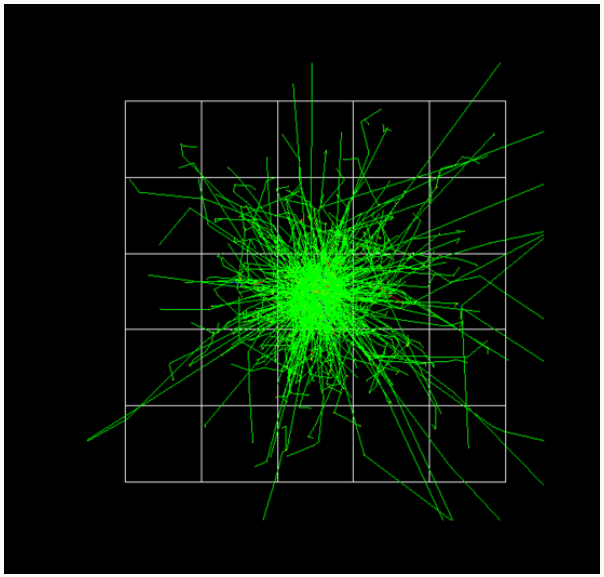
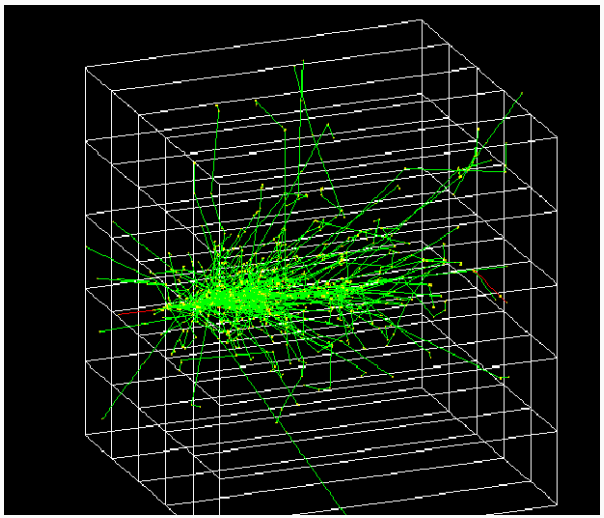
Fast Simulation of Belle II ECL using Deeplearning

Jubna Irakkathil Jabbar, Florian Bernlochner, Pablo Goldenzweig, Jochen Gemmler

01-10-2019

Geant4 Simulation





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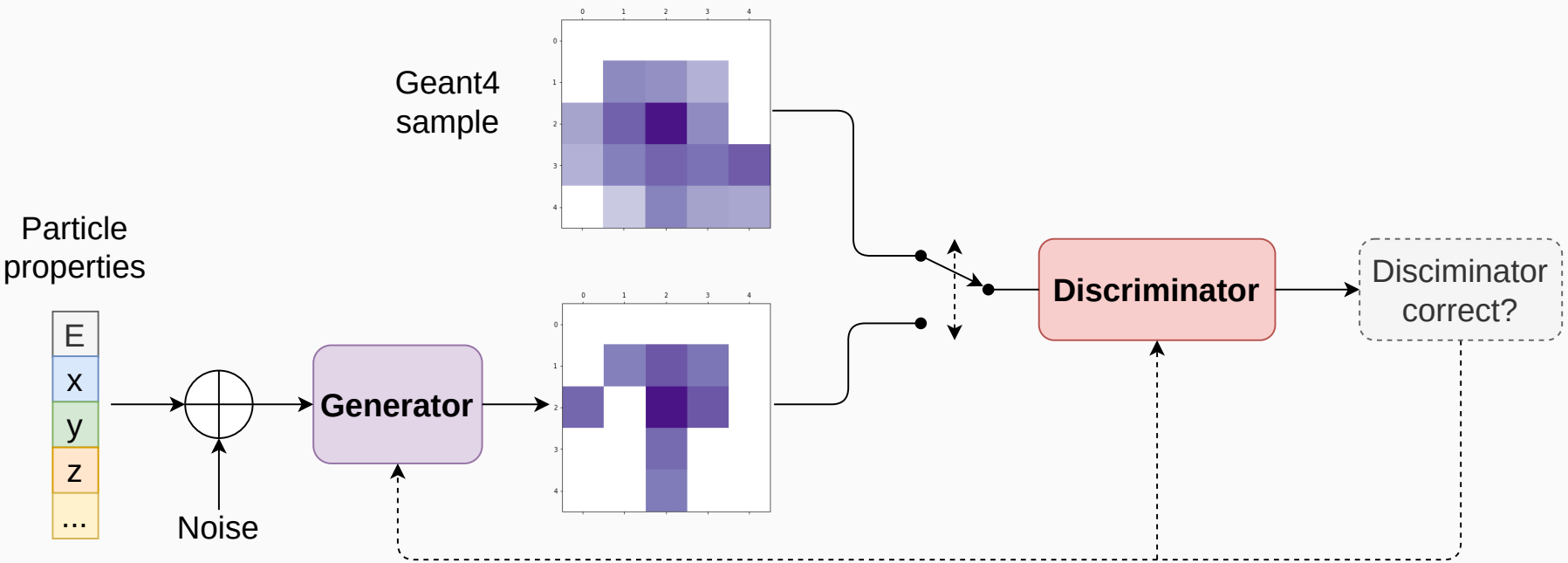
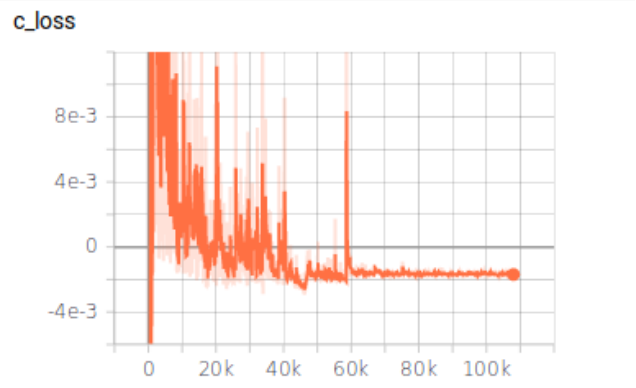
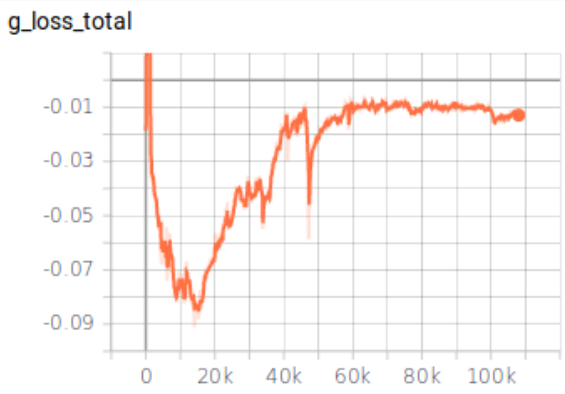
WGAN Model

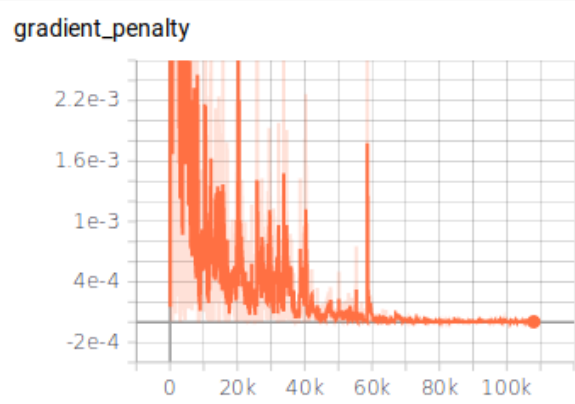

Geant4
sample
Particle
properties
E
x
y
z
...
Noise
Generator
Discriminator
Disciminator
correct?

WGAN Results

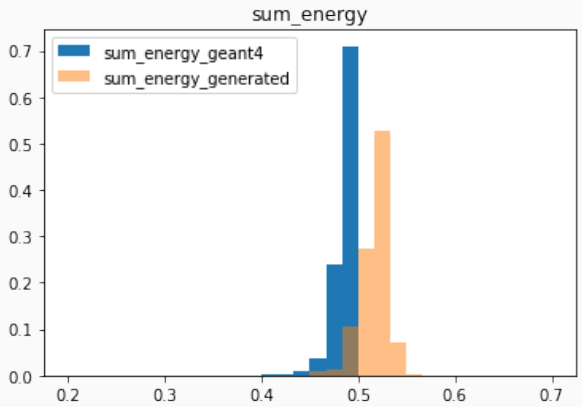
- Inspired from the results from Torben Quast
- ArXiv:1807.01954v1[physics.ins-det]

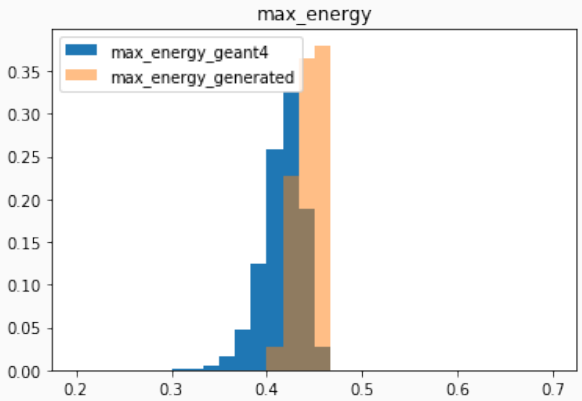


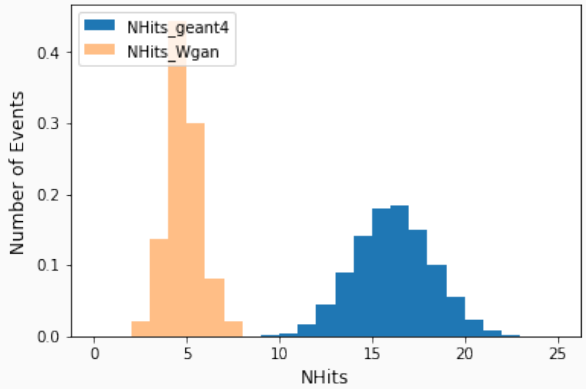


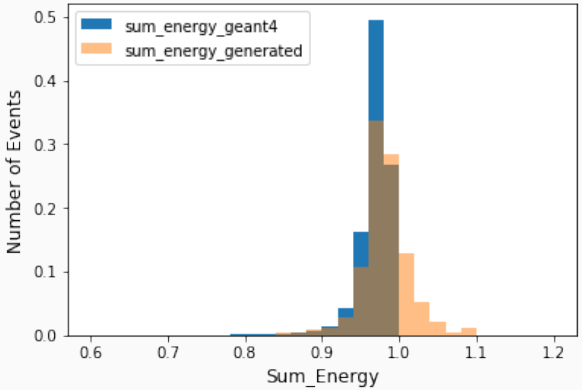


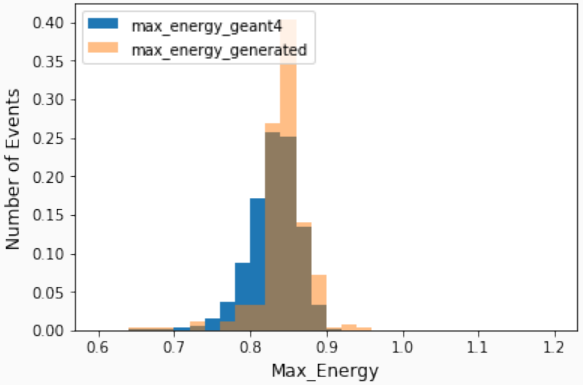
WGAN Results for 0.5 GeV and 1 GeV

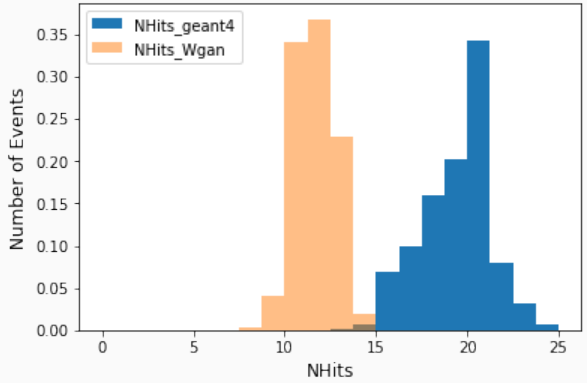




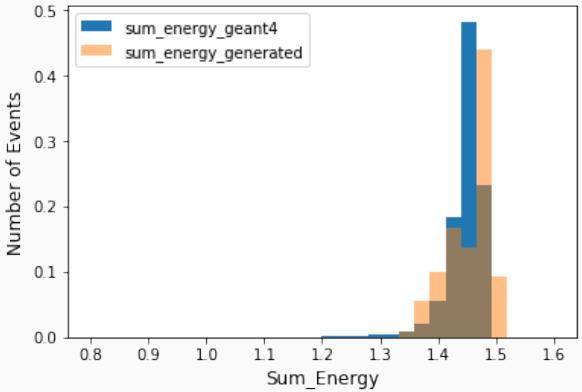


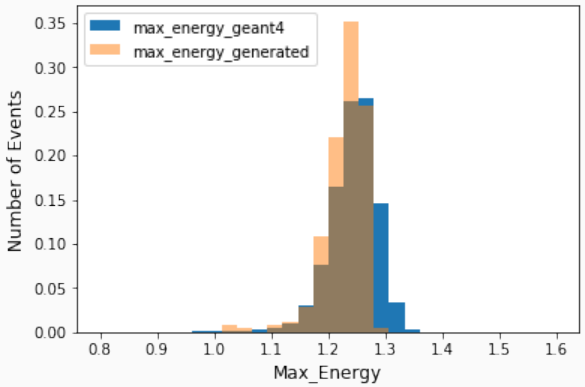


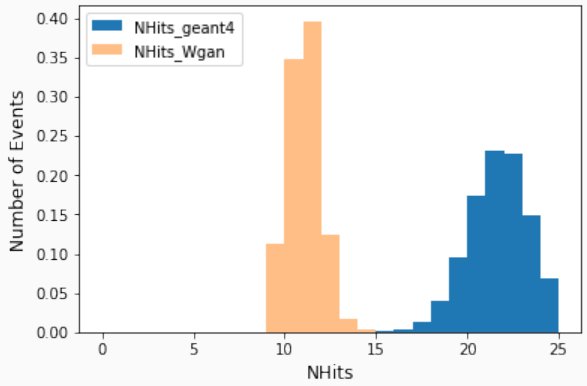


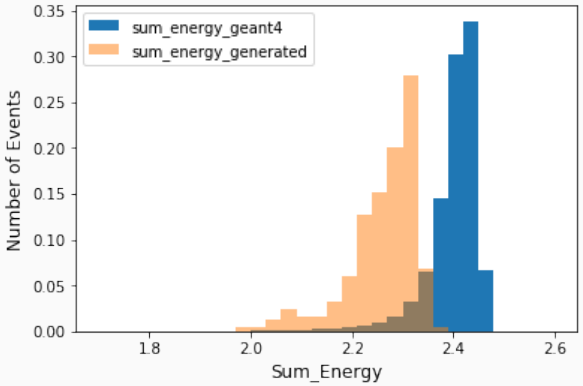


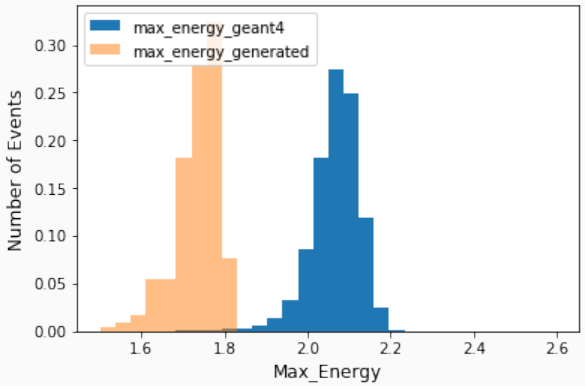
WGAN Results 1.5 GeV and 2.5 GeV

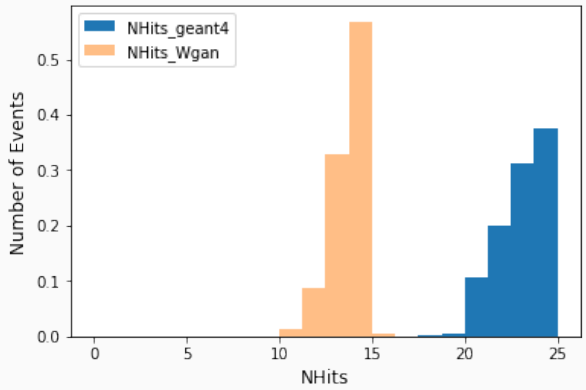




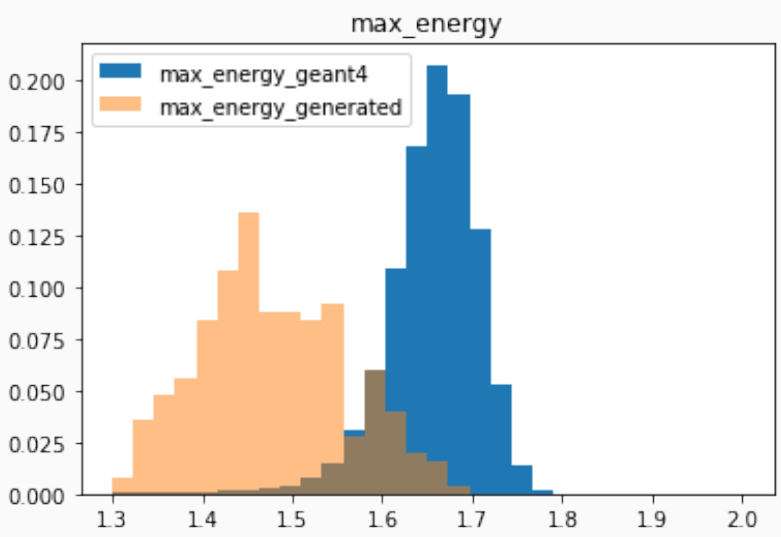


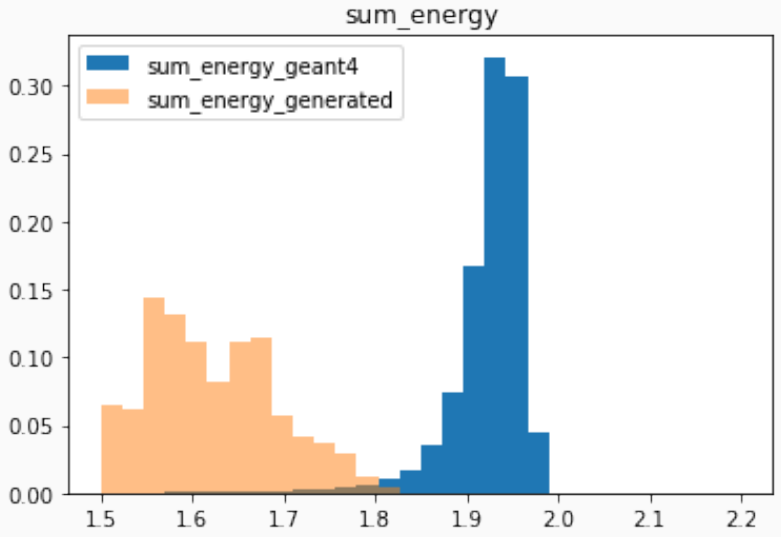




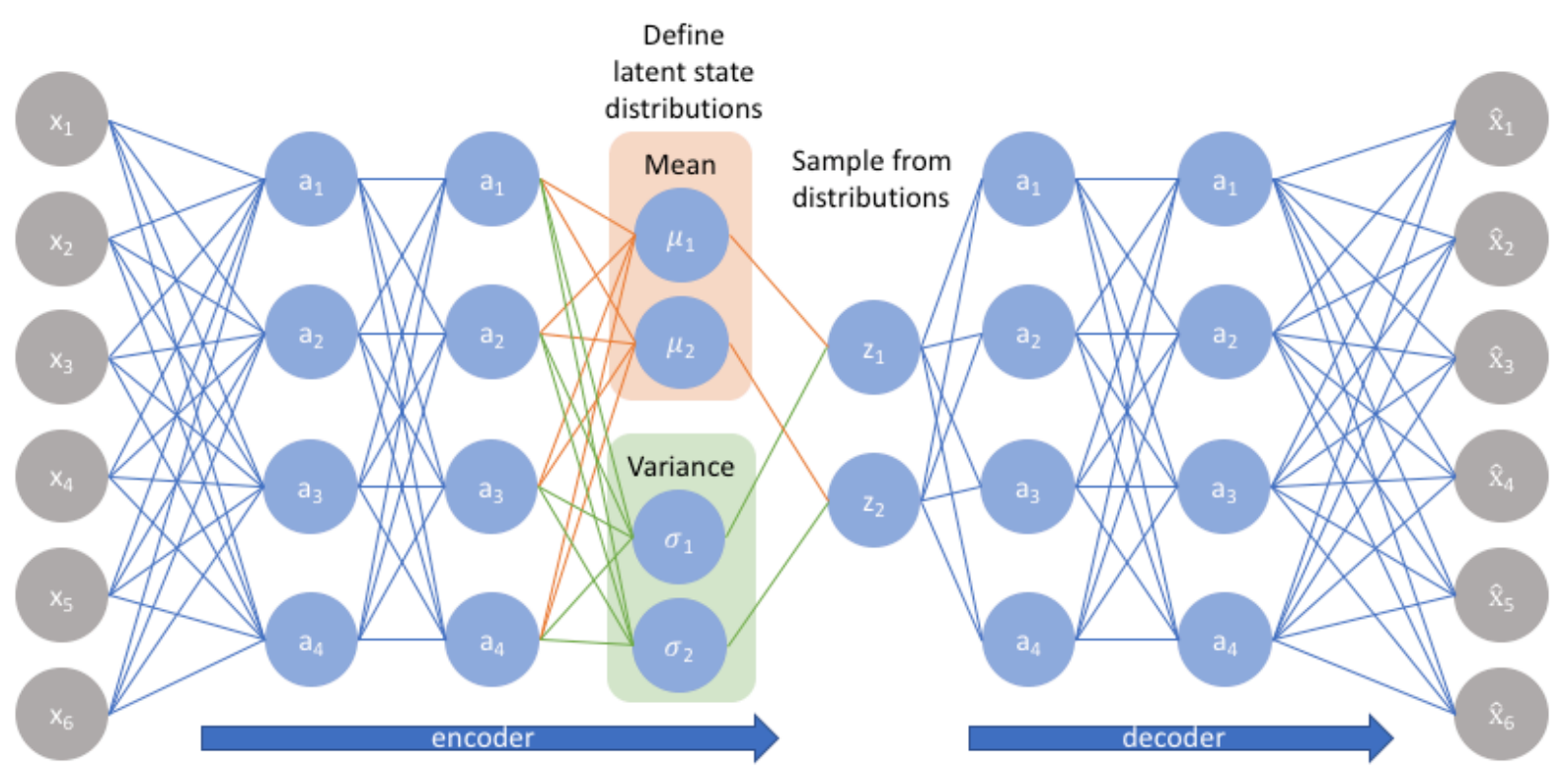


Tried to generate an unseen 2GeV electrons

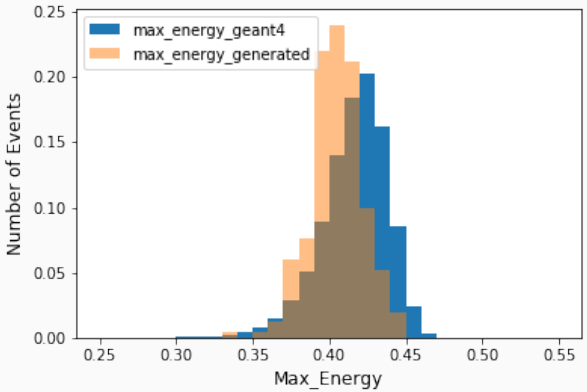


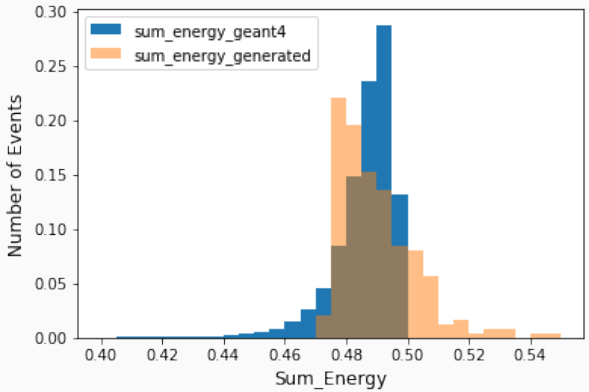


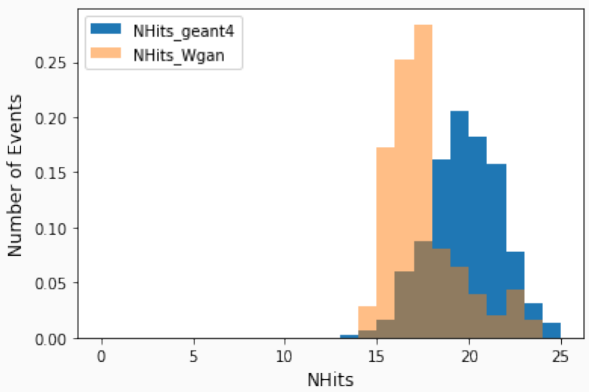
Variational Auto Encoder

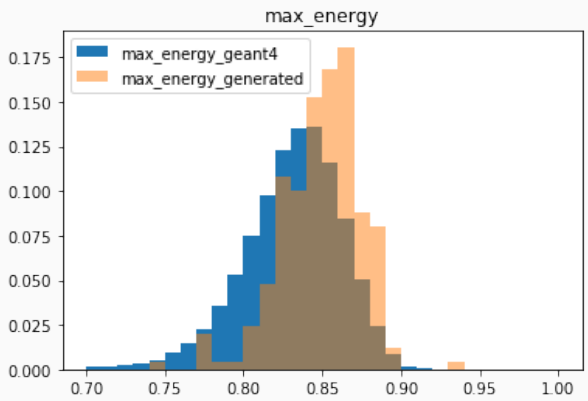


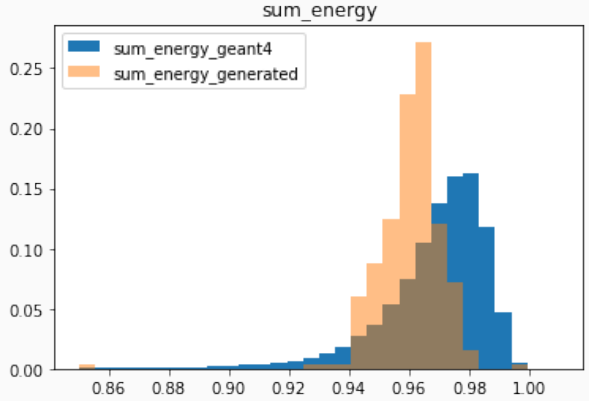
VAE Results 0.5GeV and 1GeV

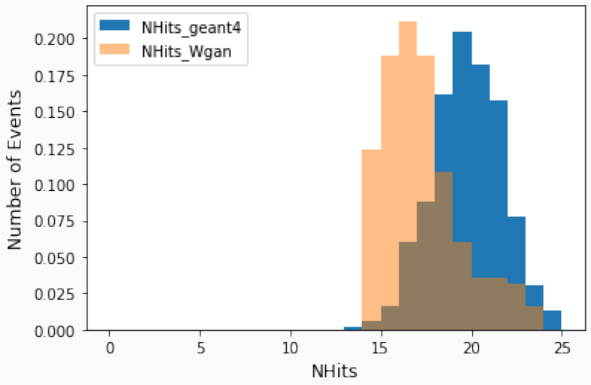




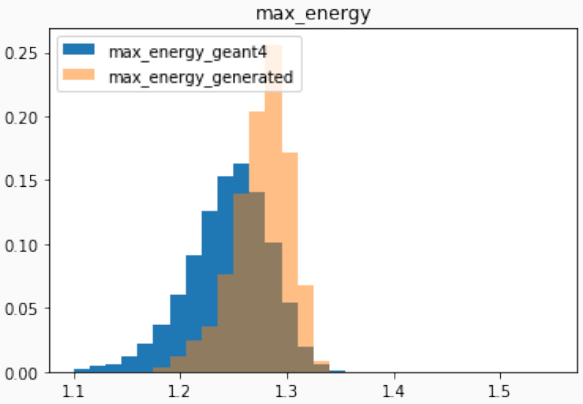


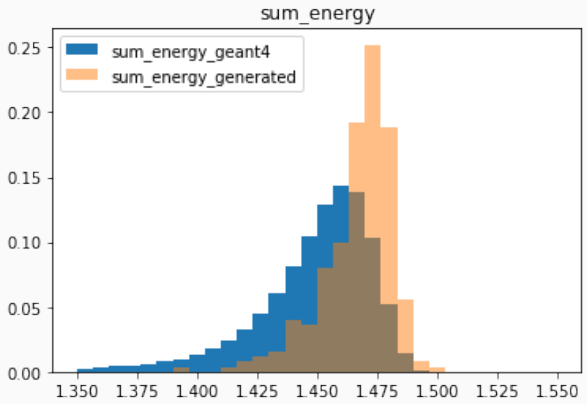


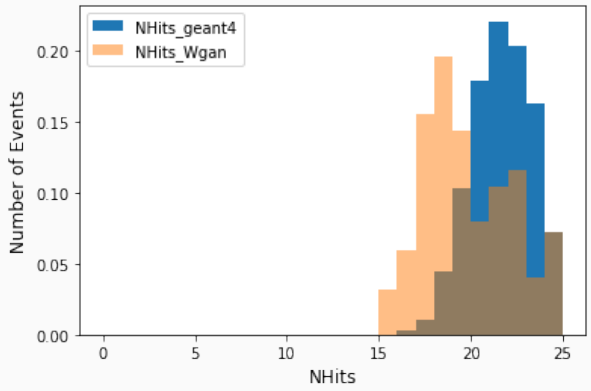


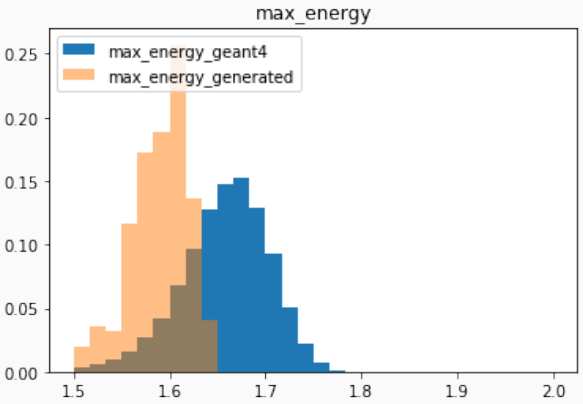


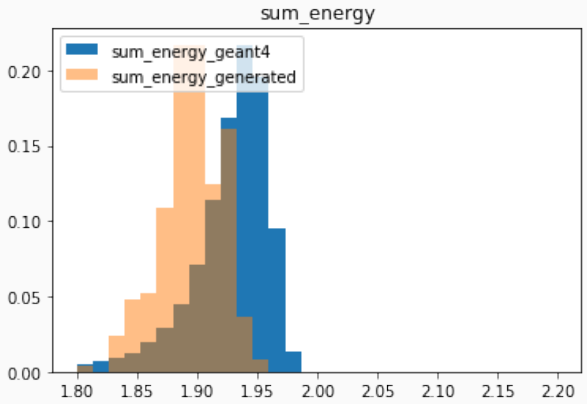
VAE Results 1.5GeV and 2GeV

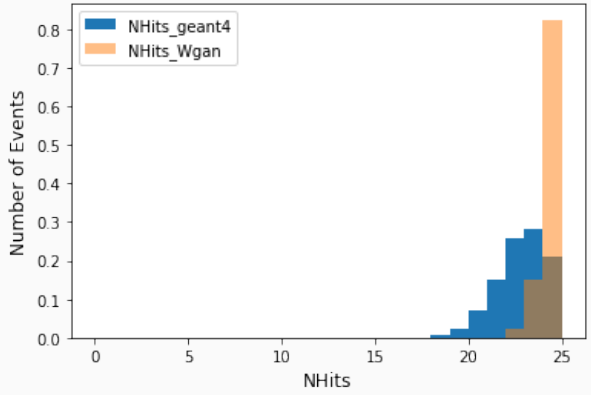




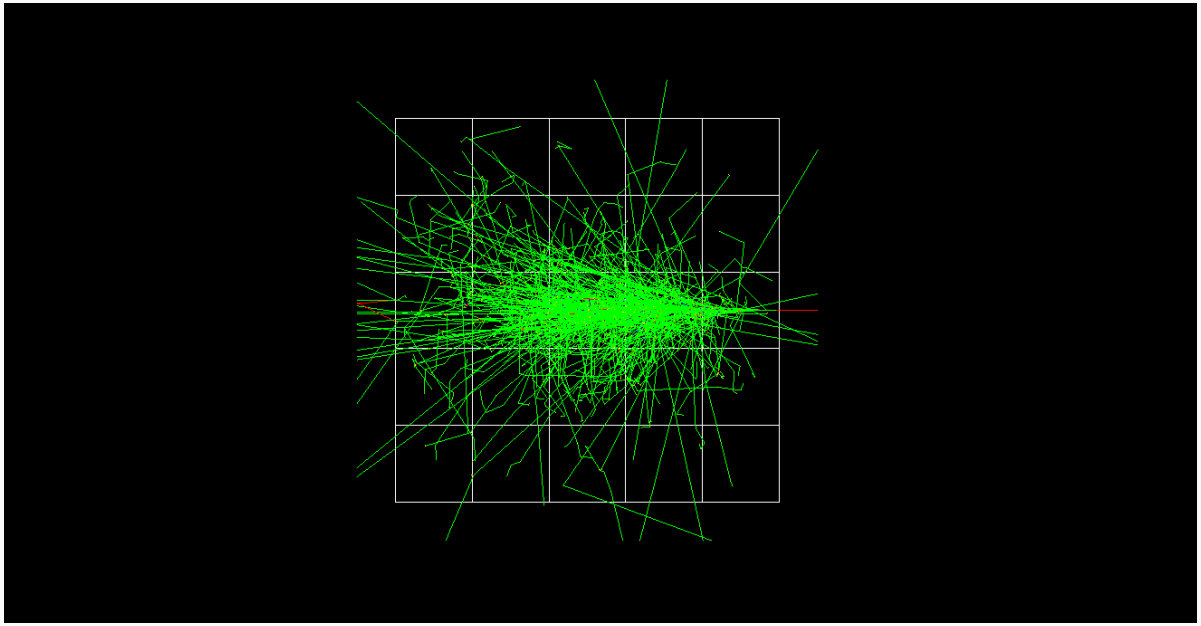






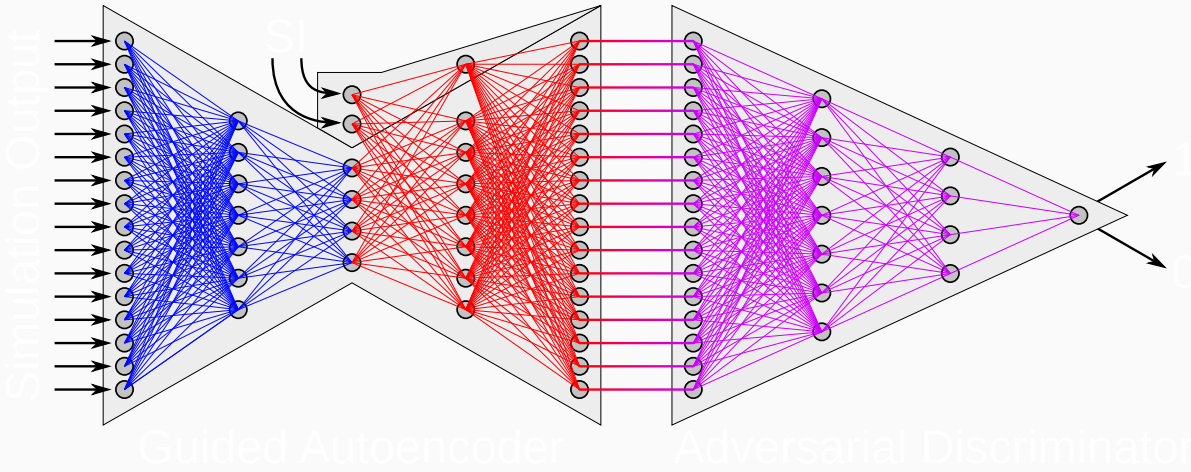


Ongoing Work



- Made bigger data sets of dimention 5x5x5
- Trying to fit them using both WGAN and Variational AutoEncoder.
- Adding Self attention to the network.
- Looking at more variables like clusterE9E25 and correlations between variables.

Works in plan



- Try Graph Network
- Also Try Fish Proposed by Marcel
- Try on different particles like muons and shapes of crystals

Thank You