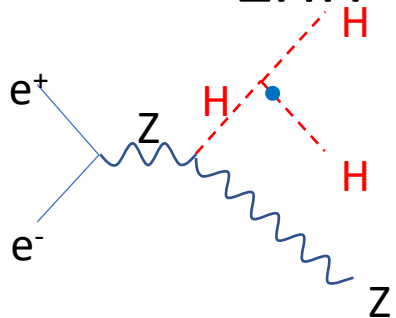


Work this week

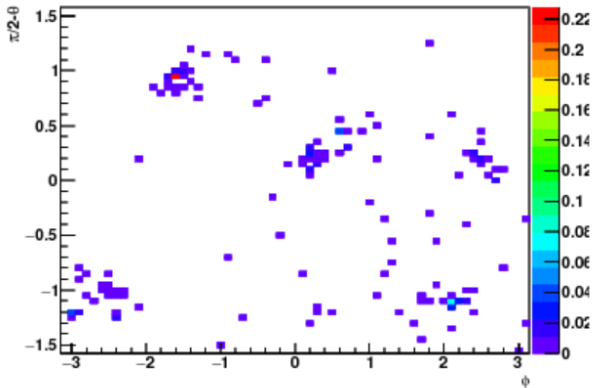
- Start to stay at home...
- Note: Start to include reviewer's comments
 - Writing and checking some plots
 - Will discuss with Frank online
 - Creating some materials
- Start to use keras & tensorflow backend
 - Jet clustering
 - Network training
 - Continue to check BUGS
 - Looks very good... → Very suspicious

Trial

- Create maps of physics variables as input image
- $ZHH \rightarrow (qq)(bb)(bb) \rightarrow (\text{jet})(\text{jet})(\text{jet})(\text{jet})(\text{jet})(\text{jet})$



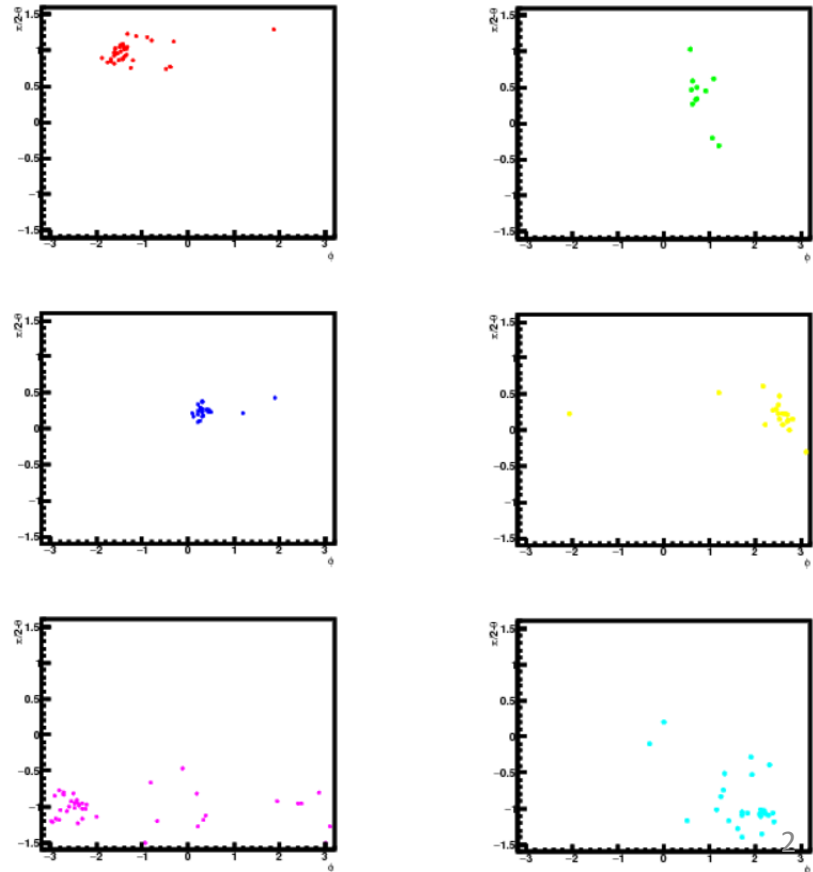
Input(64×64 pixel figure)
e.g.) energy map



ML

Input variables
map of 6 variables
(E, charge, d0, z0, ecal, hcal)

Output(64×64 pixel figure)



Pseudo-labelling

- Output is probability
 - Assign color with highest probability

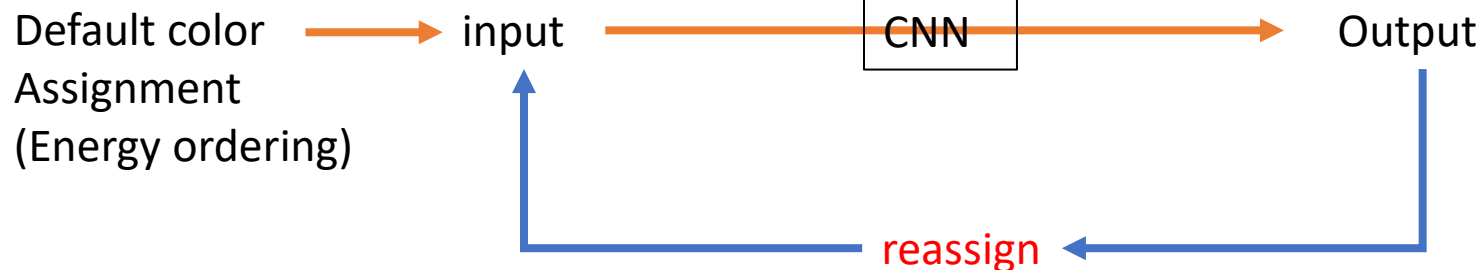
output



- Combination of color assignment is arbitrary
 - So, reassign combination using preliminary output of trained CNN
 - Reassignment is determined with minimum loss function (cross-entropy) event by event

$$L = -\frac{1}{N} \sum_{jet} \sum_{track} \text{Log}(y_{track})$$

Start:



Preliminary result

Keras	training	validation	test
Accuracy	0.9952	0.9980	0.9989

- ZHH → qqbbbb
- Test: 1000 events

- Found one bug
 - Initialization of array was something wrong...
- Start to retrain
 - Checked ~97% reached

