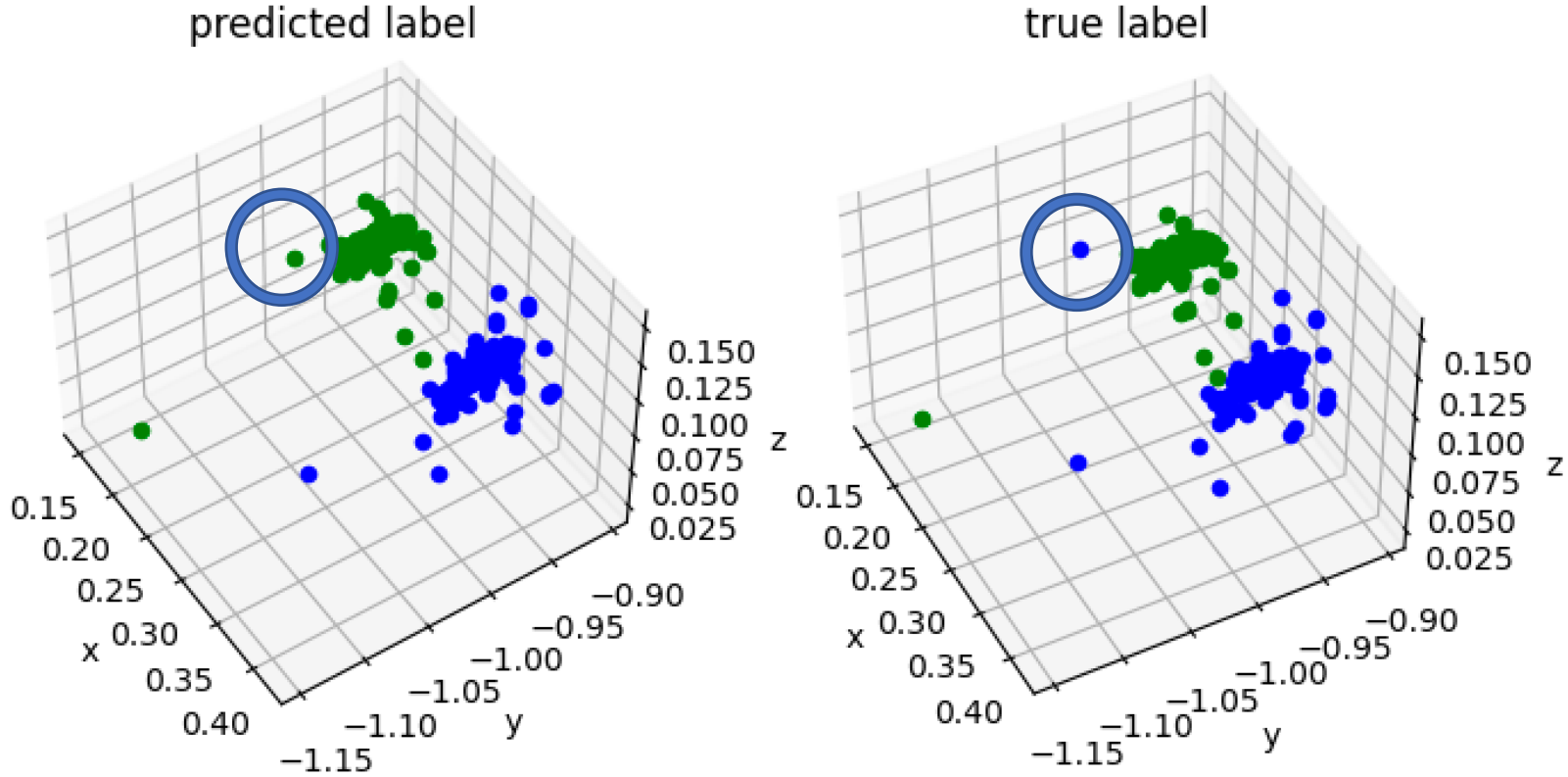


true label



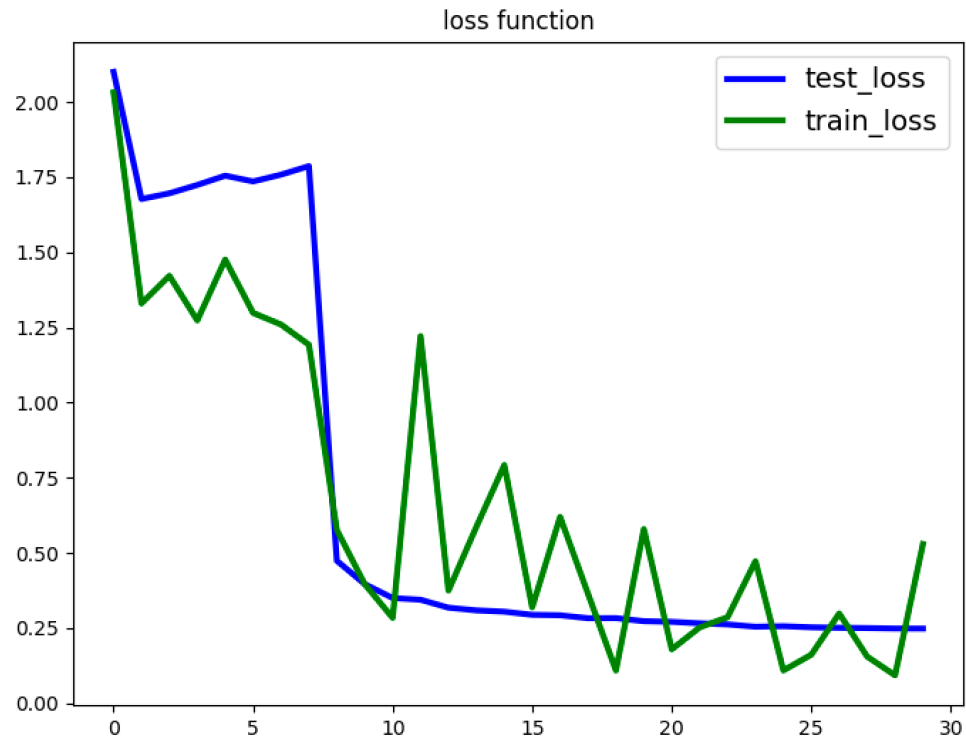
Comparison between prediction and true label

Confusion example :



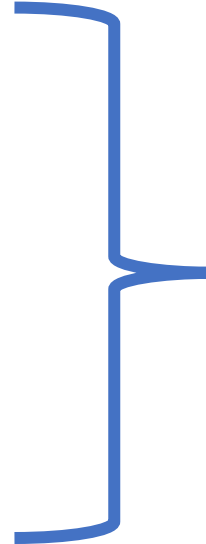
Learning

- The easiest case :



GravNet

- kekcc : 1 hour
lcio_particle_gun.py 1000 events *100 →bsub 100 times
(Generation of double particles)
ddsim 100 files
Marlin 100 files
(Reconstruction)
LCIO files → npz files(100000 files) : 20 min /1000 files
(Conversion of files)
- kekcc → bepp 100000 files 2h → shorten to about 30 min
- Bepp
GravNet training 23 min /4 batch • 1 epoch
12 min /10 batch • 1 epoch →30 epoch 5h
→ 6 min / 100 batch • 1 epoch

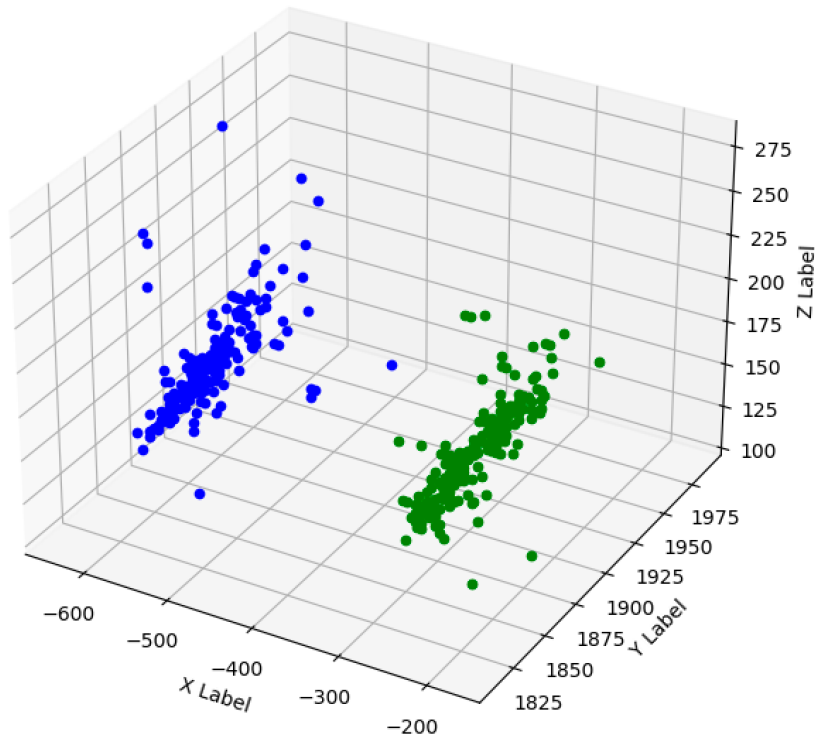


~30 GB
in total

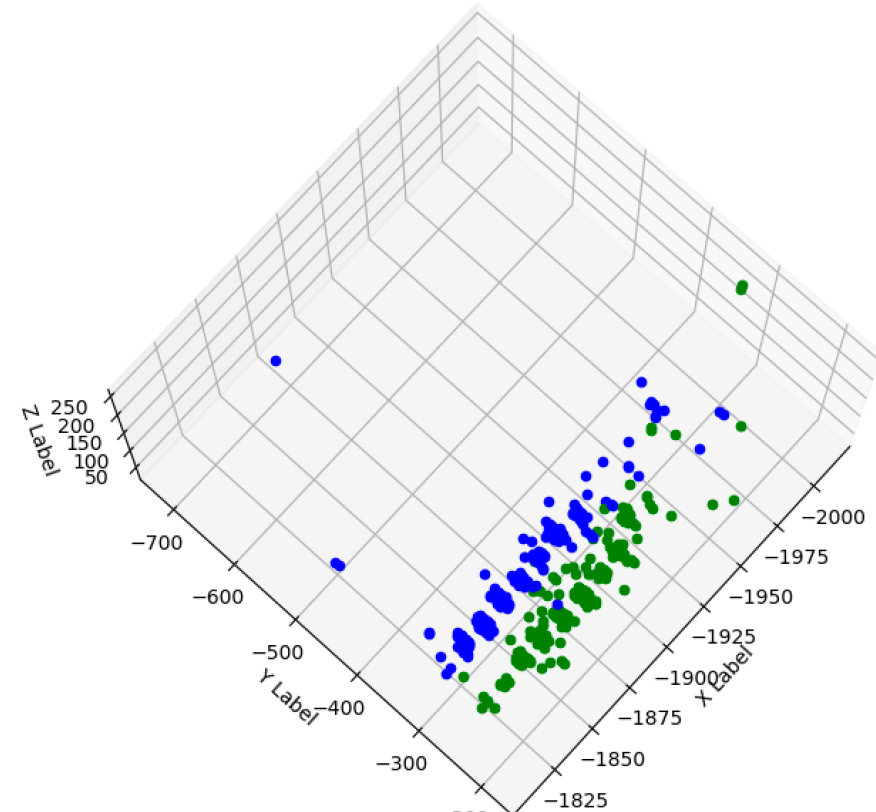
Display of Double Particle

- Two gamma rays are injected (in 5 cases of different angles)

The easiest case :

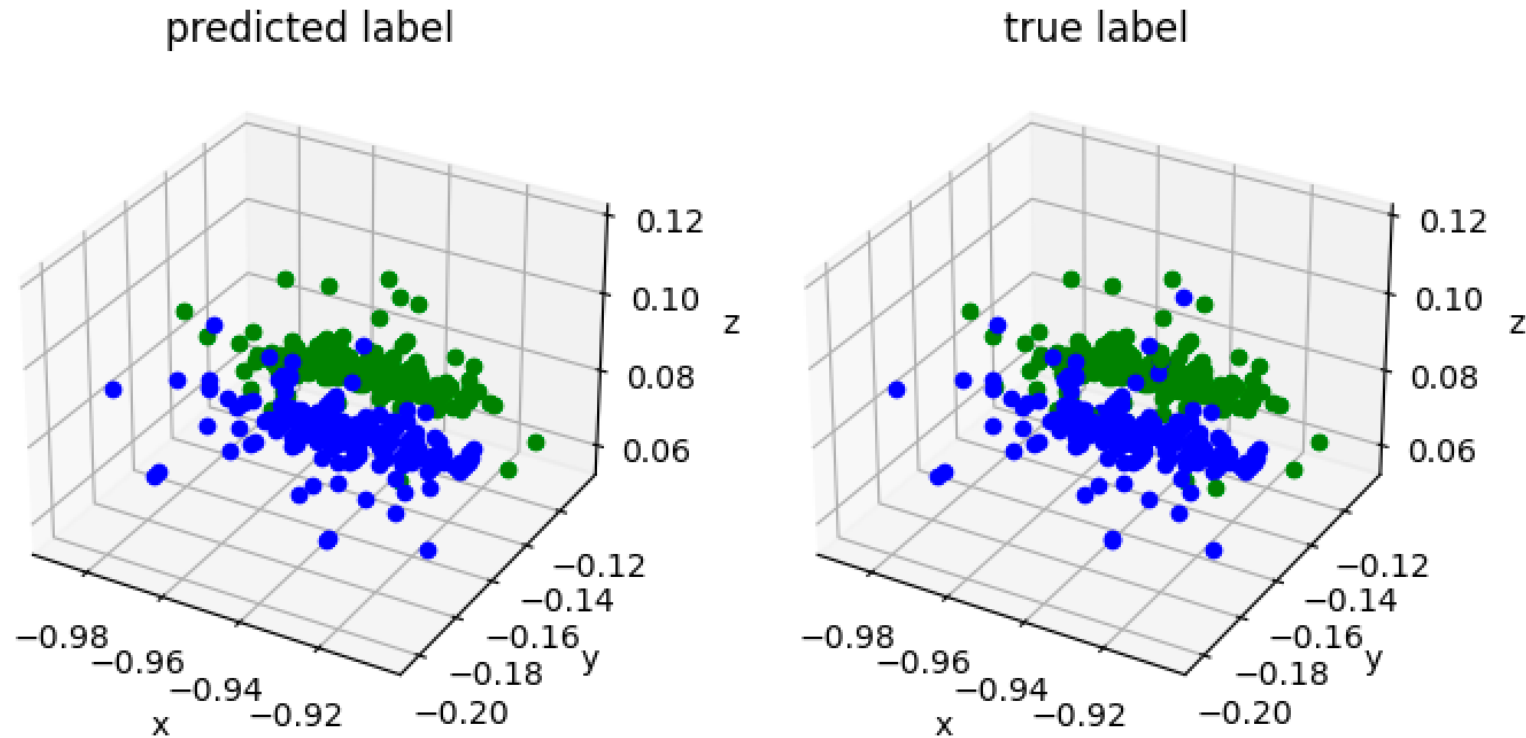


The most difficult case :



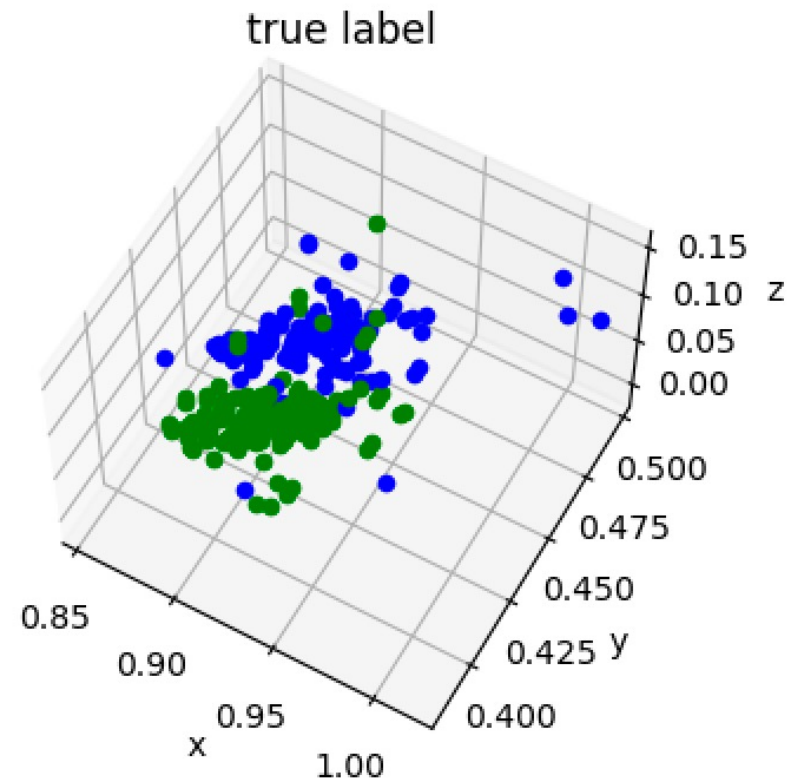
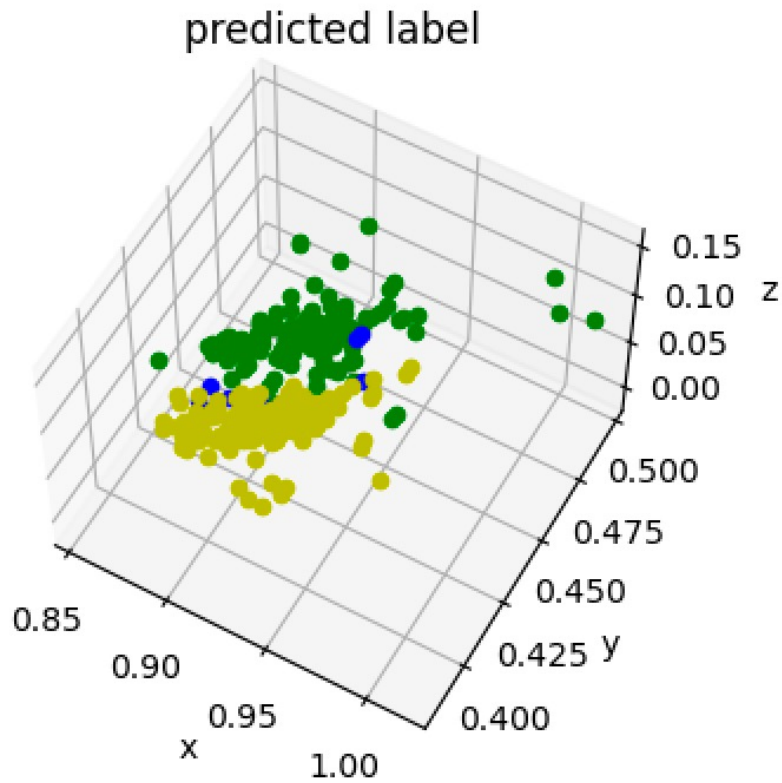
Comparison between prediction and true label

Good case :



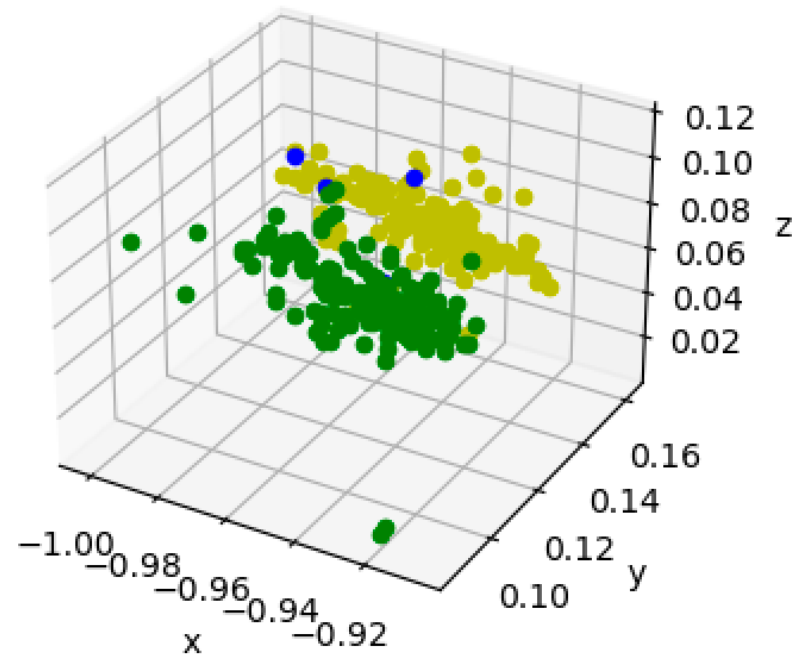
Comparison between prediction and true label

The most case :

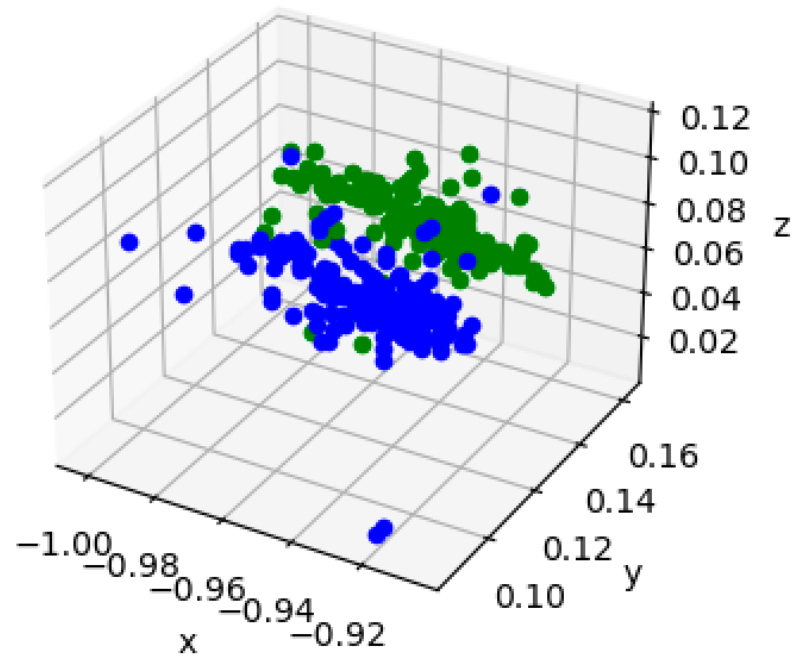


Comparison between prediction and true label

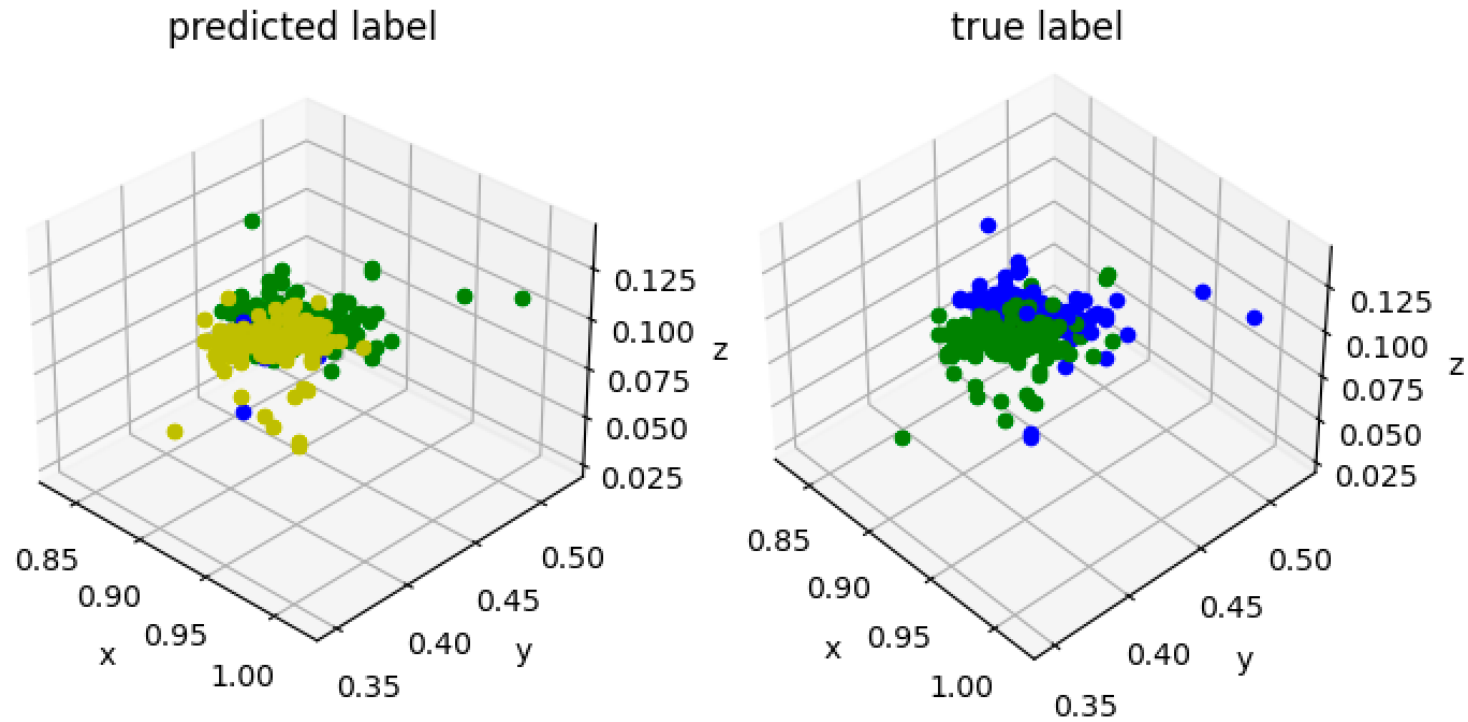
predicted label



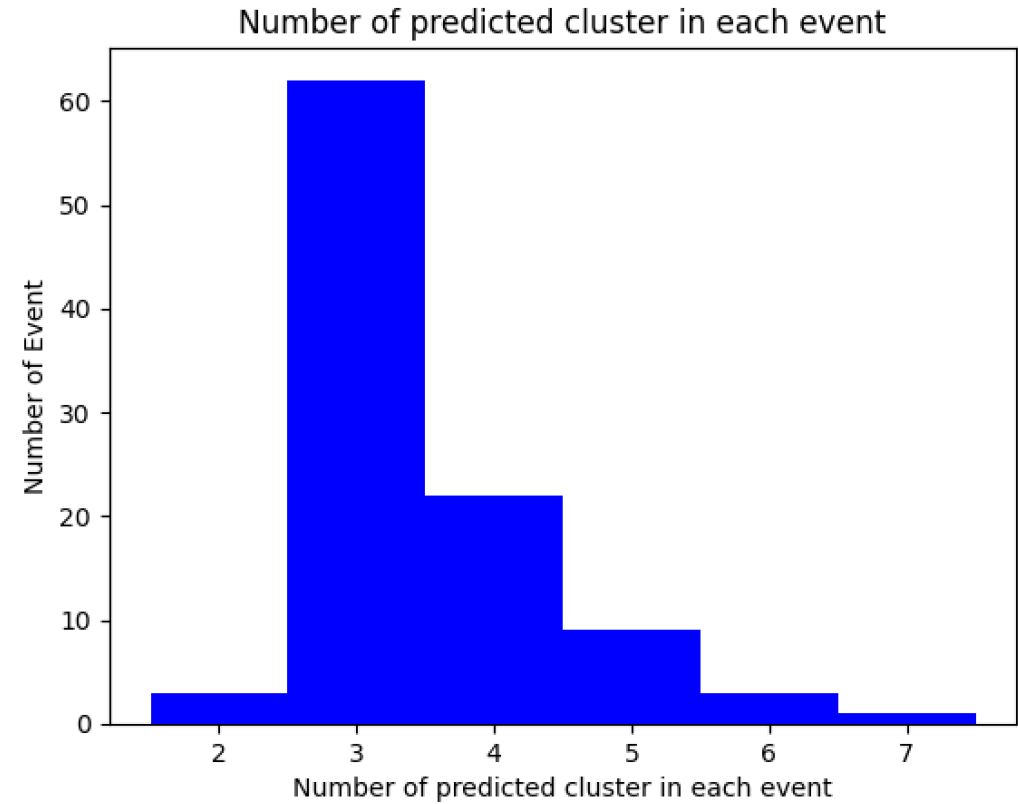
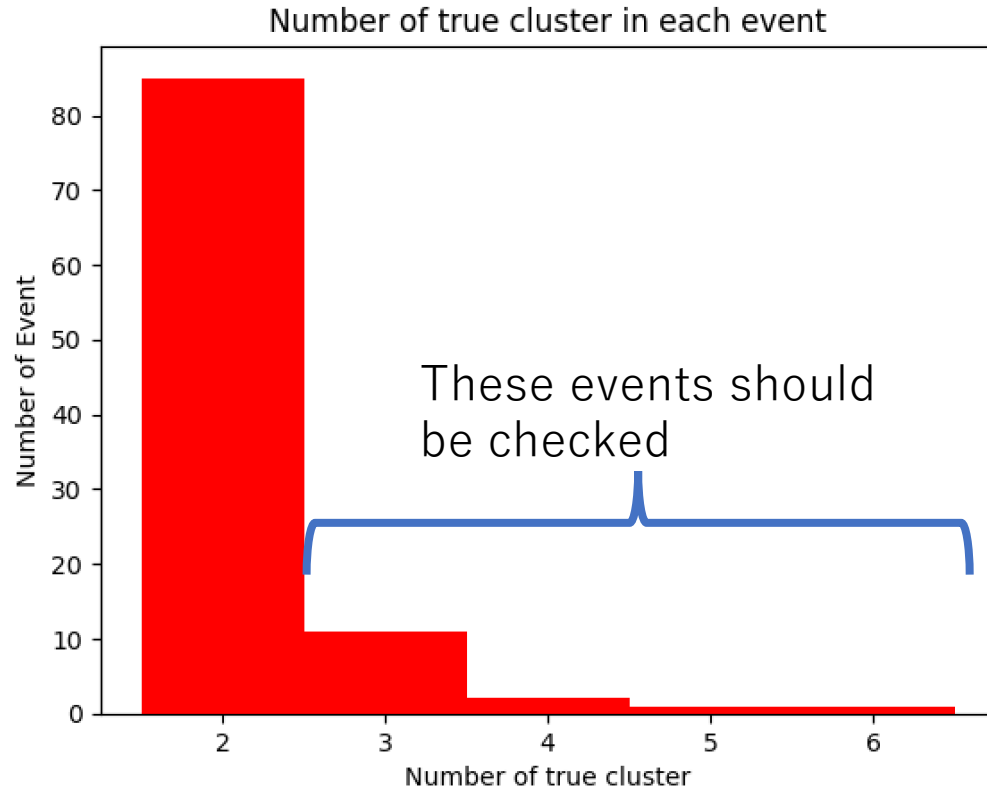
true label



Comparison between prediction and true label



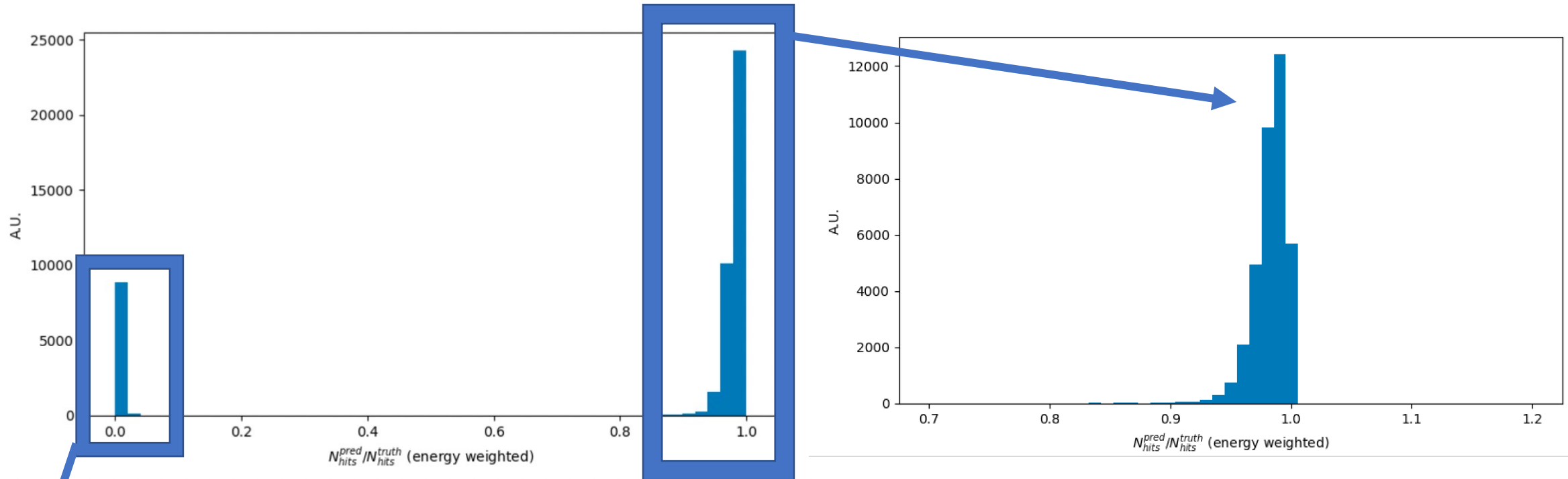
Number of cluster in each event(Just 100 events)



GravNet

- Accuracy = $\frac{\text{Number of hits with predicted label}}{\text{Number of hits with true label}}$

The angle between two gammas:
The easiest case



To do by the deadline of the master thesis :
To check the histograms of other cases
To confirm why the peak near 0.0 causes