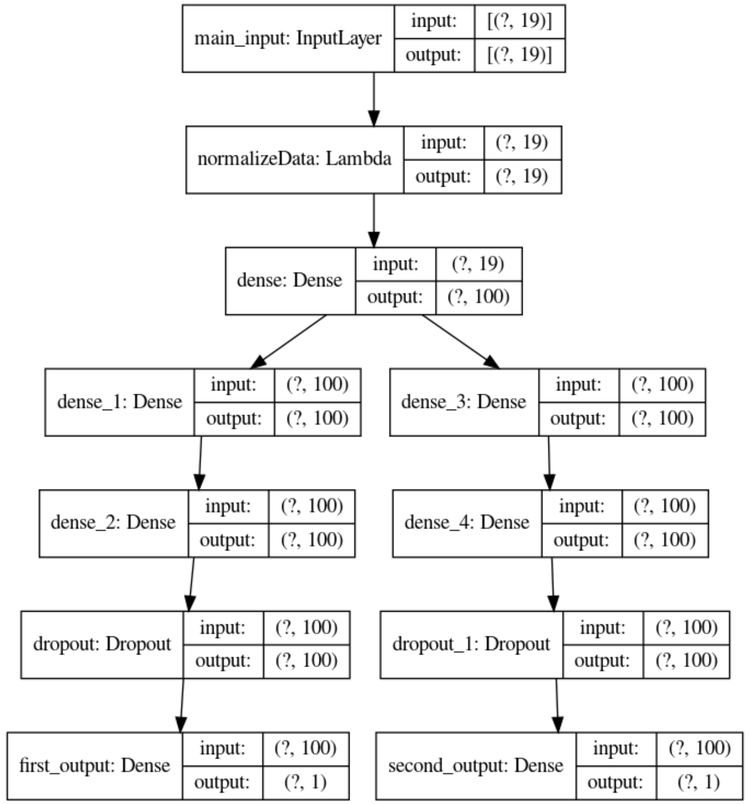
BNL 2020 AC-LGAD Neural Network: 2

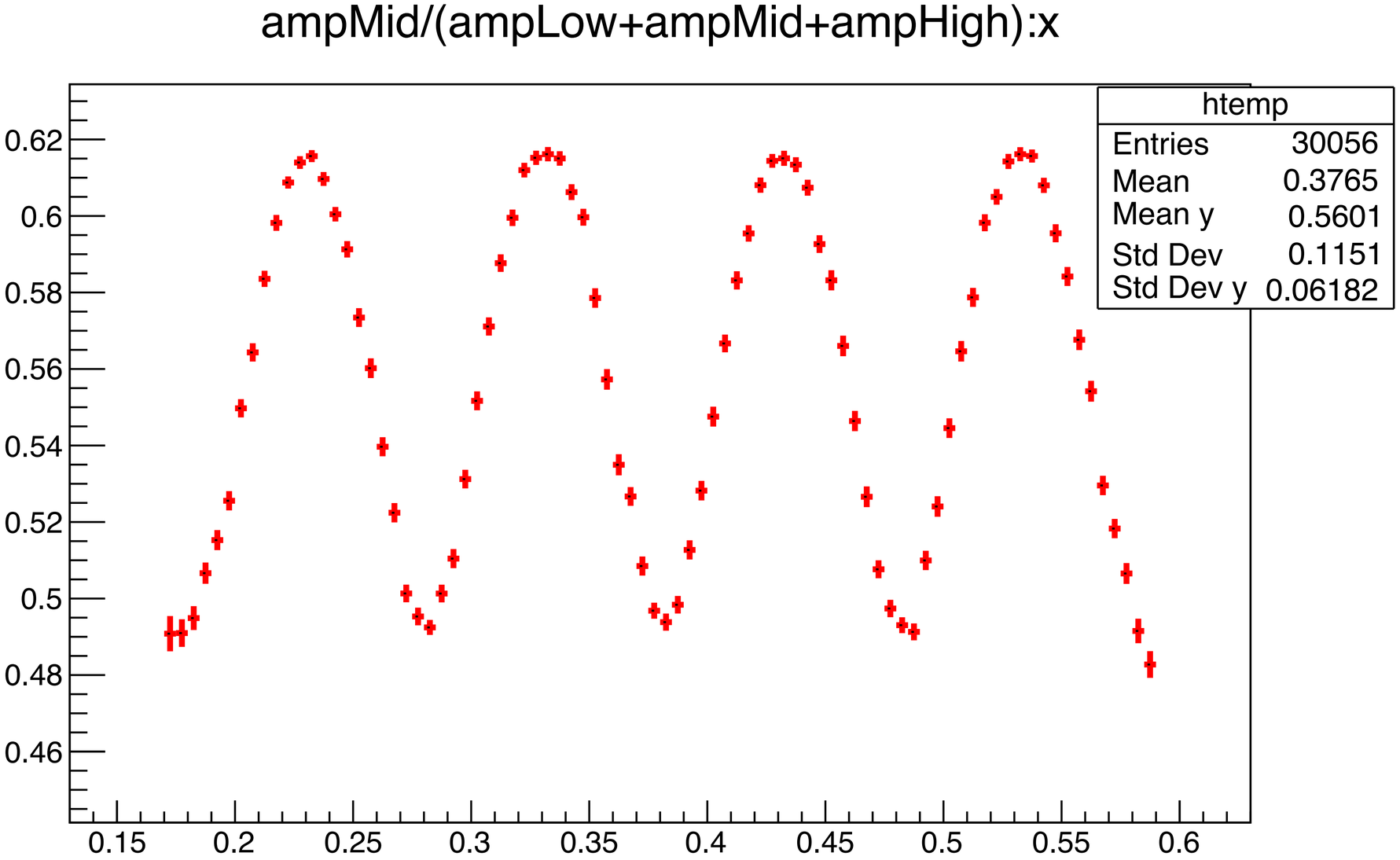
Chris Madrid

NN Setup

- Trained on data BNL 2020 220V data
  - 80% train data (~30669), 10% test data (~3833), and 10% val. data (~3833)
- Selection:
  - ntracks==1 and nplanes>10 and npix>0 and hitSensor
  - amp2-5 > 30 and max amp == amp2-5
  - 0.17 < x < 0.59
- Mean Square Error Loss functions
  - drop_out:0.5, batch_size:5000, epochs:1500, lr:0.001
- Input variables
  - amp1-6, time 1-6, rel. amplitude, ampMax, ampMax left/right, timeMax, and timeMax left/right



New Input Variable



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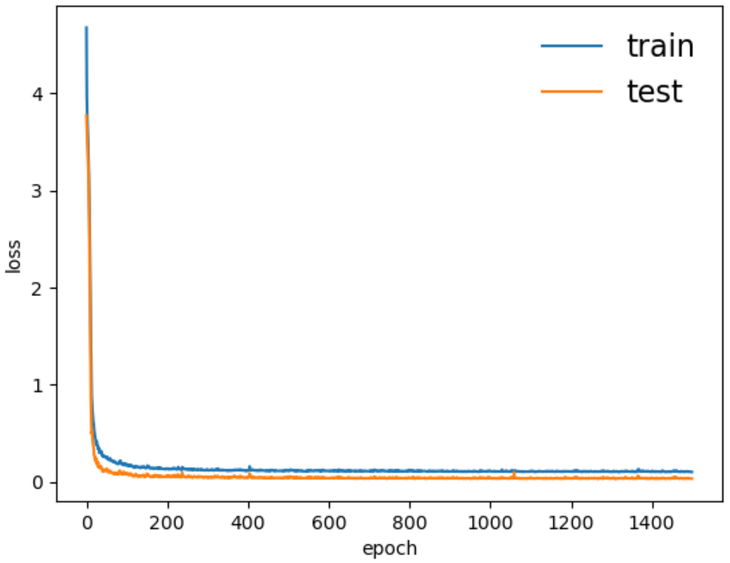
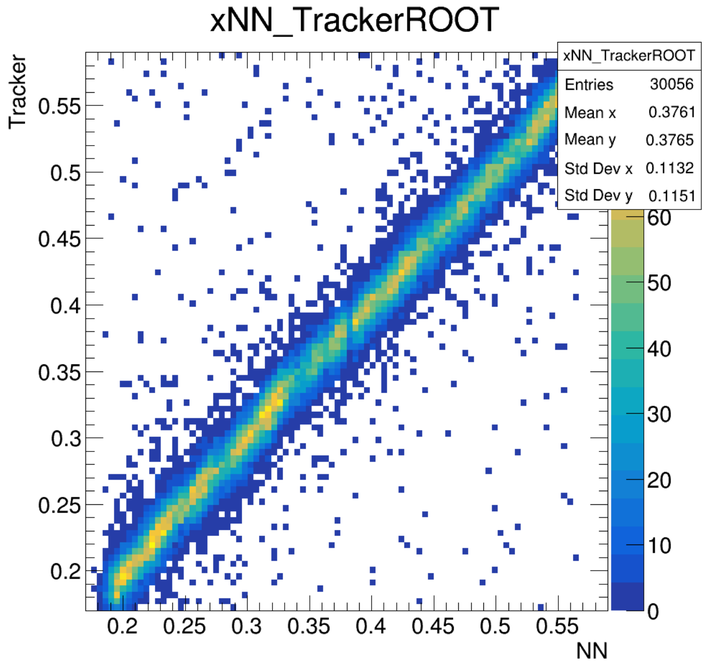
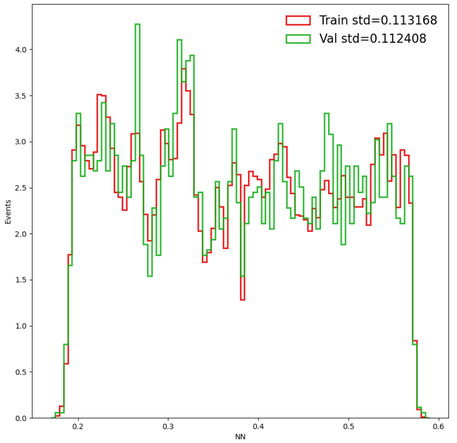
NN Validation

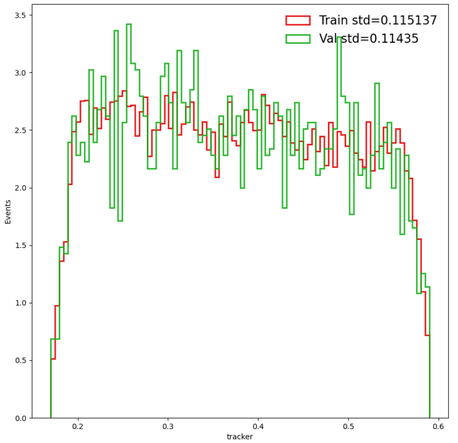




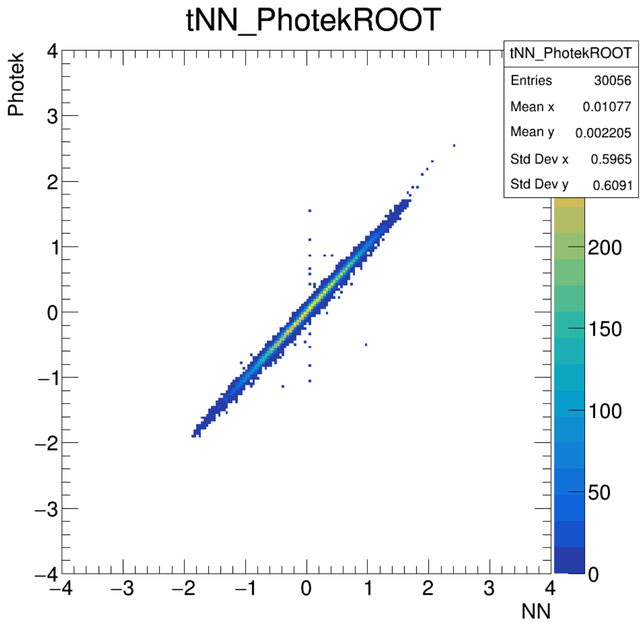
NN x vs. tracker x



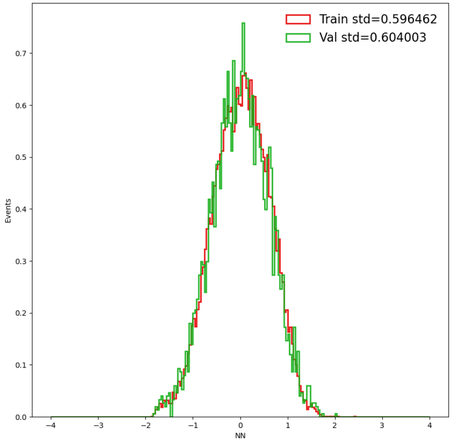
NN x



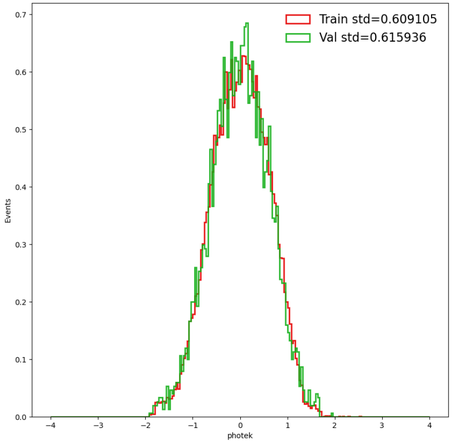
Tracker x



NN time vs. Photek time

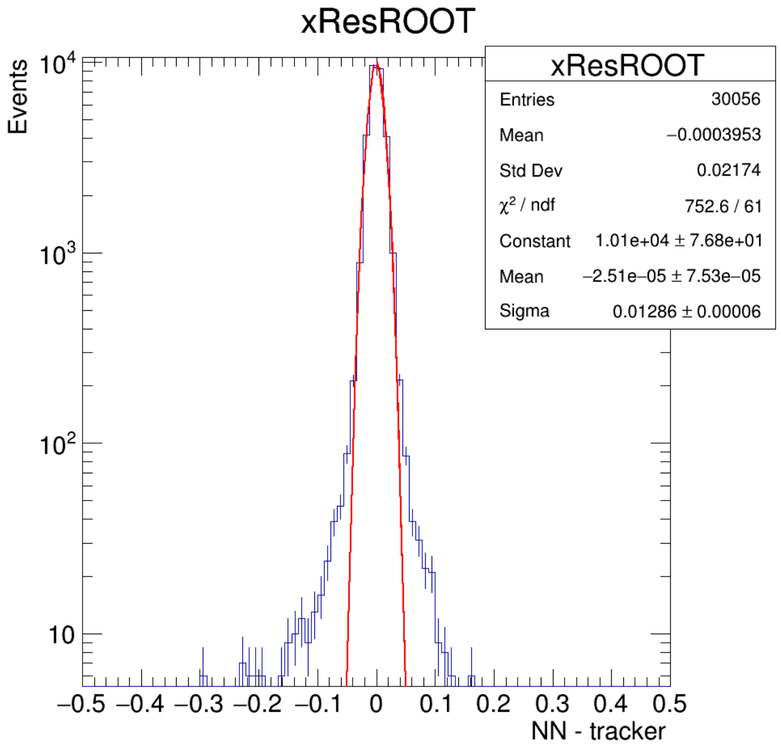


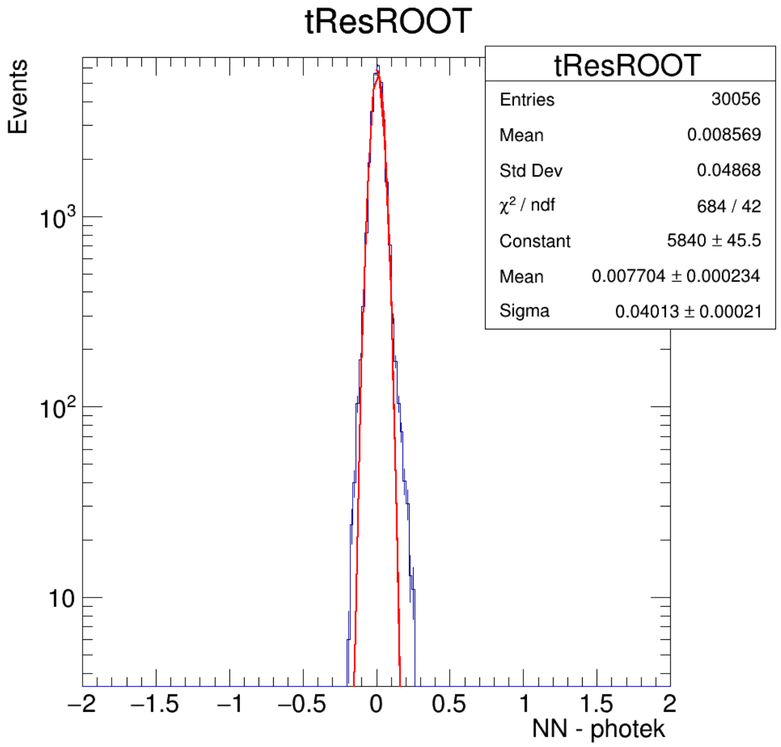
NN time

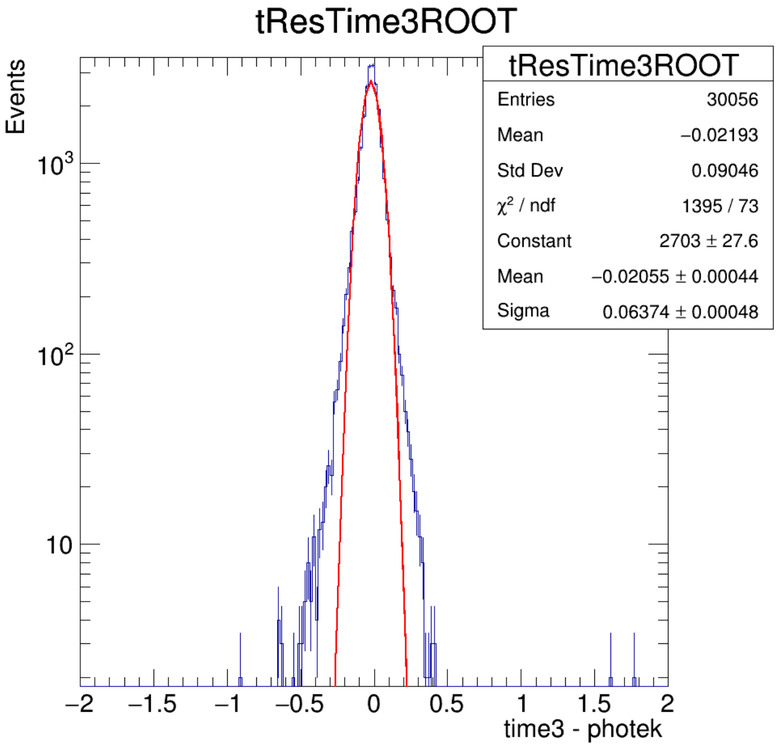


Photek time

Results







- Good looking x and t resolution now

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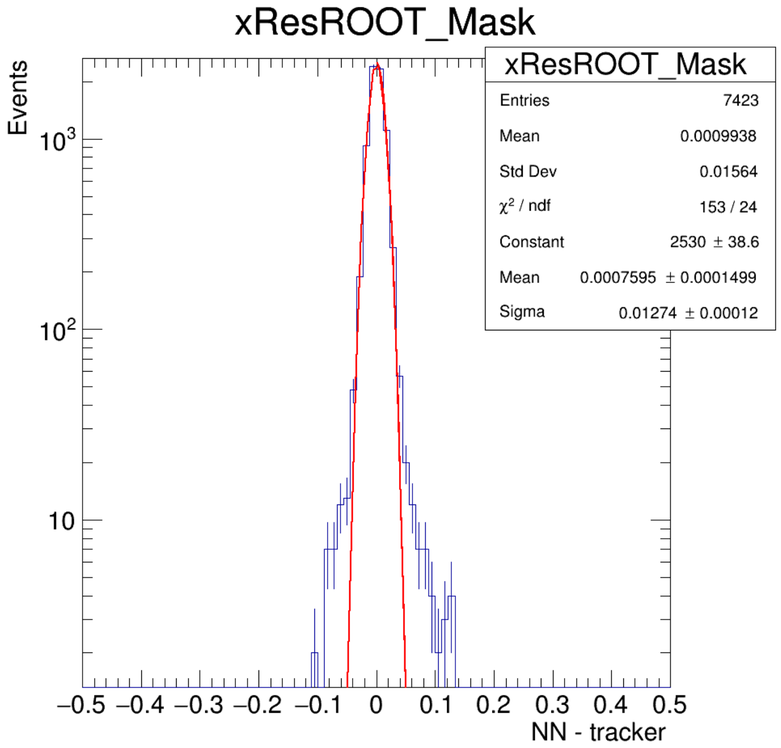
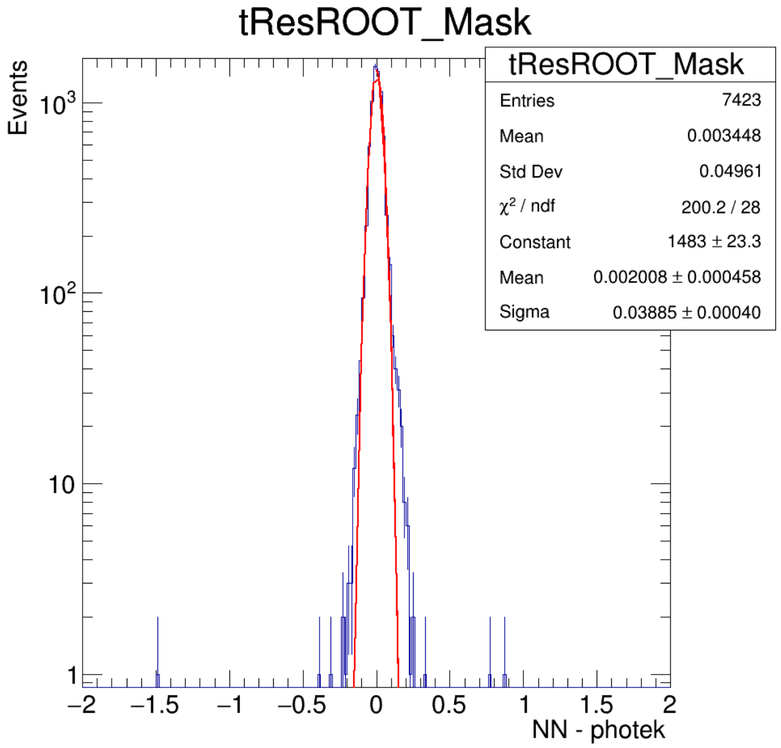
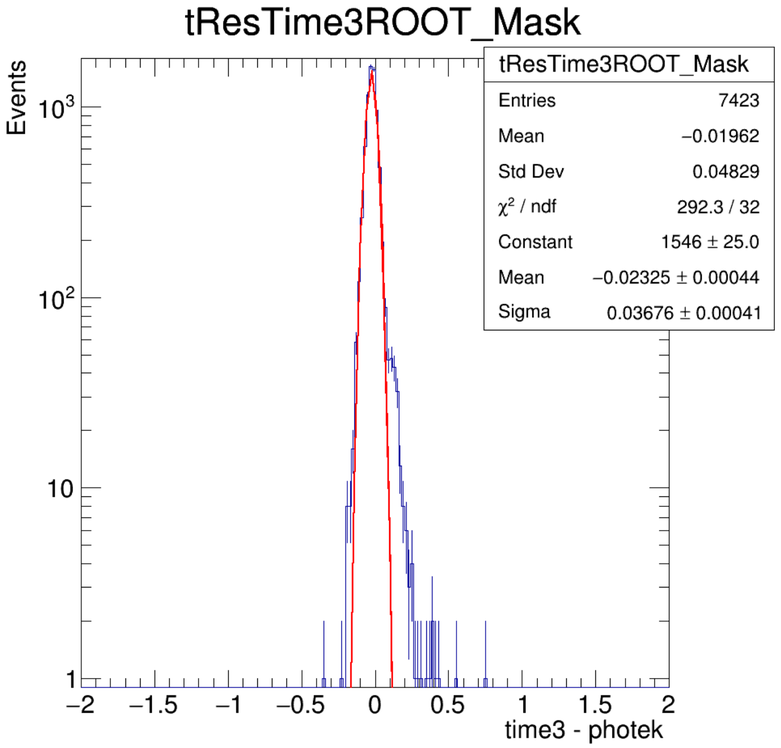
Looking Closer at Strip 3: post training cut

- Cut: 0.23 < Tracker x < 0.53 and amp3 > amp2 and amp3 > amp4







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