NN development status

Trg meeting

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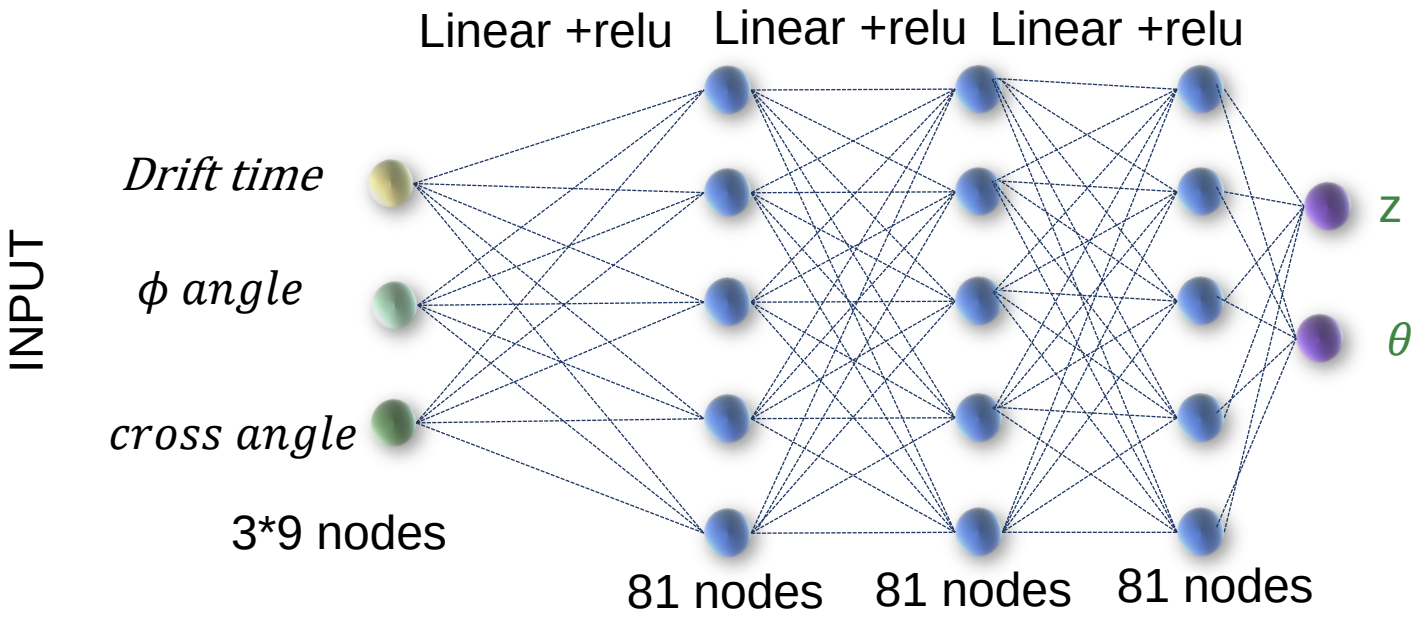
2023/04/12

NN architecture



>A simple 3 hidden layers NN with origin input

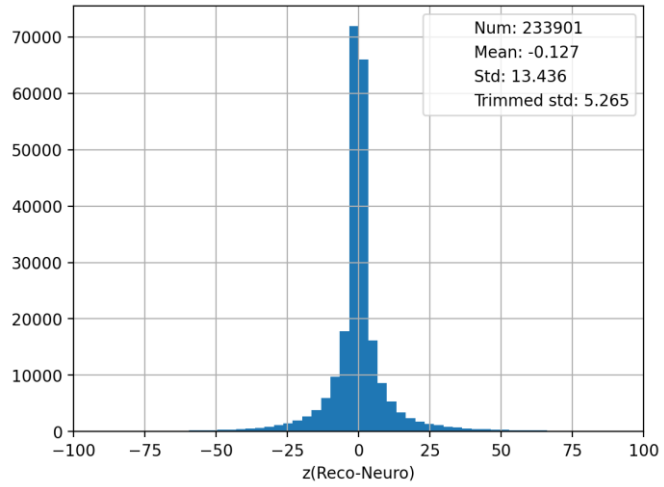
>Using simulated ETF timing

>Train and valid with data from exp26 run 1756-1781, mixed and randomly divided into train set (60%) validation set(30%) test set (10%)

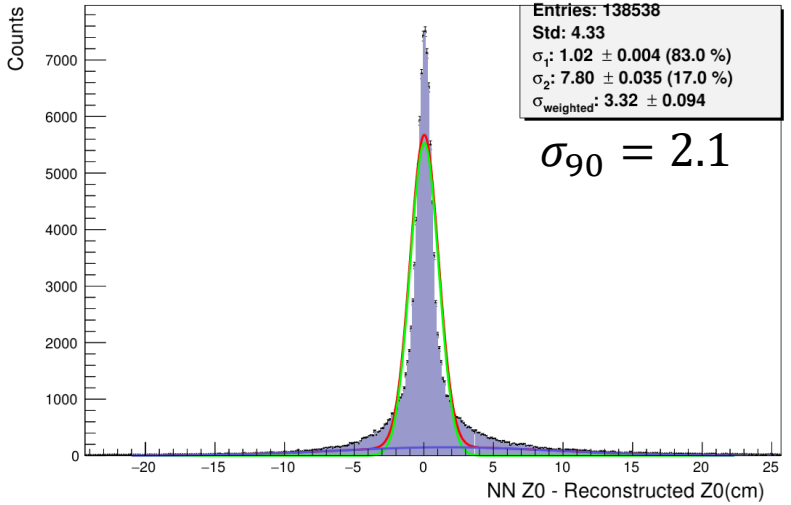
Result comparing with 1 hidden layer case

3 hidden layers

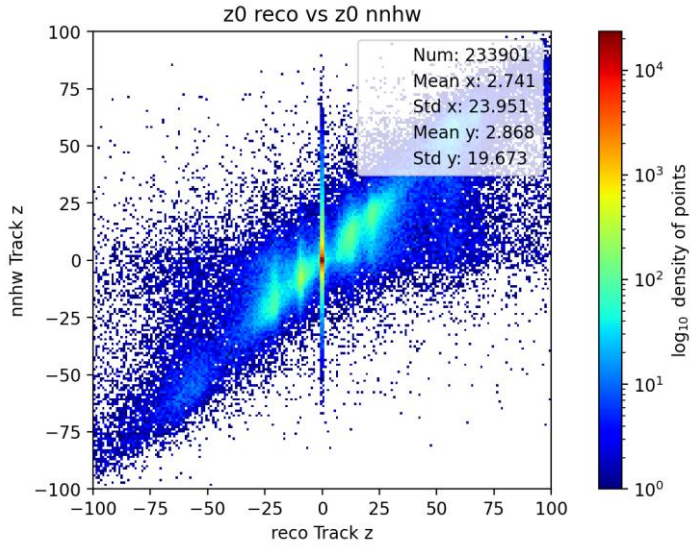
Total resolution



IP resolution

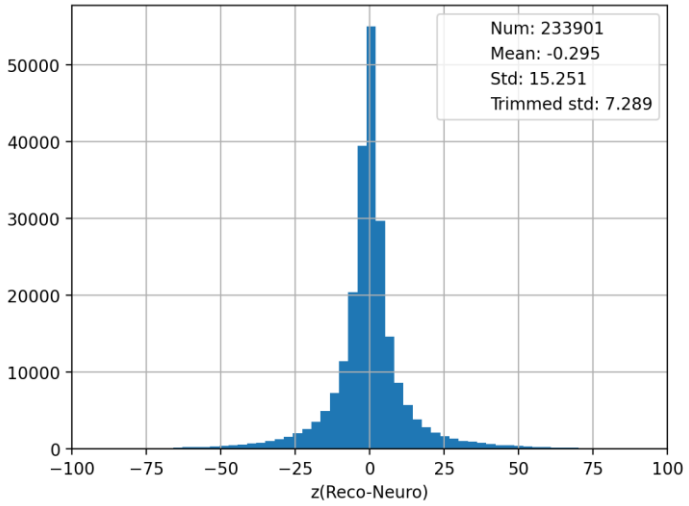


$\sigma_{90} = 2.1$

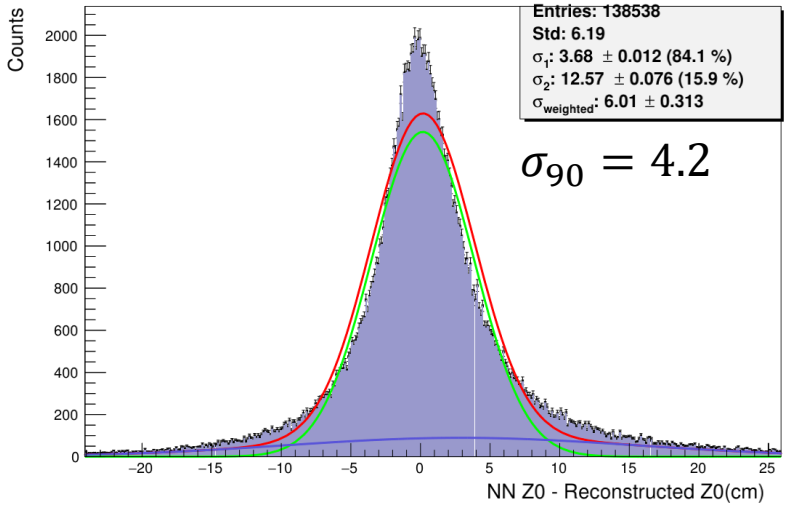


1 hidden layers

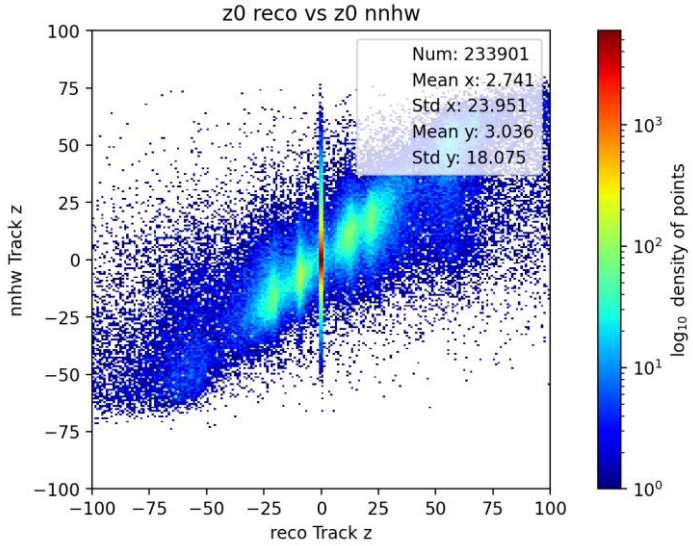
Total resolution



IP resolution



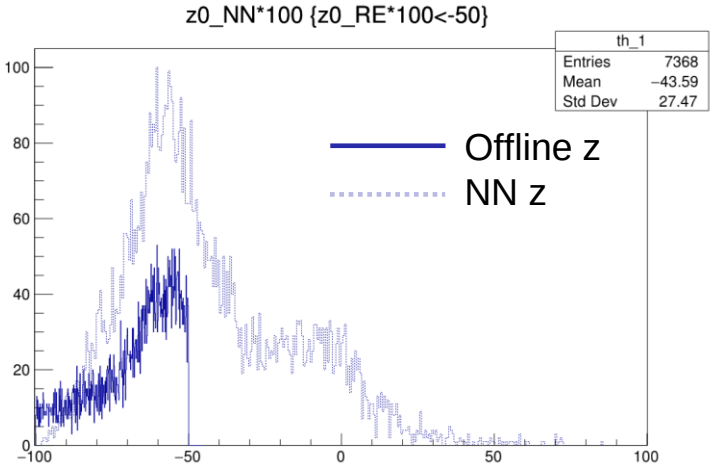
$\sigma_{90} = 4.2$

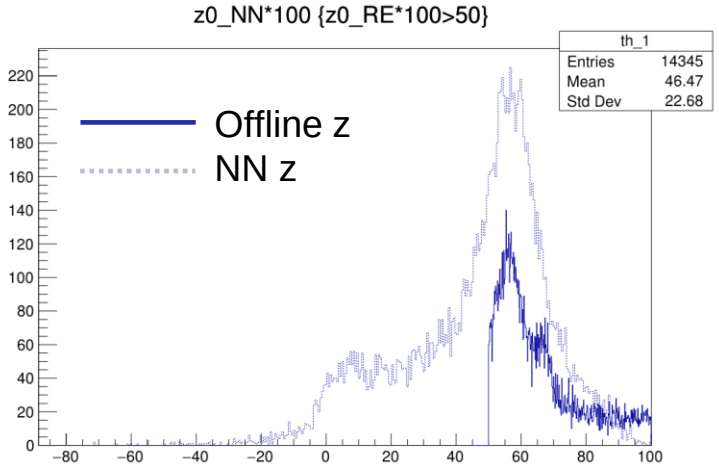


Result comparing with 1 hidden layer case

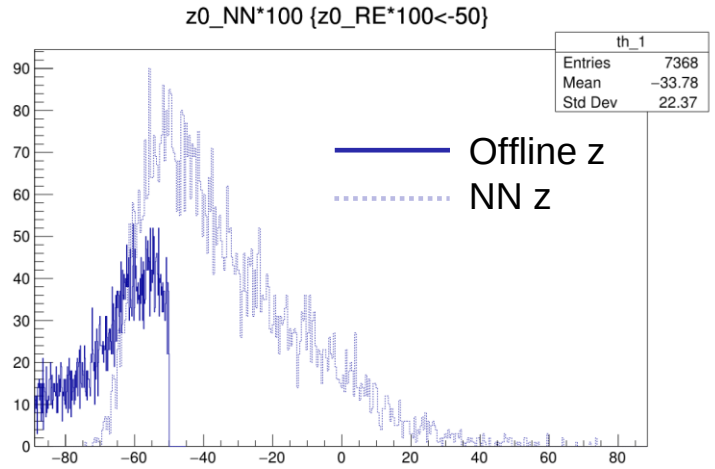
Feed up and Feed down （|z|>50cm）

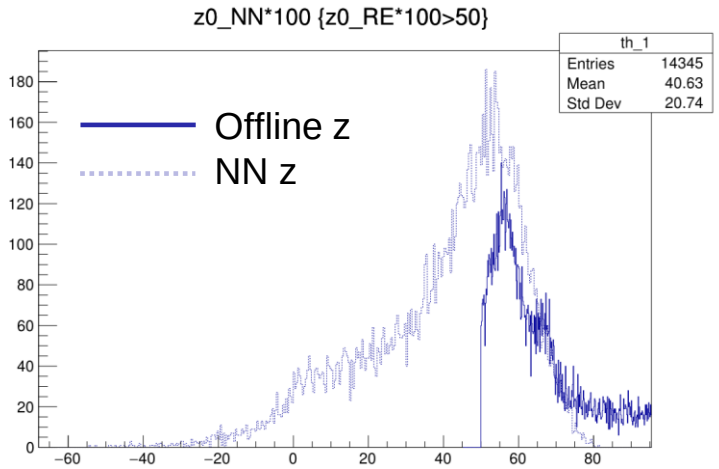
3 hidden layers



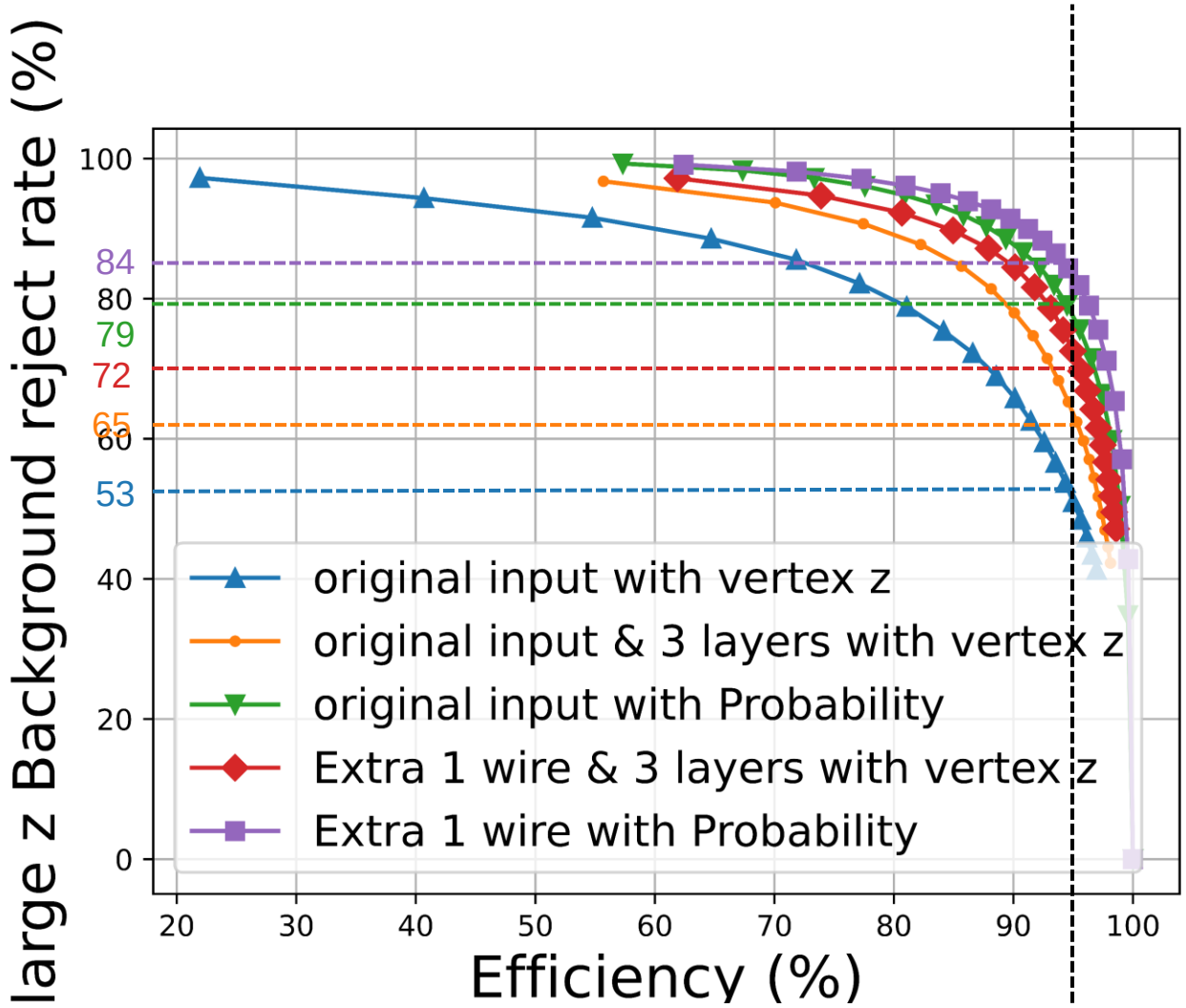


1 hidden layers





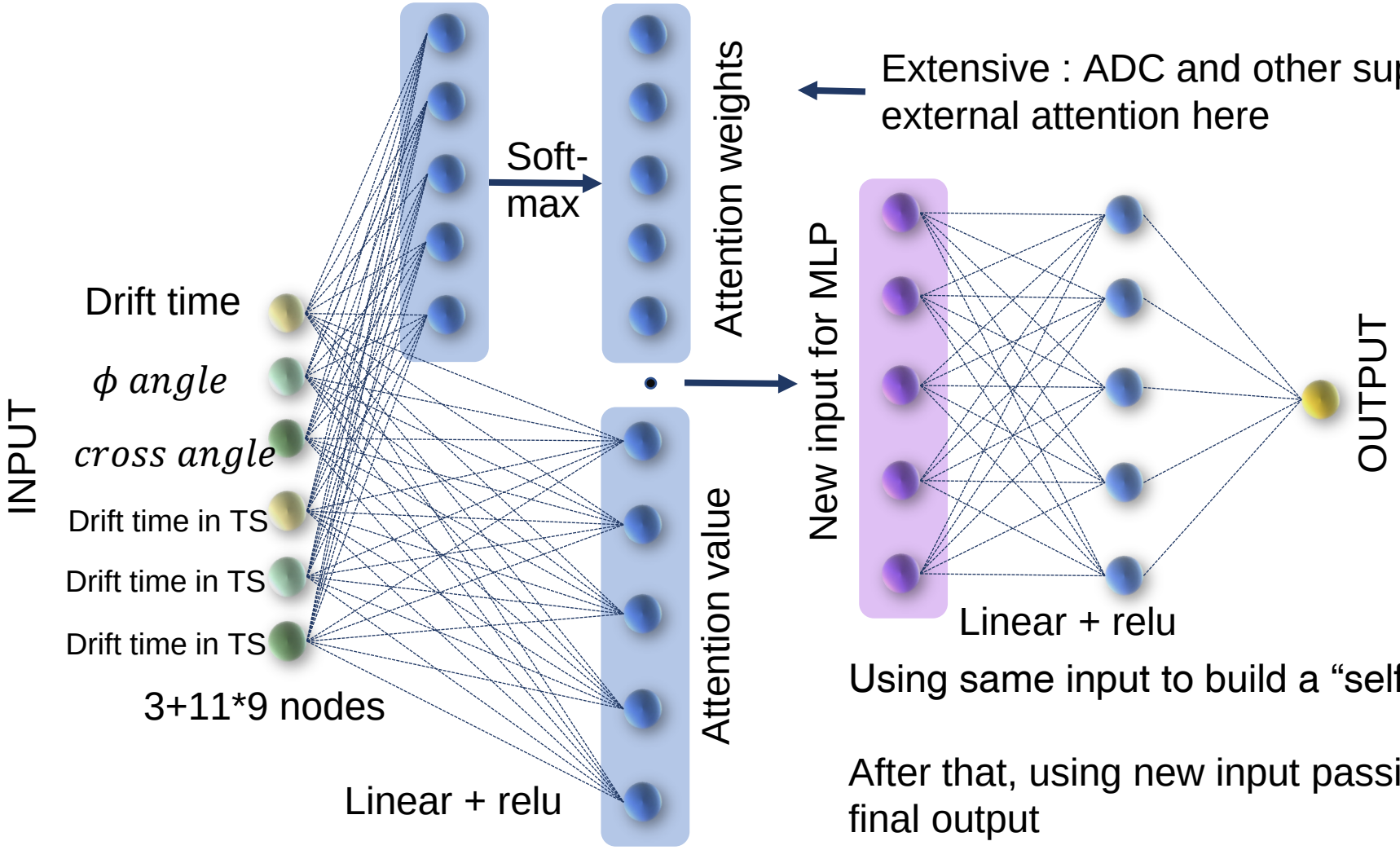
Comparison between different model



Black line:
Efficiency When we apply z cut 15 cm for origin NN

Back UP

New NN architecture: attention based MLP



Extensive : ADC and other support information could used for external attention here

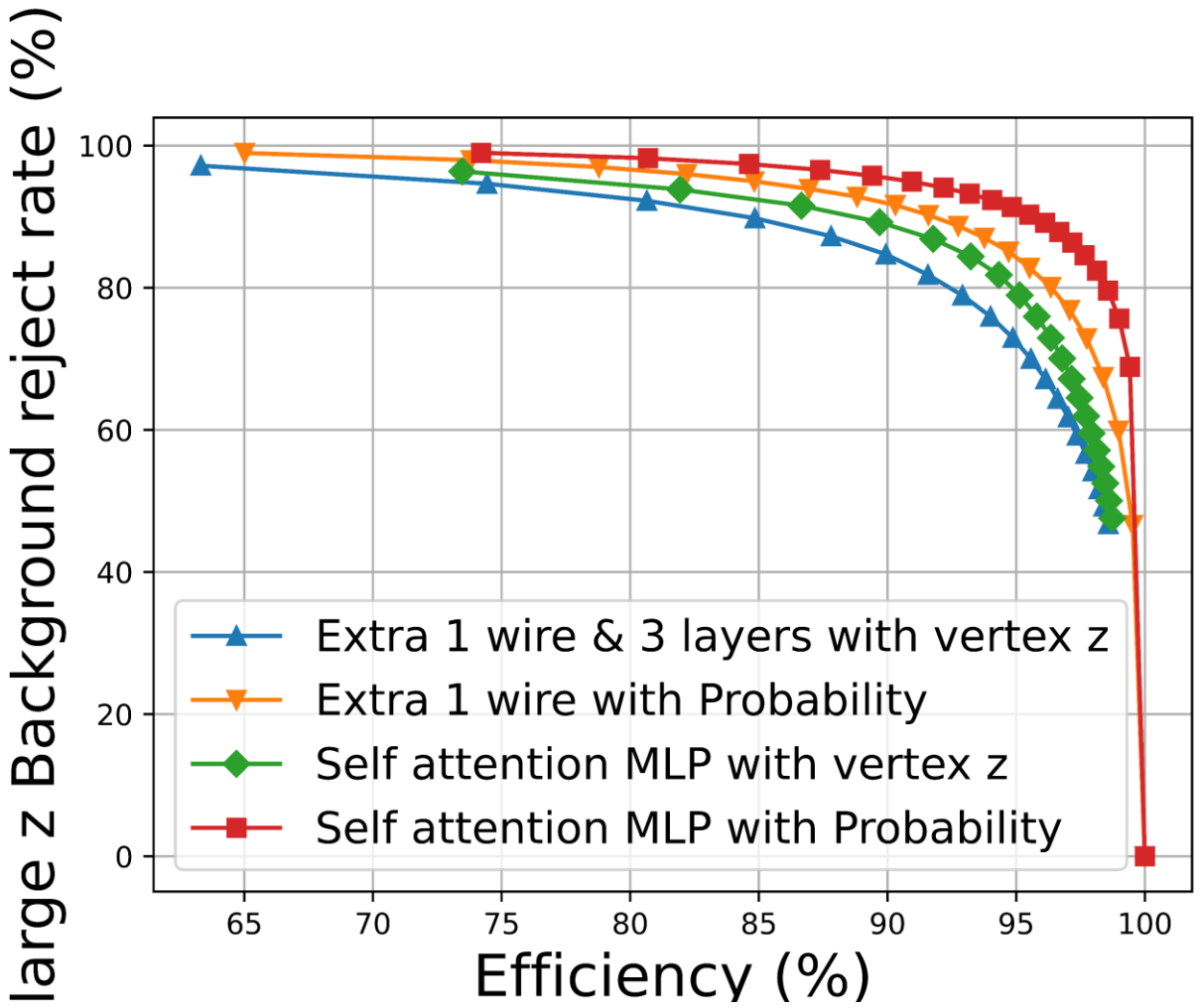
Using same input to build a “self –attention” structure

After that, using new input passing through a MLP to got final output

To keep it possible at FPGA, only three linear layer included

Input array: ϕ, α, t_{drift} and $t_{drift}(1-11)$ $(0-1$ for vaild value and -1 for invalid)

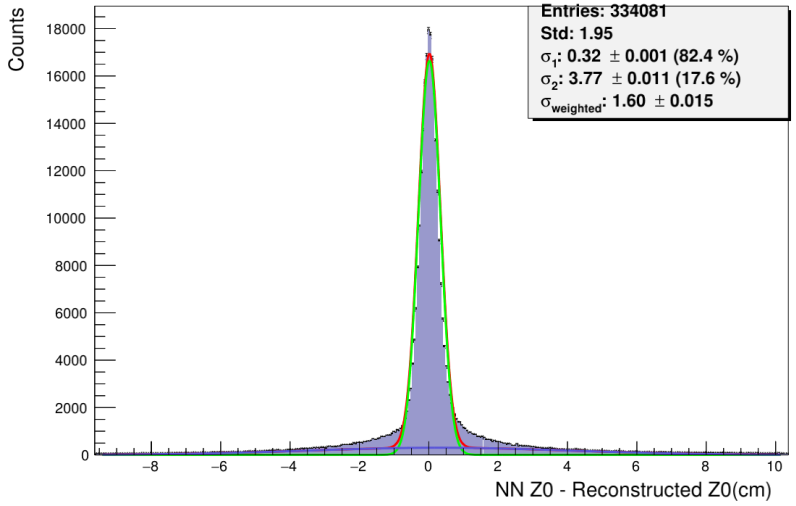
Preliminary result

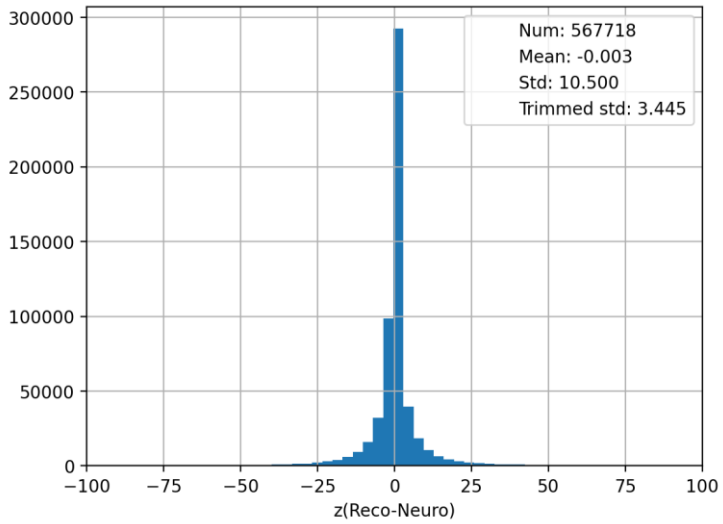


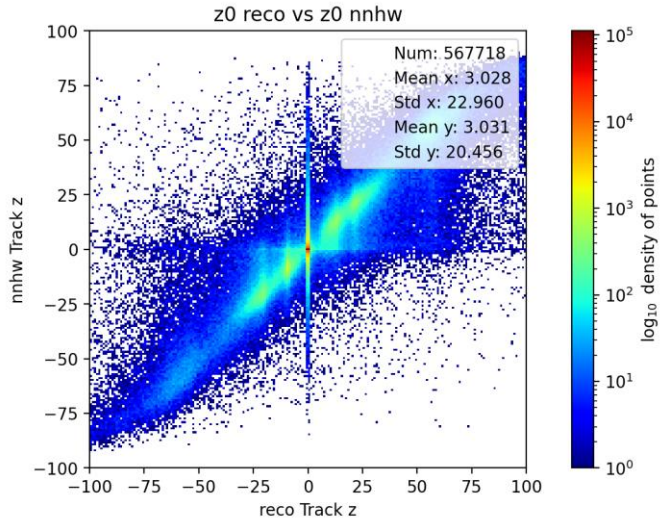
Preliminary result

Training is still ongoing, here I show the result from first 200 epoch

Self attention MLP







Optimized 1 Extra wire 3 hidden layers MLP