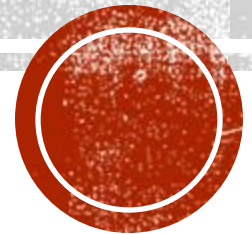


OpticSiren status

Ka Ming Tsui

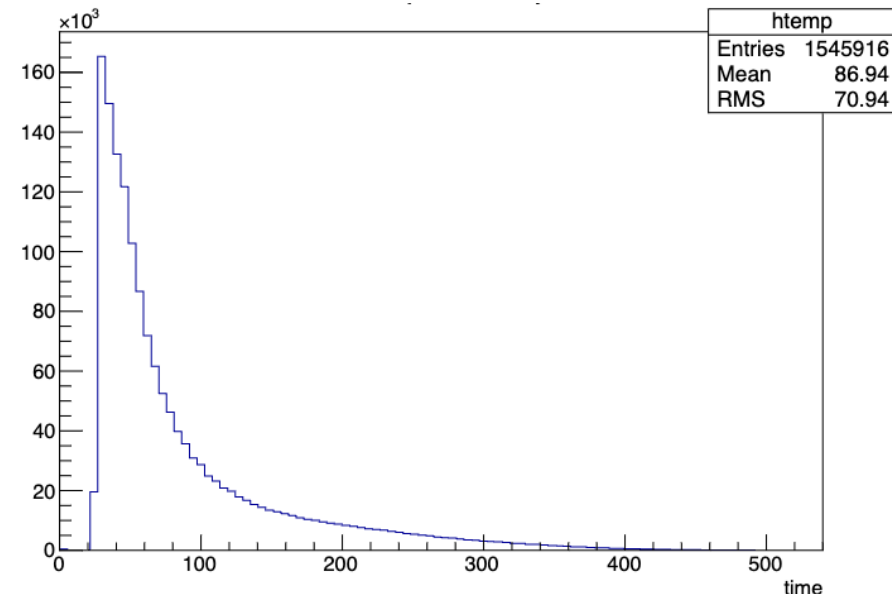
kaming.tsui@ipmu.jp



Production summary

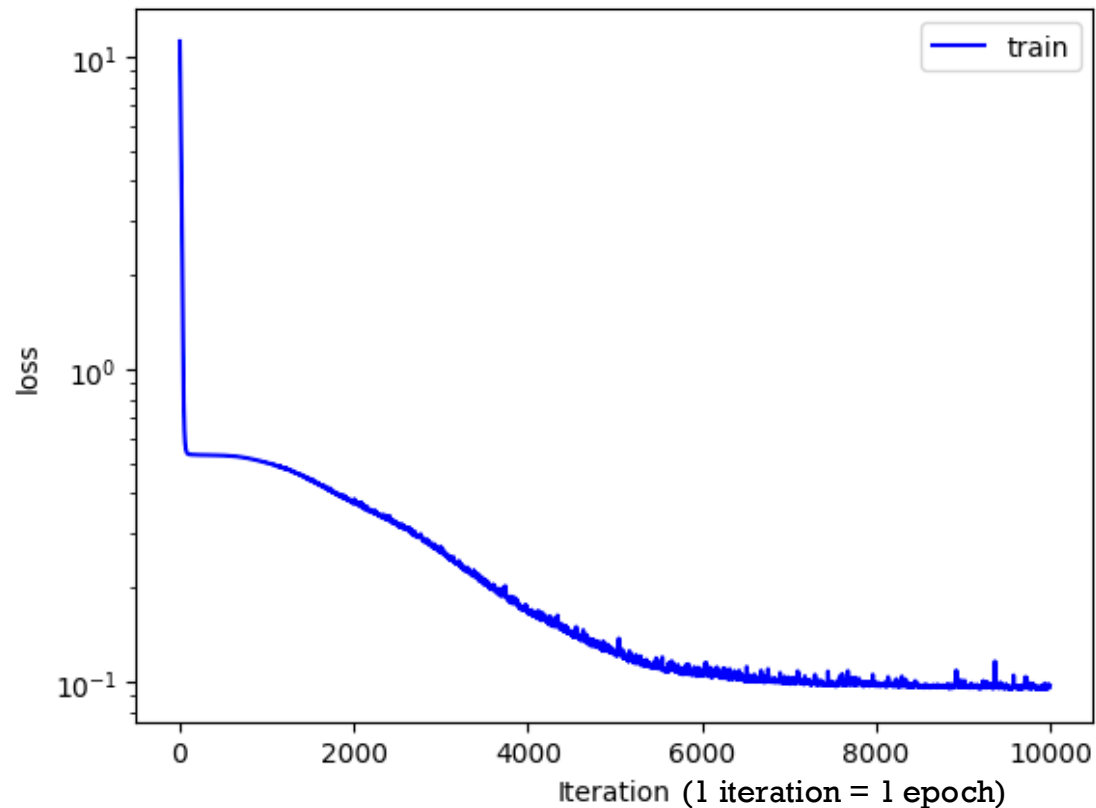
Project name: first_wcte_posdir_500000
Cylinder geometry
R: 0.0 => 1271.96
Z: -1379.118 => 1379.118
Bin in Direction: 1
Gap space: 200.0
Gap angle: 10.0
Starting n phi: 4
Sampling points: 2268
Sampling directions: 684
Sampling configs: 1551312
Photons per config: 500000

- Total number of configs (photon starting position/direction): 1551312
- Failure rate
 - Job scheduler problem ~ 1 in 1000 → rerun
 - Database connection problem ~ 1 in 100 → rerun
 - Overlap problem in WCSim (event aborted) ~ 1 in 100000 → change RNG seed
- Storage
 - Size per config: ~ 4.4 MB per config
→ 6.6 TB in total
 - h5 files: 141 GB in total
- Run time
 - Mean ~ 90s with a long tail



Training test

- Dataset: 500 voxels (files), all are photons pointing upwards from lower barrel

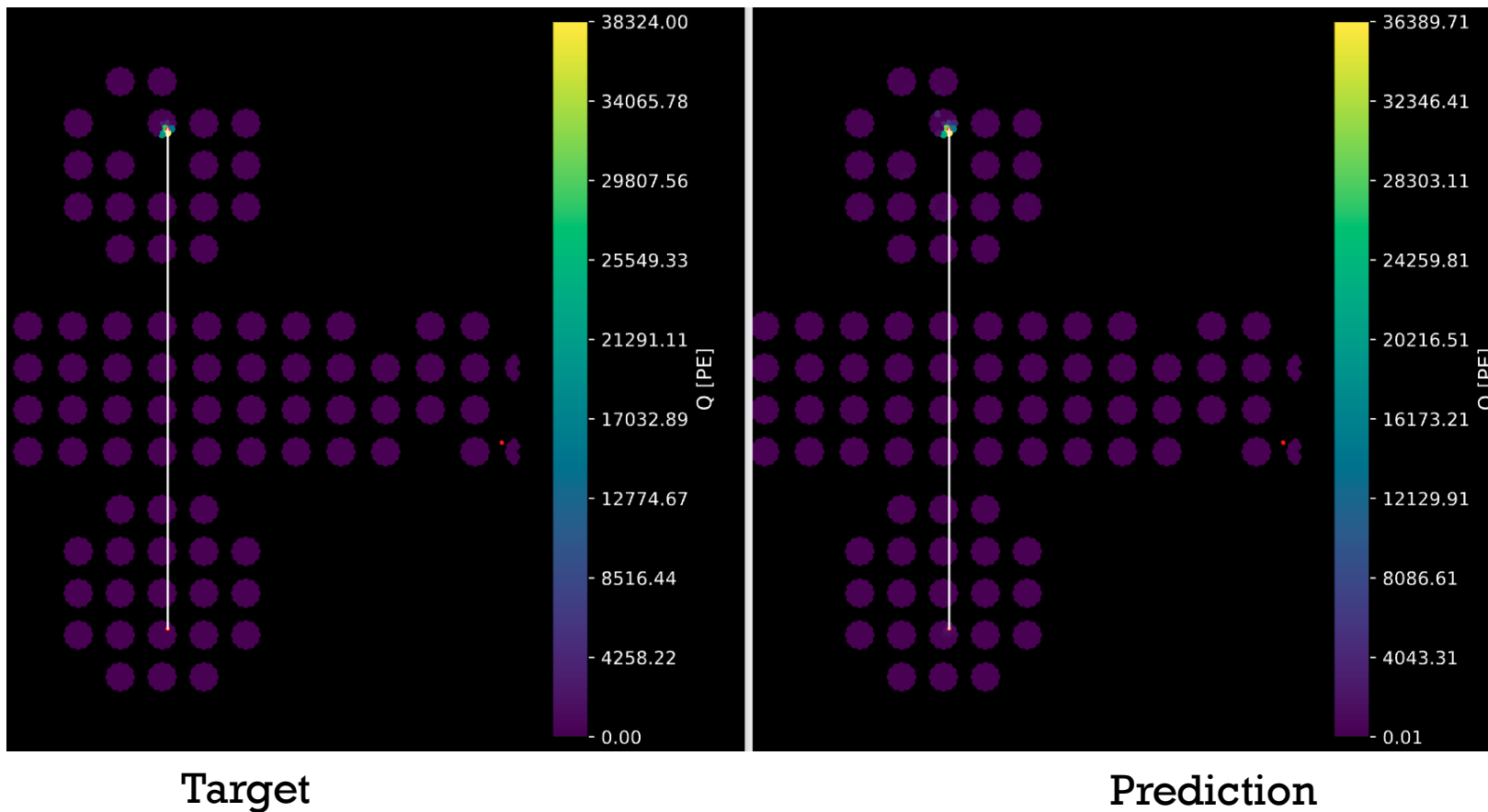


```
network:  
  hidden_features: 64  
  hidden_layers: 5  
  in_features: 5  
  out_features: 3686
```

```
loss: MeanSquaredLoss  
optimizer:  
  name: Adam  
  parameters:  
    lr: 5.0e-05  
lr_scheduler:  
  name: ReduceLRonPlateau  
  parameters:  
    factor: 0.9  
    mode: min  
    patience: 10  
    threshold: 0.0001  
    threshold_mode: rel
```

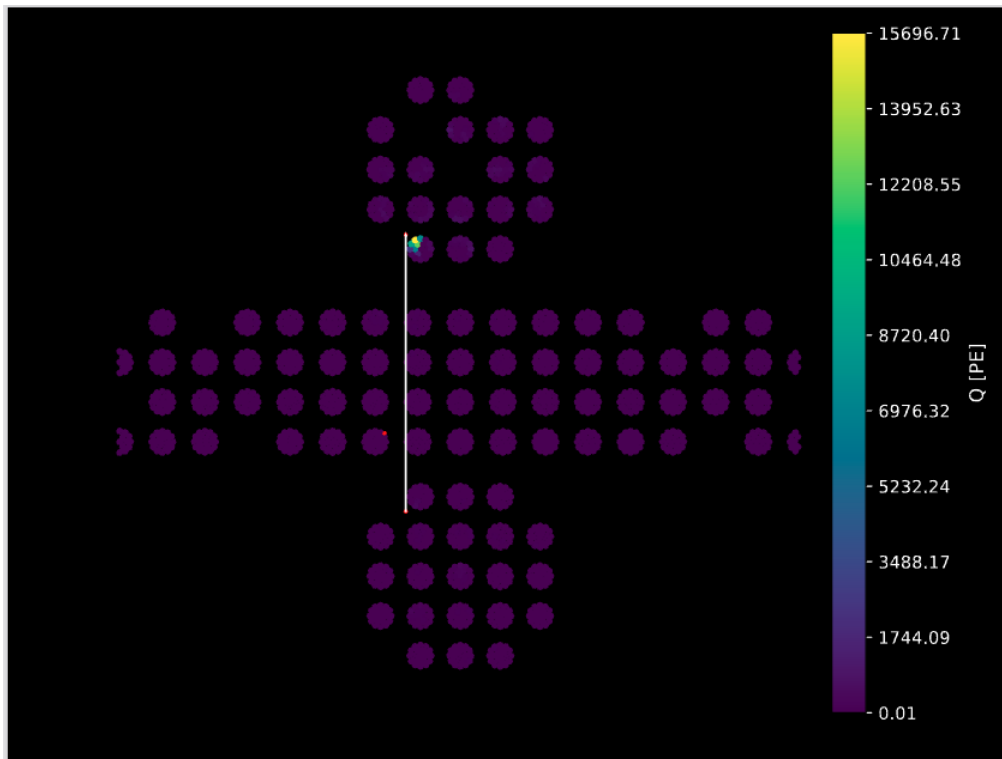
Training results

- High charge events
 - This one looks very good

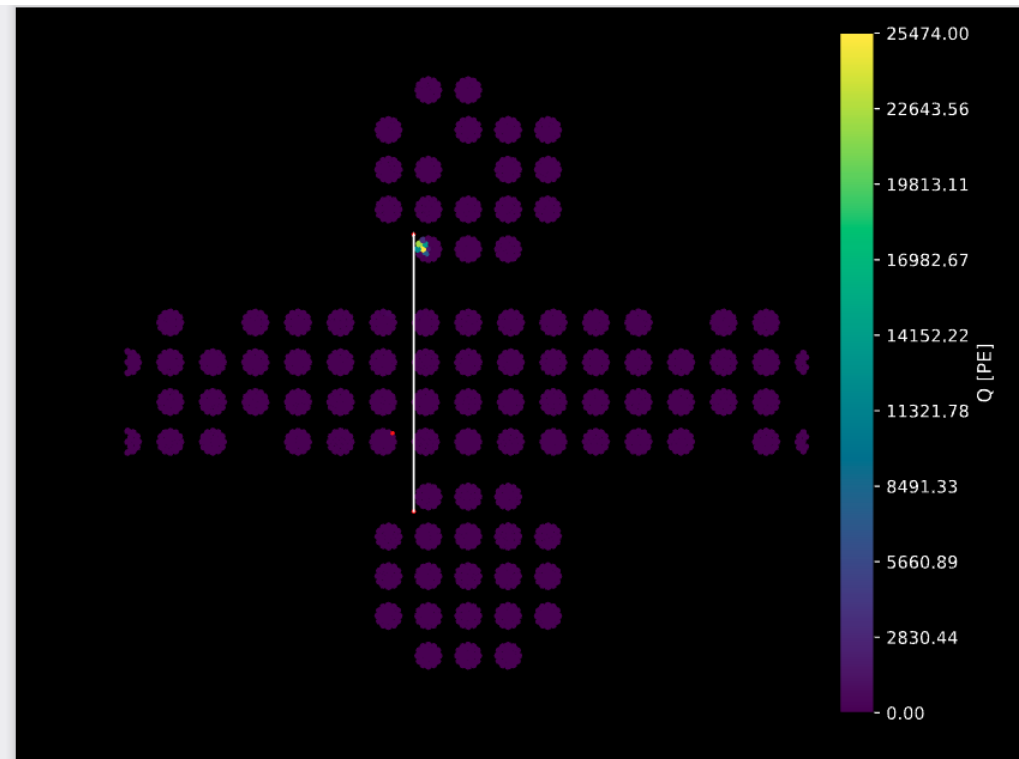


Training results

- High charge events
 - Hit/peak positions slightly shifted



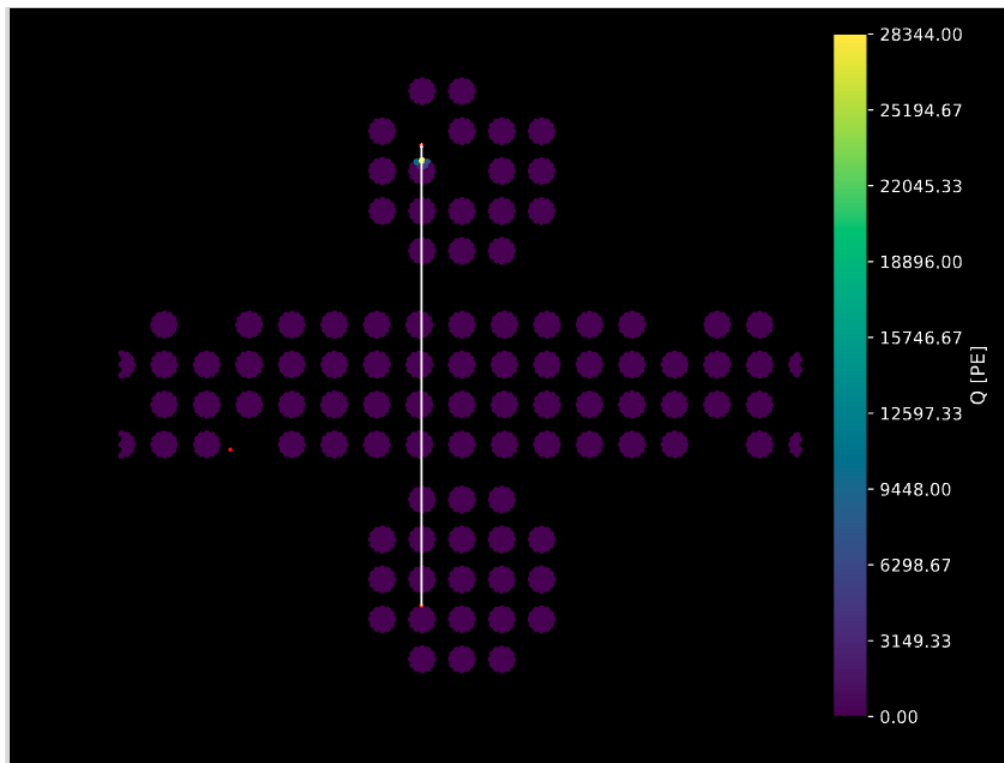
Target



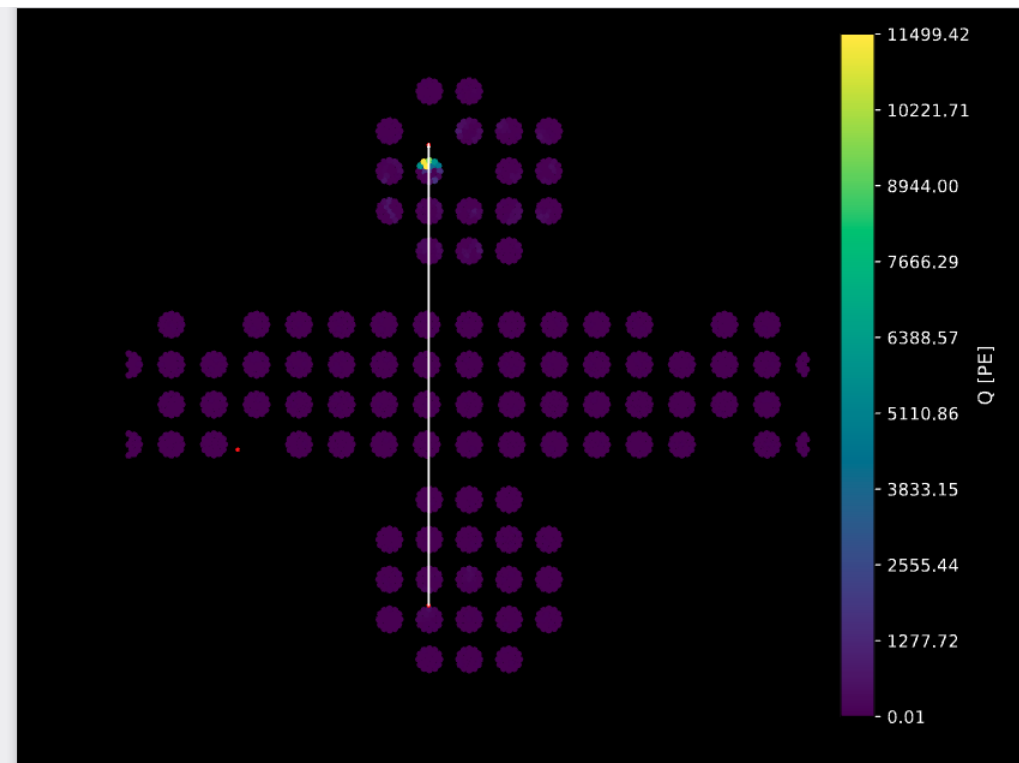
Prediction

Training results

- High charge events
 - Hit/peak positions slightly shifted



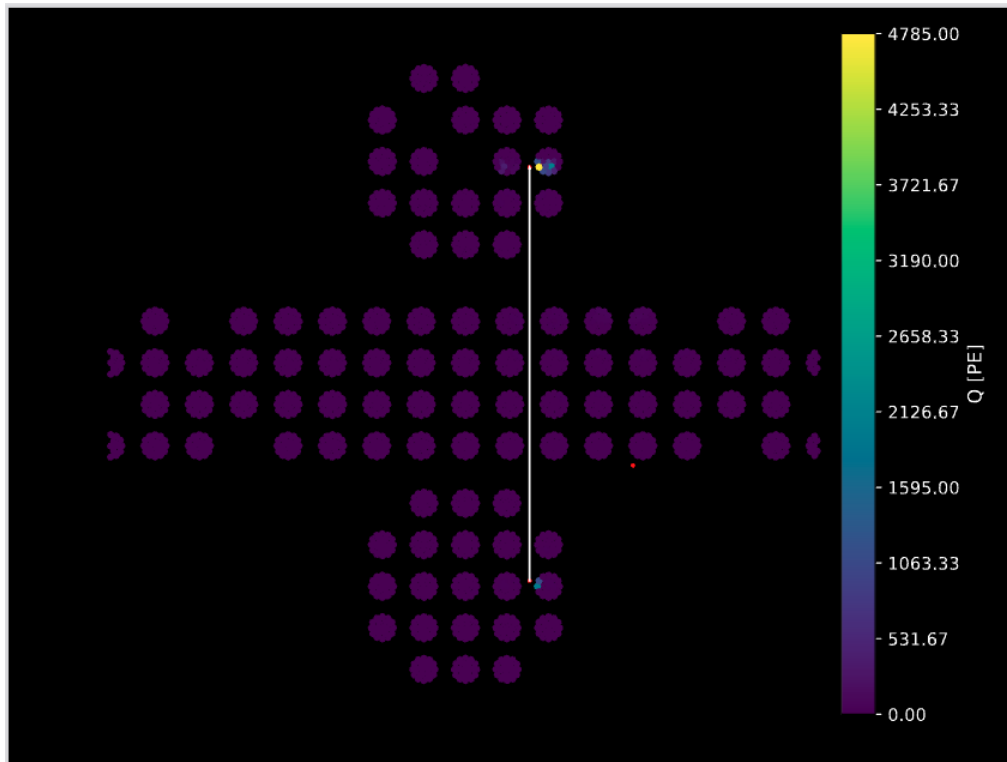
Target



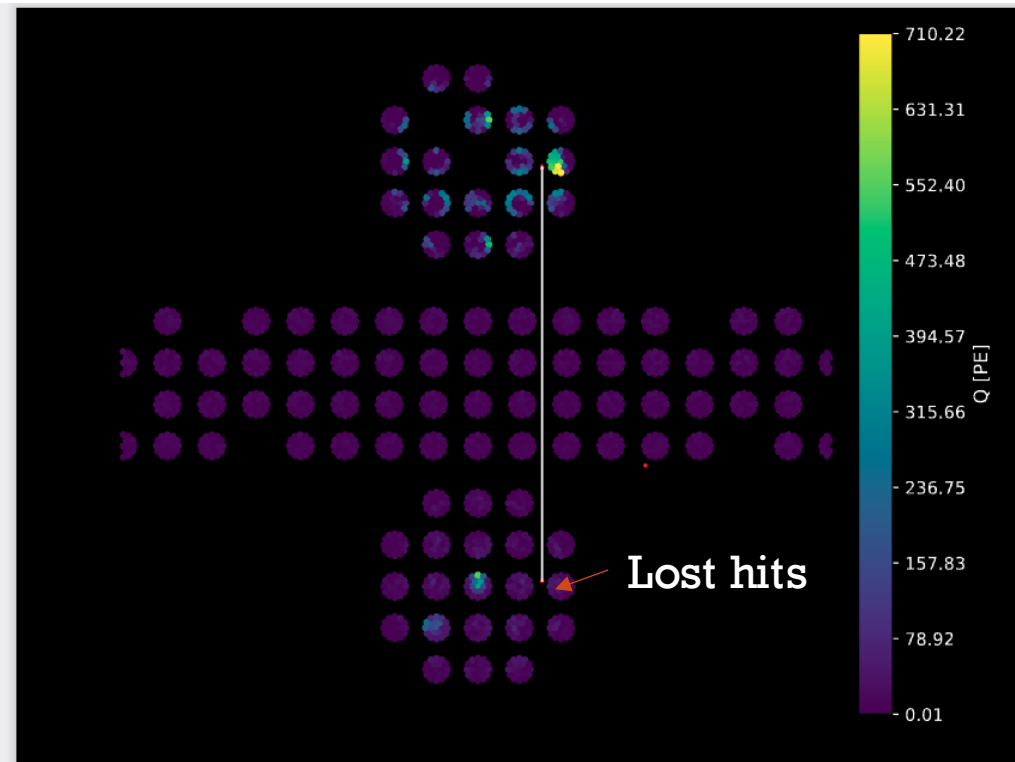
Prediction

Training results

- Low charge events
 - Phantom hits from averaged responses?



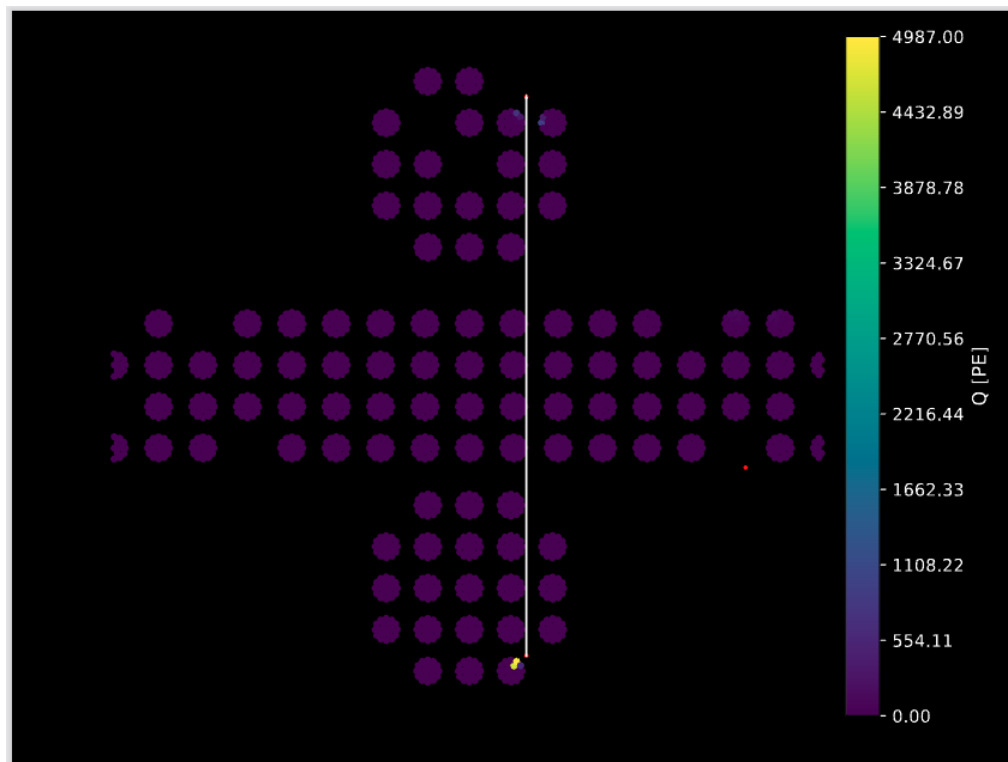
Target



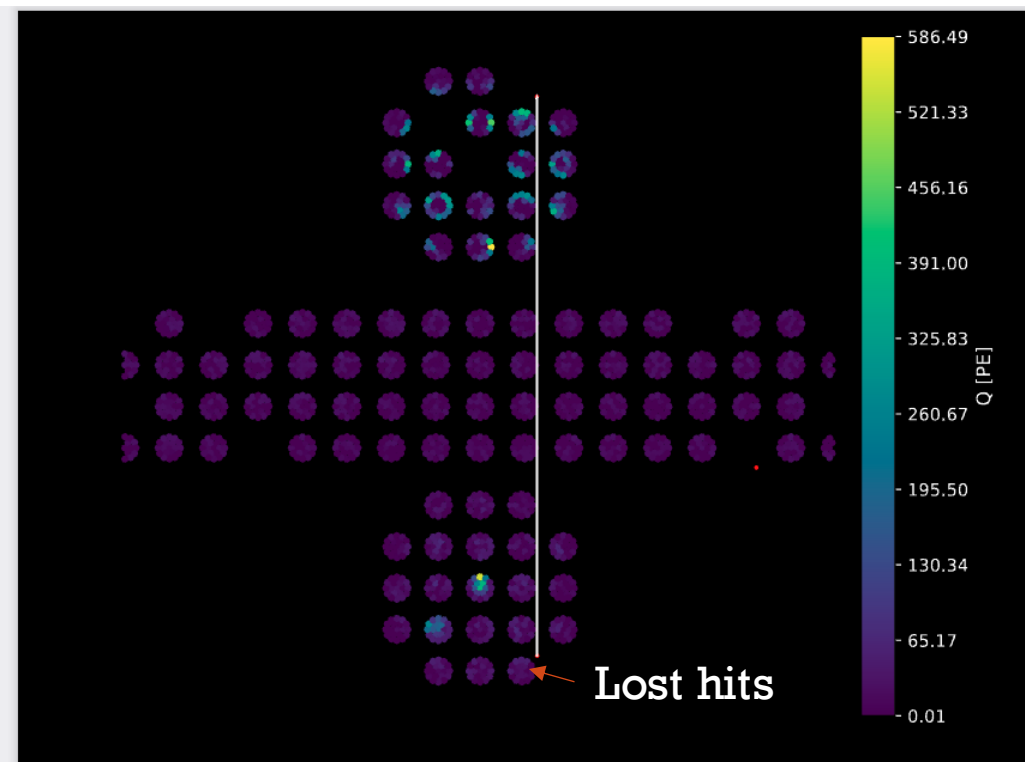
Prediction

Training results

- Low charge events
 - Phantom hits from averaged responses?



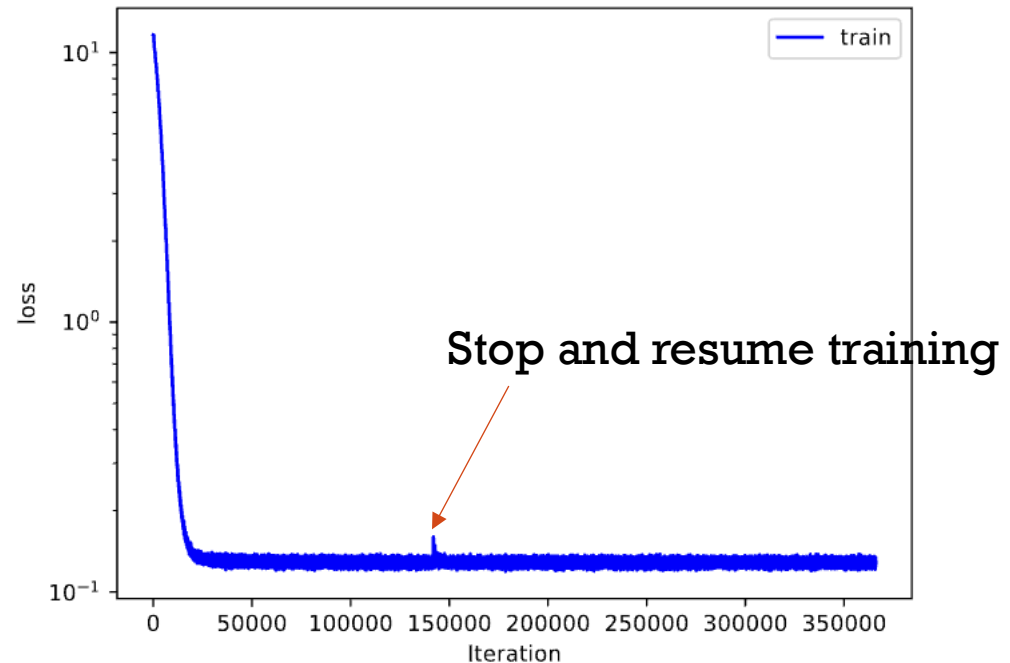
Target



Prediction

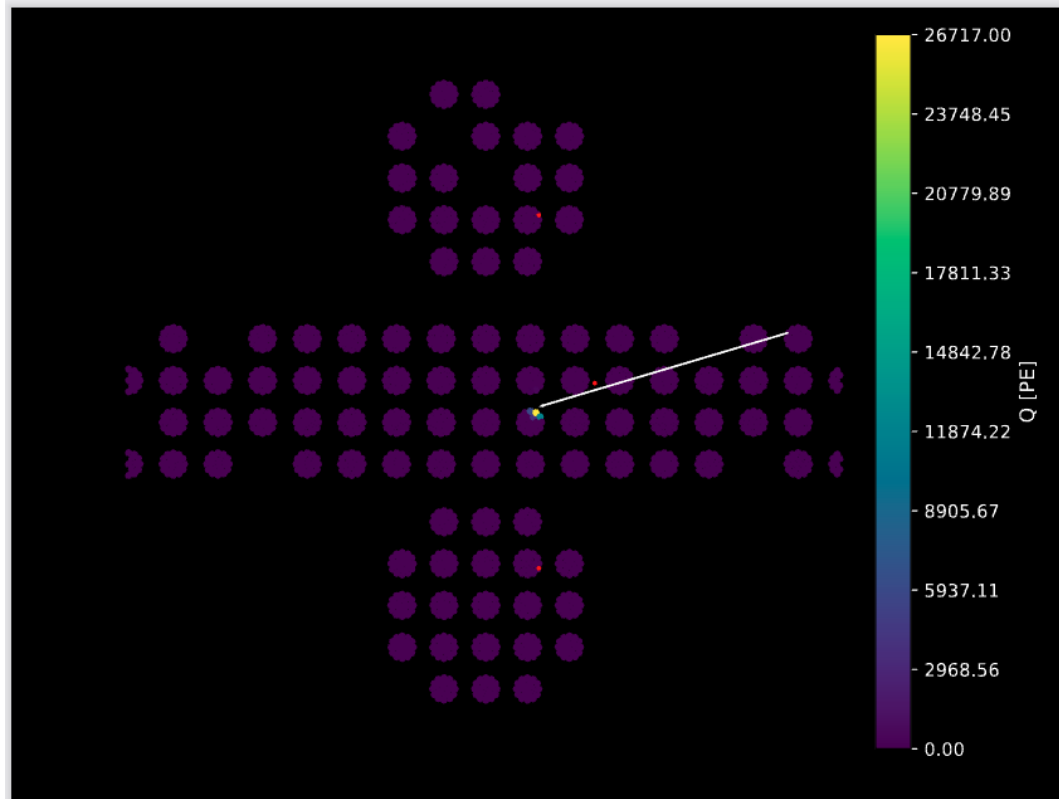
Training with more files

- Number of files: 236516 (15% of total files)
- Dataloader: > 31 min, 123.23 voxel(file)/s
 - Combining all files into one: >15 min, 256.673 voxel/s
 - Plus combine subevents into a single event for each voxel: 1 min 44 s, 2270.75 voxel/s
- Training: ~ 10 s/epoch
 - Batch size = 1000
 - Total epoch = 1500

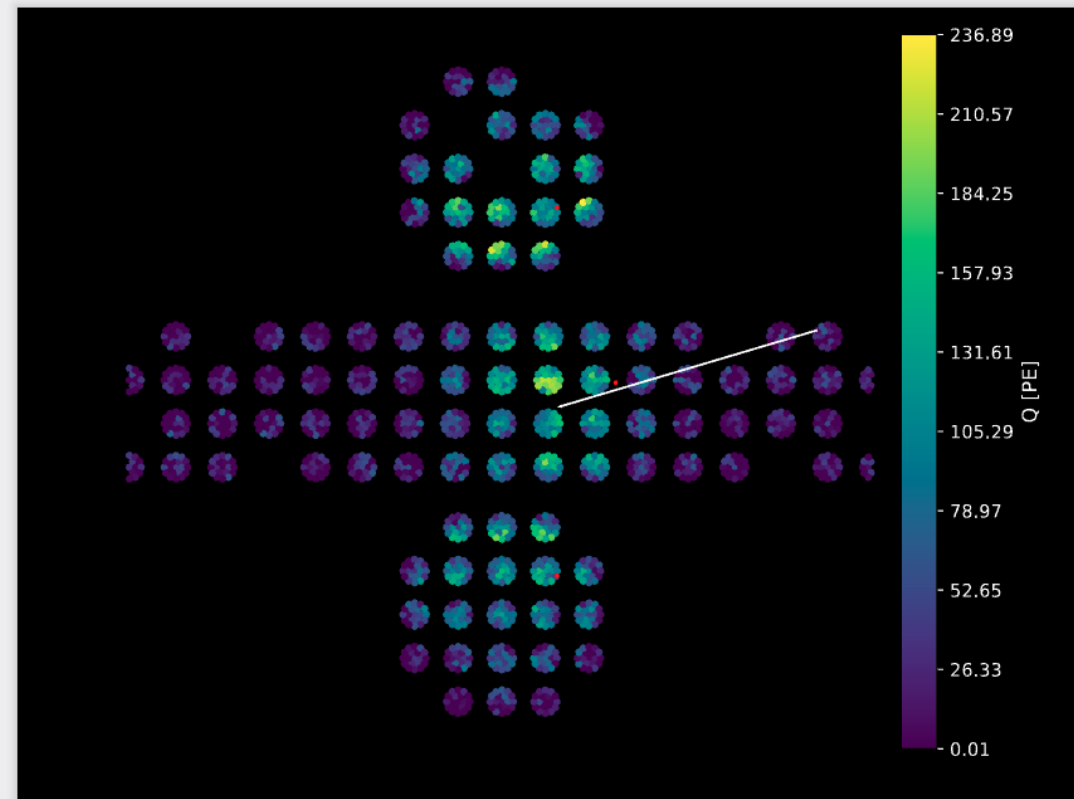


Training results

- Definitely not converging yet



Target



Prediction

- **Any suggestion before I train on the full dataset?**