每周小结

Weekly Summary

周柏宏

2024年7月5日星期五

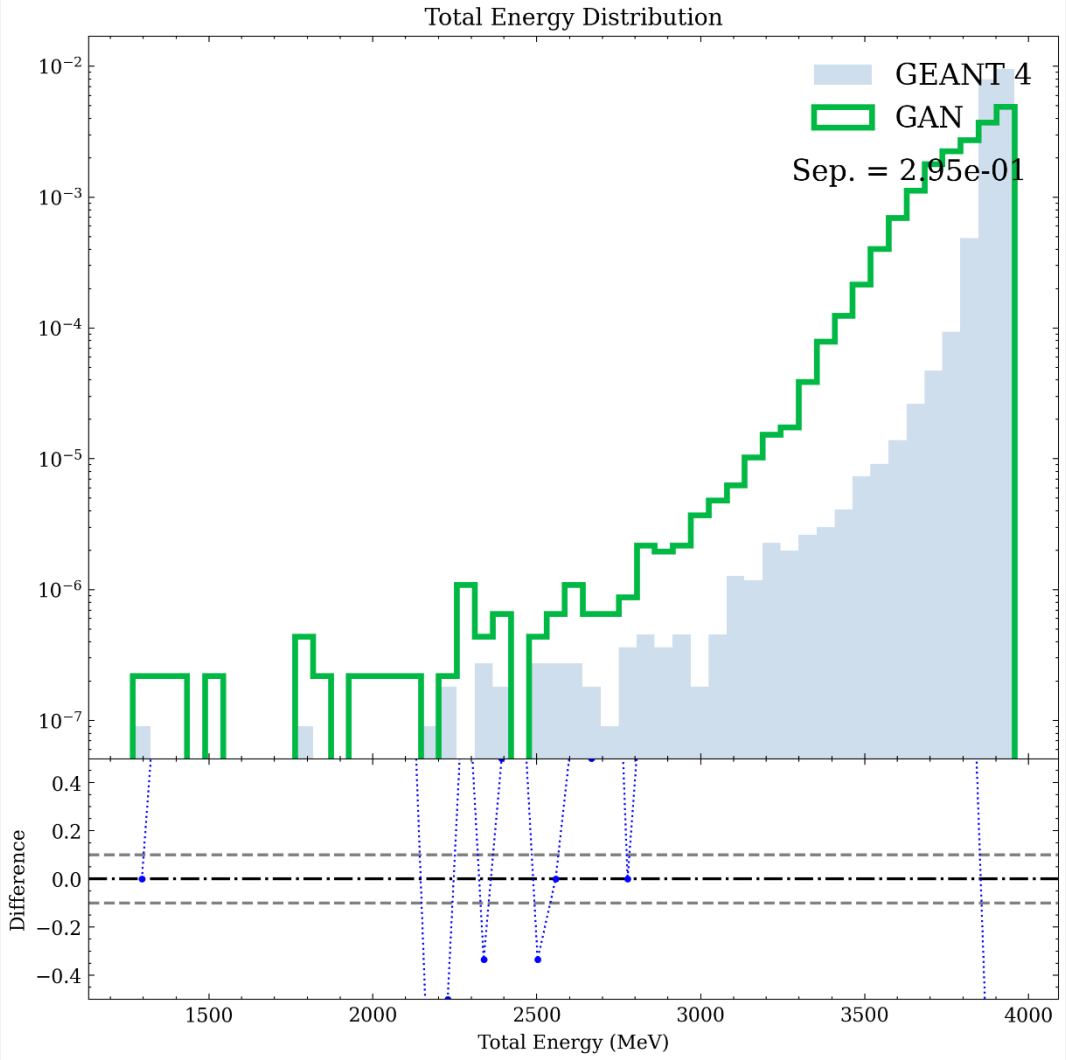
李政道研究所
TSUNG-DAO LEE INSTITUTE

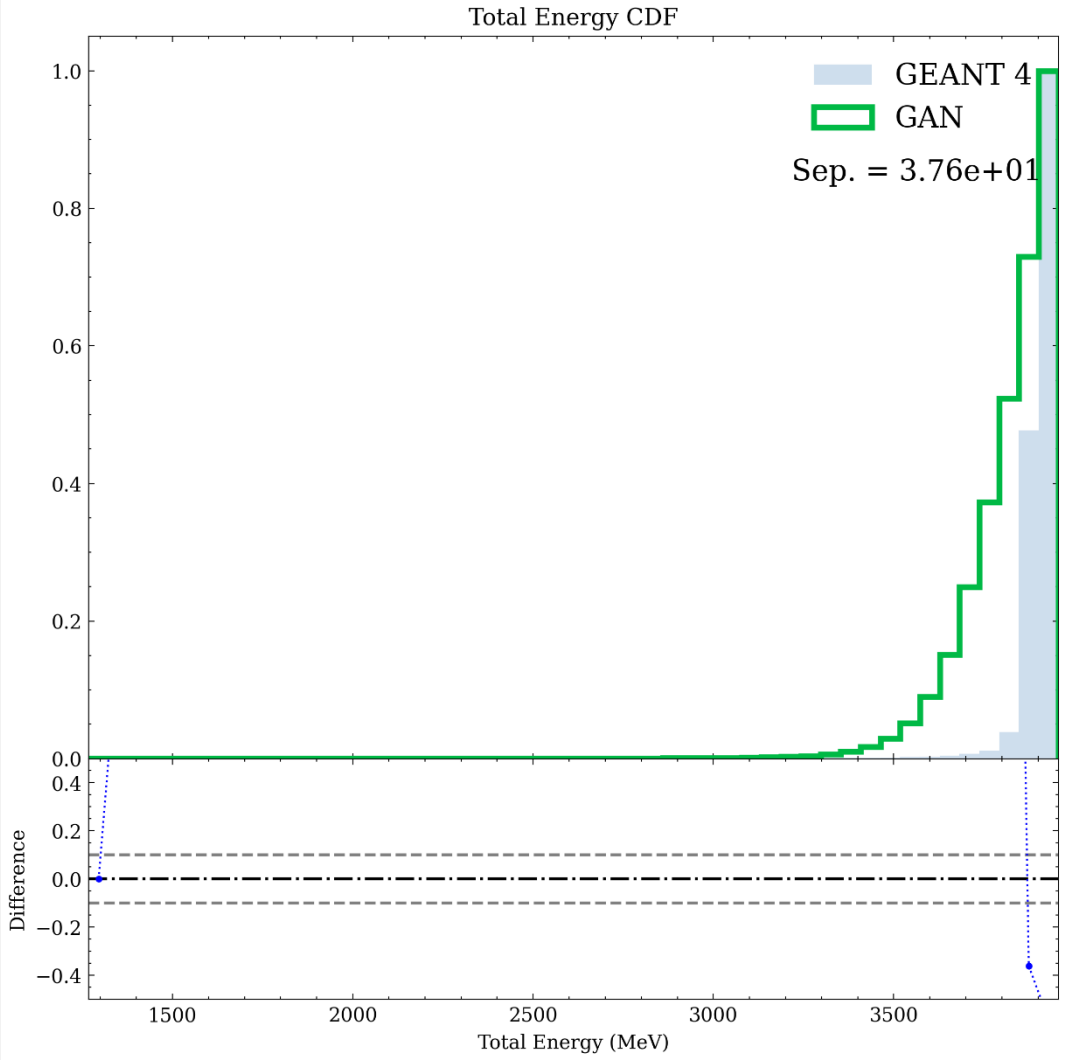
Finished

- **Dark SHINE**
  - Got the Fast Simulation results for 4 GeV inclusive samples using the best model before;

- **Tri Higgs**
  - Produced the Ntuples for ML signal discrimination;
  - Reproduced the Ntuples based on the latest framework;
  - Got the pairing results from Nick;

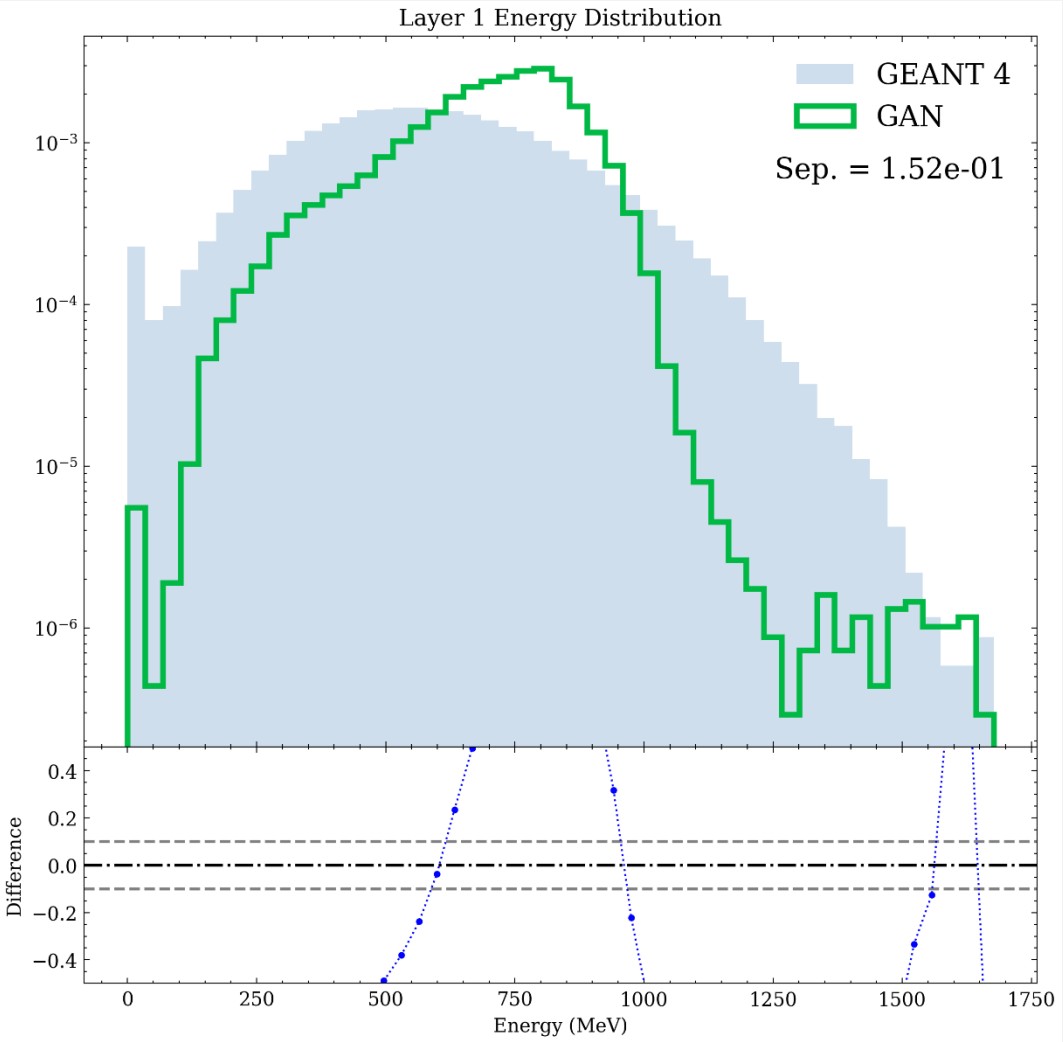
Finished – Dark SHINE – Total E

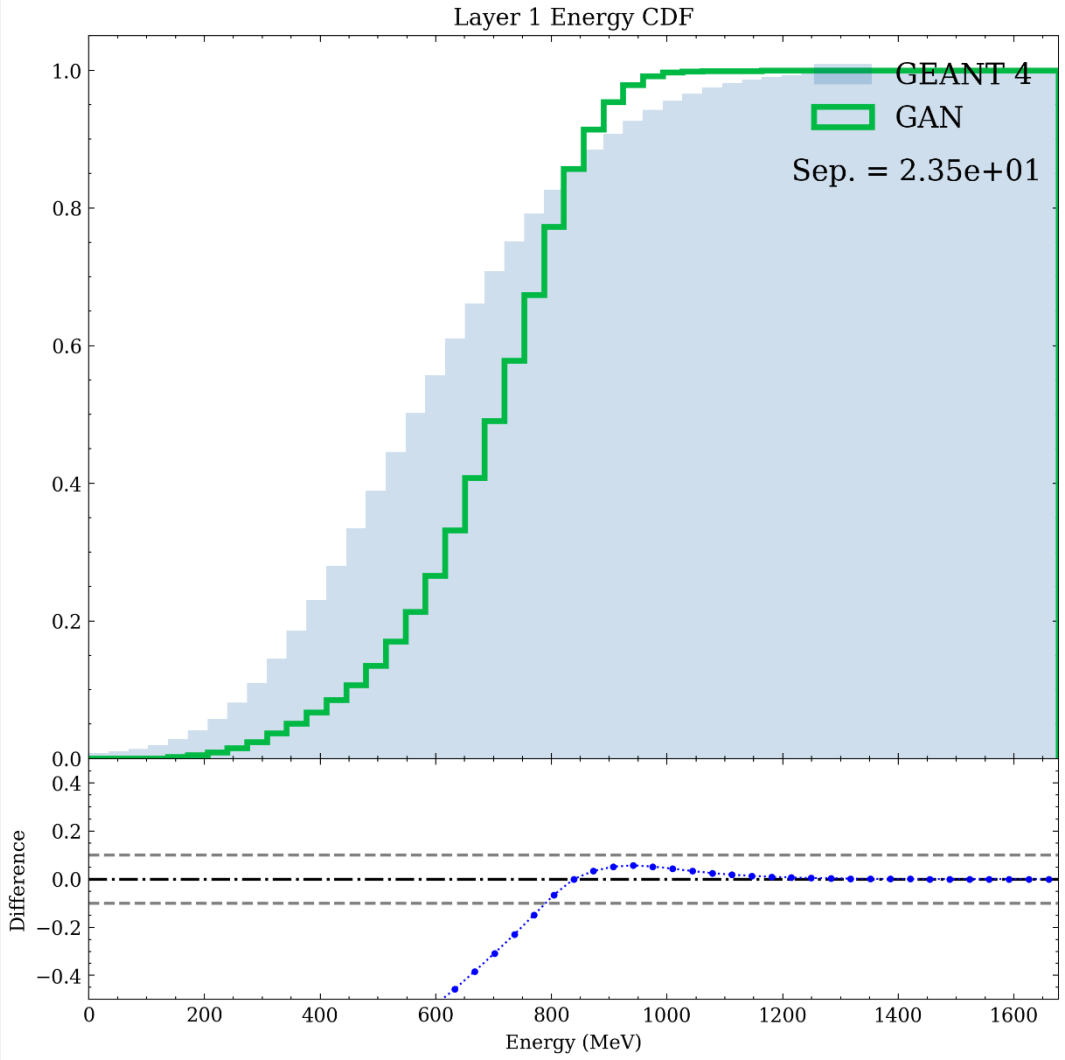




Learned trends but did not learn details

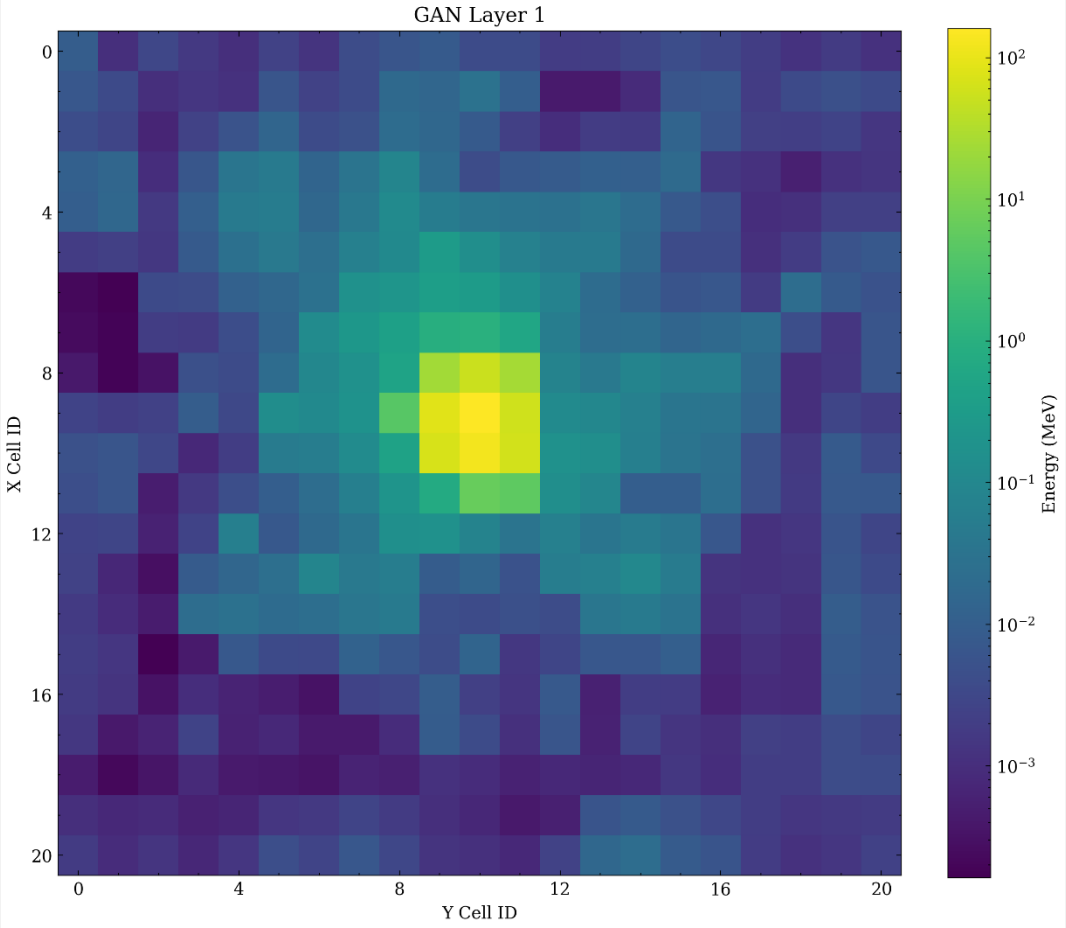
Finished – Dark SHINE – Layer E

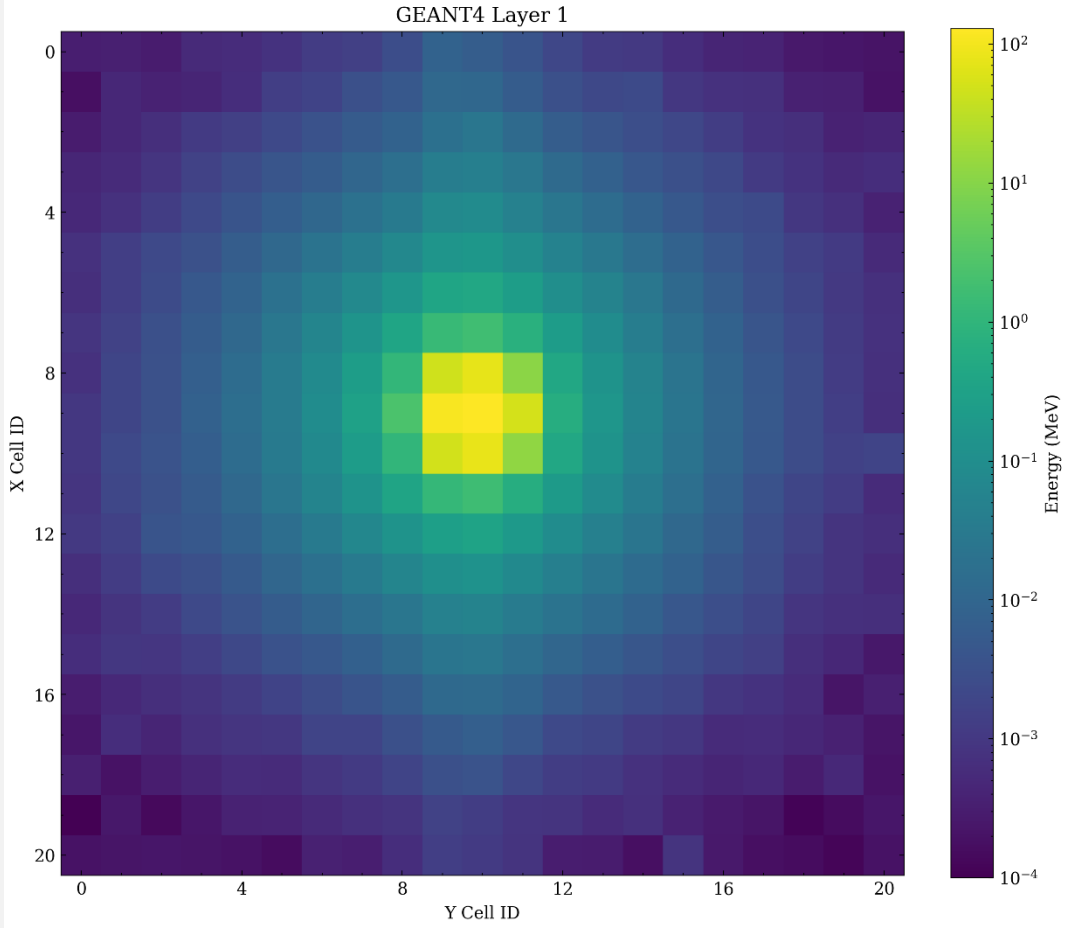




Learned some trends, but the distribution is not reasonable

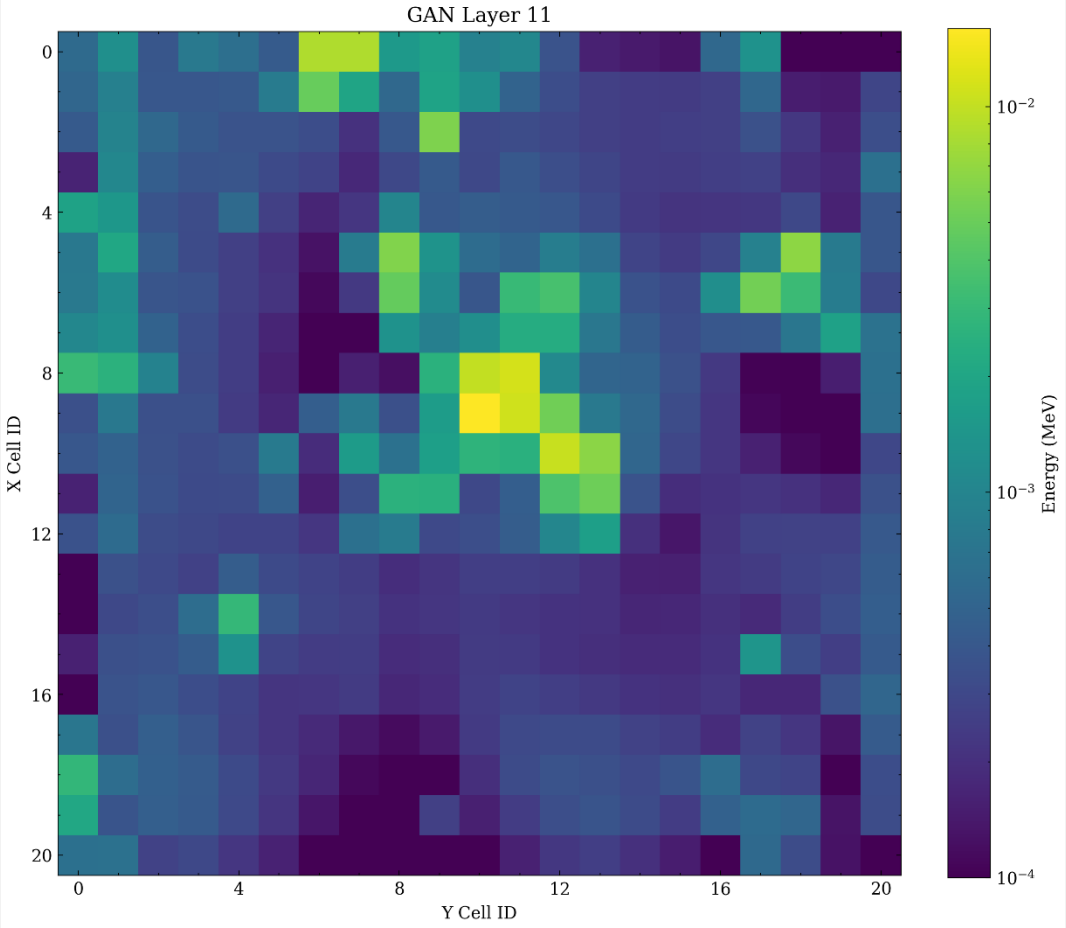
Finished – Dark SHINE – Layer

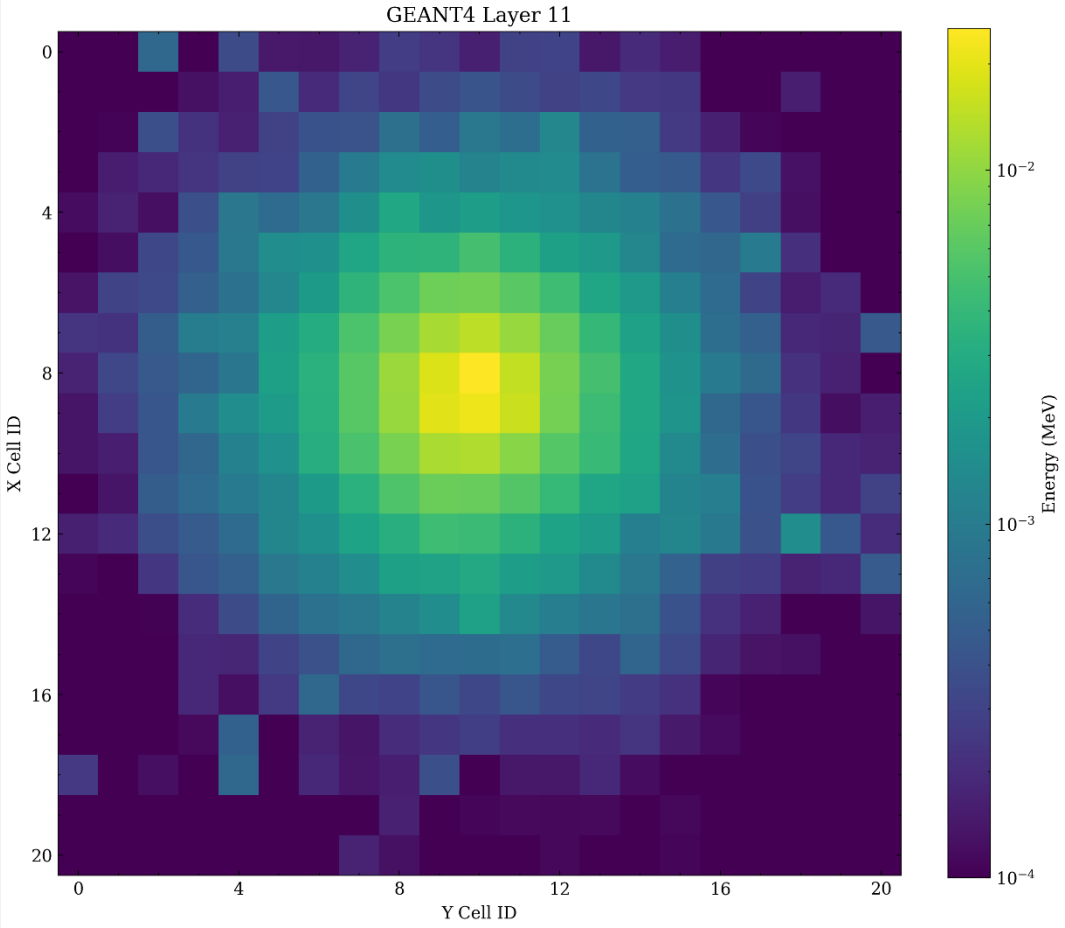




Relatively reasonable deposited energy image

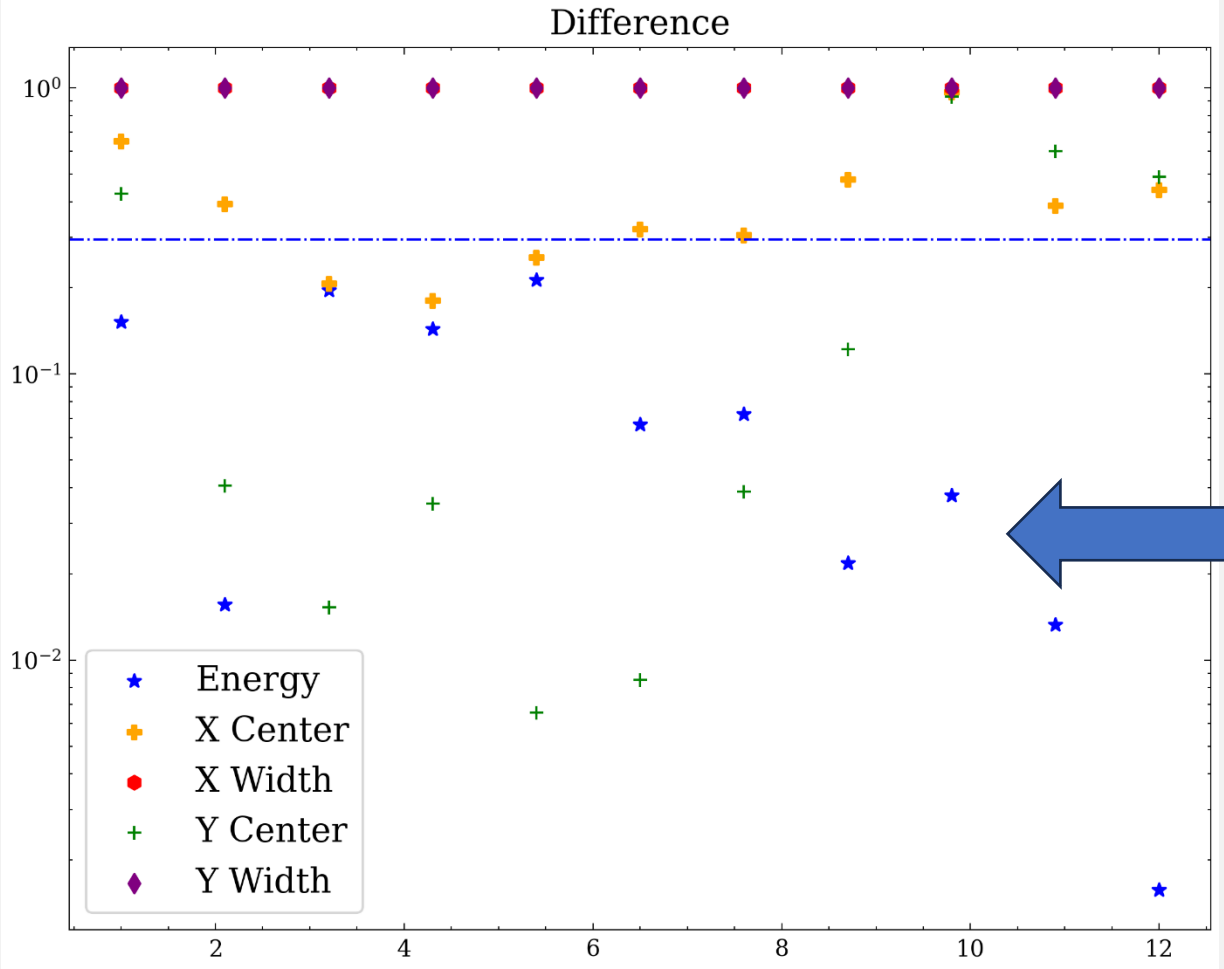
Finished – Dark SHINE – Layer





The first time a relatively reasonable deposited energy image was generated in the last layer

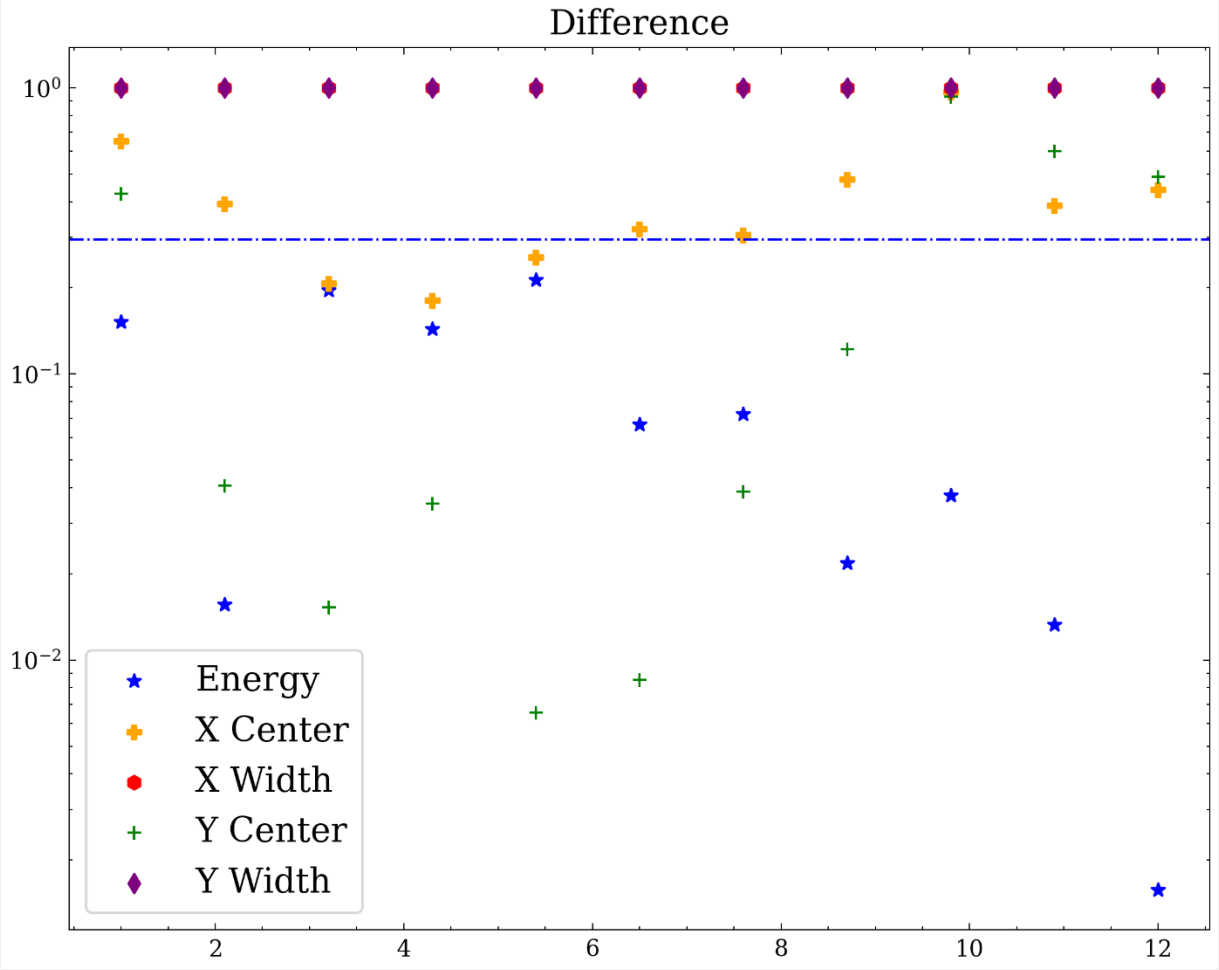
Finished – Evaluation – Summary



Good in each layer energy

Bad in total energy

Finished – Evaluation – Epoch



Epoch : 249

The epoch set before is not suitable for 4 GeV samples

Finished – triHiggs – ML

- **No definitions change in the variables we use in ML;**

Table 6.1: A table summarising the input variables used in resDNN training.

Variable	Definition
rms ~~m_{dijet}~~ ΔR_{dijet}	RMS of ~~masses of~~ the angular separation between all possible dijet combinations can form a Higgs Boson candidate
~~rms~~ Skewness ΔA_{dijet}	~~RMS~~ Skewness of $\cosh(\Delta\eta_{ij}) - \cos(\Delta\phi_{ij})$, where i, j are all possible dijet combinations that can form a Higgs Boson candidate
$H_{T_{6jets}}$	Scalar sum of the p_{T} of the 6 jets selected to reconstruct the 3 Higgs Boson candidates
$m_H \cos\theta$	θ is the angle between the vector of the reconstructed mass of the Higgs Boson candidates in the $m_{H1} - m_{H2} - m_{H3}$ coordinate system and vector formed by the origin to $(m_{H1} - m_{H2} - m_{H3})$ = (120, 115, 110) GeV.
$\mathrm{Aplanarity}_{6jets}$	The fraction of p_{T} ~~of~~ from the 6 jets selected to reconstruct the 3 Higgs Boson candidates ~~outside of a plane~~ lying outside the plane formed by the 2 leading jets.
~~Transverse~~ $\mathrm{Sphericity}_{6jets}$	Isotropy of the momentum of the 6 jets selected to reconstruct the 3 Higgs Boson candidates with respect to the transverse (x,y) plane.
$\eta - m_{HHH}$ fraction	$\frac{\sum_{i,j} 2p_{T_i} * p_{T_j} * (\cosh(\Delta\eta_{ij}) - 1)}{m^2_{HHH}}$ where i, j are all possible dijet combinations that can form a Higgs Boson candidate, and m_{HHH} is the reconstructed tri-Higgs invariant mass
ΔR_{H1}	Angular separation between the 2 jets paired to form the leading Higgs Boson candidate
ΔR_{H2}	Angular separation between the 2 jets paired to form the sub-leading Higgs Boson candidate
ΔR_{H3}	Angular separation between the 2 jets paired to form the least-leading Higgs Boson candidate

Finished – triHiggs – ML

- **How can I make sure the correct partitioning of the training set:**
  - For signal:
    - All the entries are placed in Ntuple by the order of an vector with random number;
  - For background:
    - Just as the order of the entry number;

Finished – triHiggs – New Ntuples produce

- **Change may not be so many:**
  - HHHCommon updates; → Data 18

sources/HHHCommon/config/masterConfig.py +1 −1 View file @ ff5fbd2e

```
@@ -59,7 +59,7 @@ grlsBJets = [
    'GoodRunsLists/data15_13TeV/20170619/data15_13TeV.periodAllYear_DetStatus-v89-pro21-02_Unknown_PHYS_StandardGRL_All_Good_25ns.xml',
    'GoodRunsLists/data16_13TeV/20180129/data16_13TeV.periodAllYear_DetStatus-v89-pro21-01_DQDefects-00-02-04_PHYS_StandardGRL_All_Good_25ns_BjetHLT.xml',
    'GoodRunsLists/data17_13TeV/20180619/data17_13TeV.periodAllYear_DetStatus-v99-pro22-01_Unknown_PHYS_StandardGRL_All_Good_25ns_BjetHLT_Normal2017.xml',
-   'GoodRunsLists/data18_13TeV/20190318/data18_13TeV.periodAllYear_DetStatus-v102-pro22-04_Unknown_PHYS_StandardGRL_All_Good_25ns_Triggerno17e33prim.xml'
+   'GoodRunsLists/data18_13TeV/20200426/data18_13TeV.periodAllYear_DetStatus-v102-pro22-04_PHYS_StandardGRL_All_Good_25ns_BjetHLT.xml'
]

grlsStandard = [
```

  - xAOD updates; → nCPack error;

Plan

- **Dark SHINE**
  - Talk with Qibin about how to use Calo-VQ for Fast Simulation;;

- **Tri-Higgs**
  - Produce the Ntuples based on the latest framework; (521173, 2017-2018)
  - Check our pairing results using the latest Ntuples;
  - Produce the v6 Ntuples for ML;
  - Get cutflow using Nick’s codes;
  - Check with Nick concerning the pairing and the definition of the variables for signal discrimination;

谢 谢！