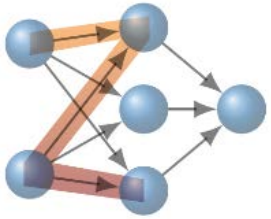
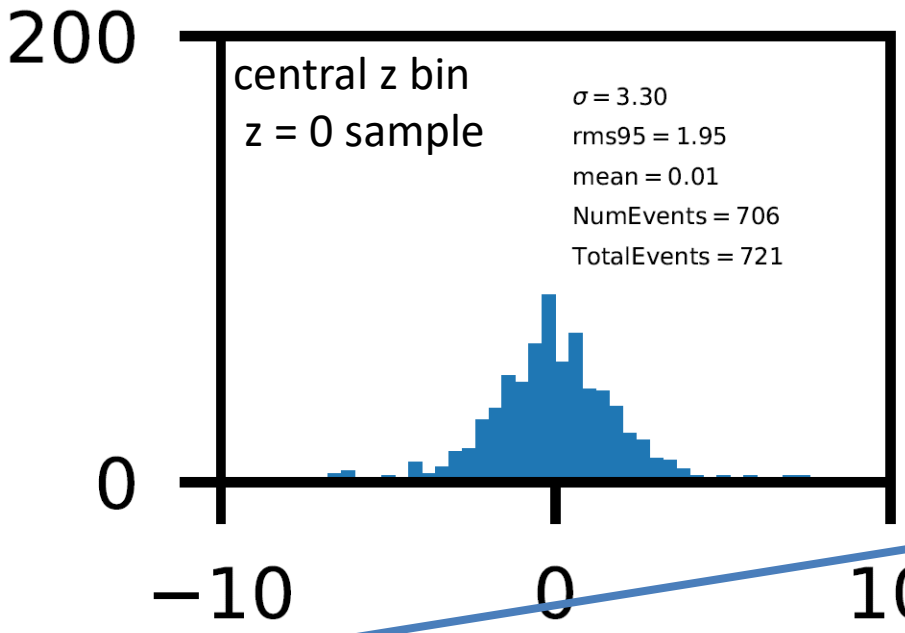


Study of Network Performance in Real Data

- Runs from Phase 3, Exp. 8
- Select 2 prong events from IP
- First Try to load new network (from „supersamples“)

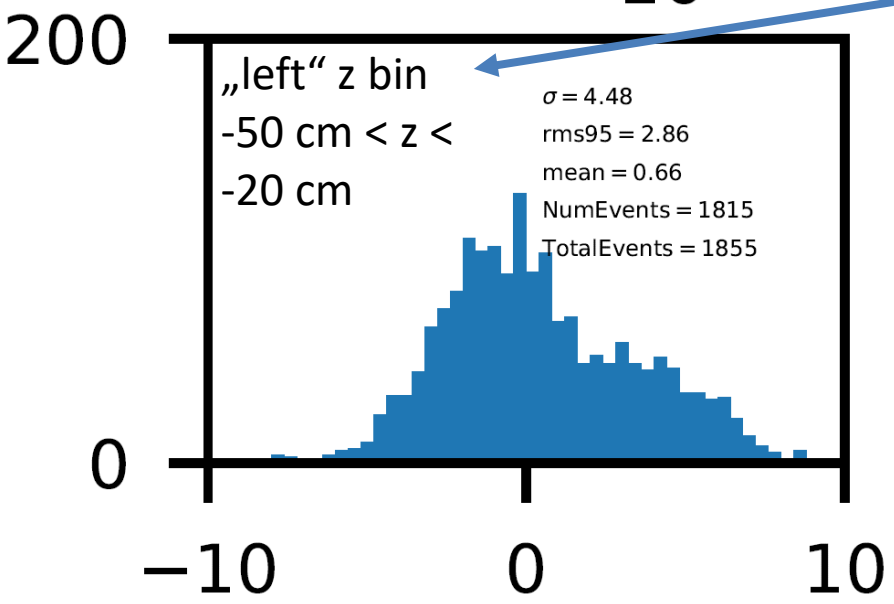
Network Resolutions – Typical Examples

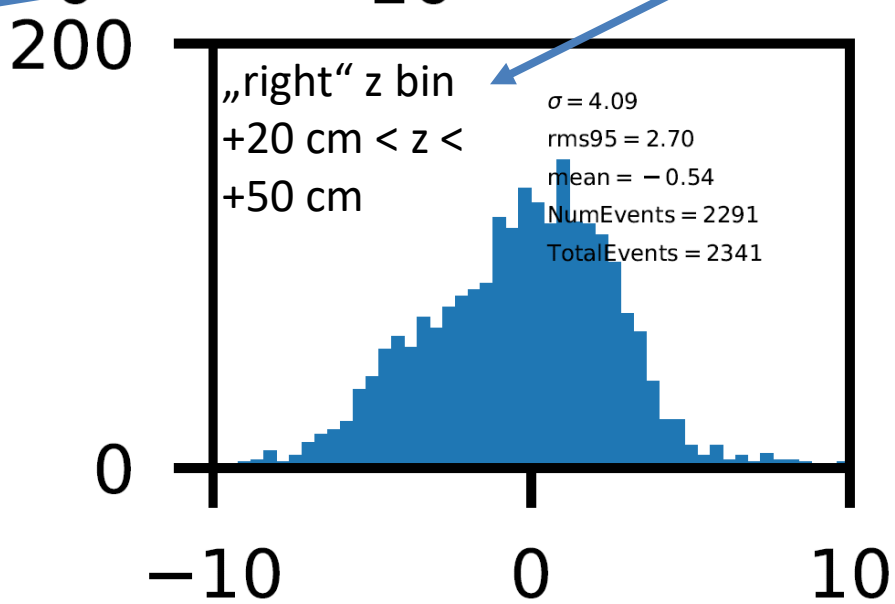
Resolutions in the high momentum bin (> 1.5 GeV)



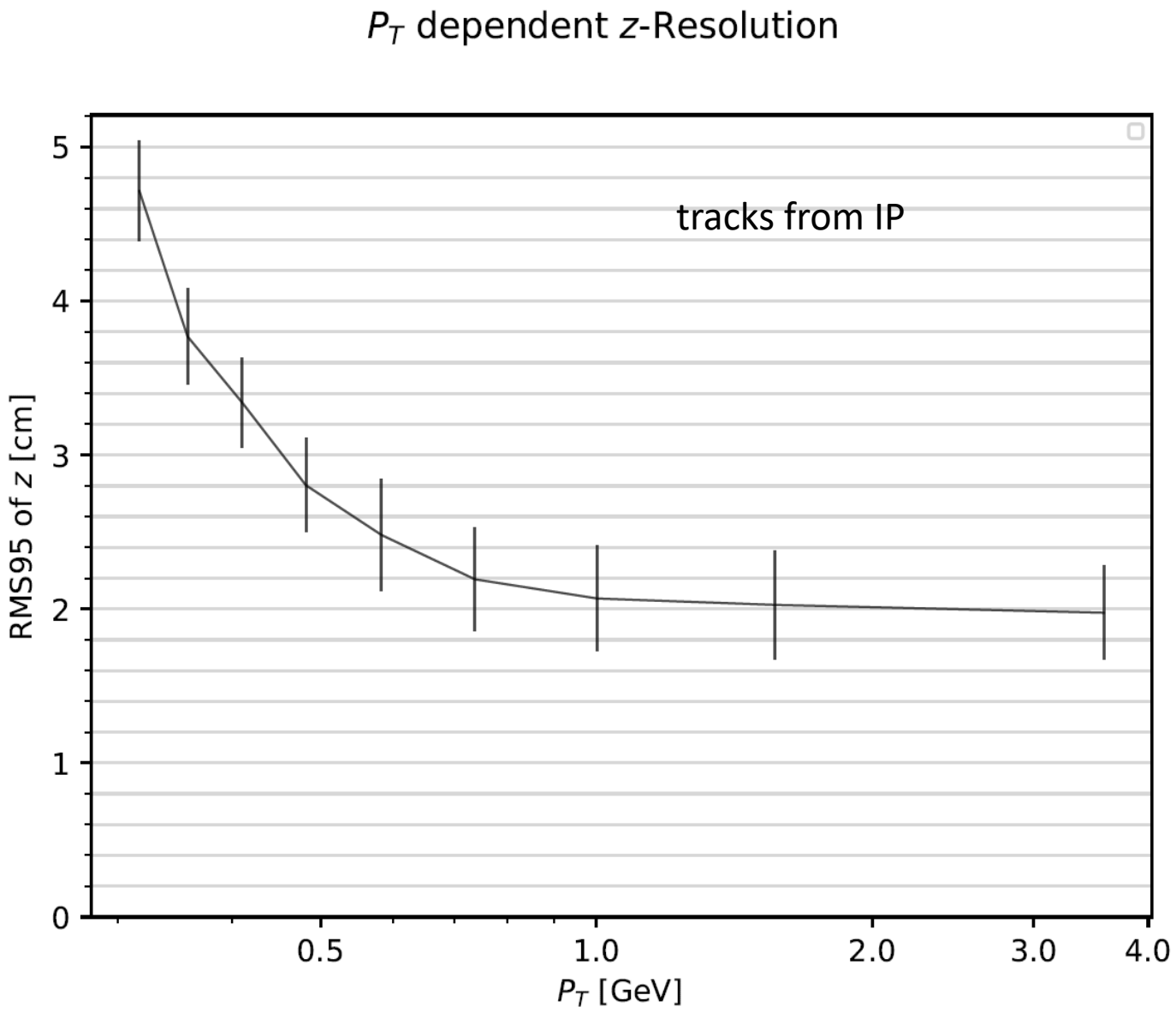
MC trained and tested

As expected by geometry, z resolutions get worse with distance from IP





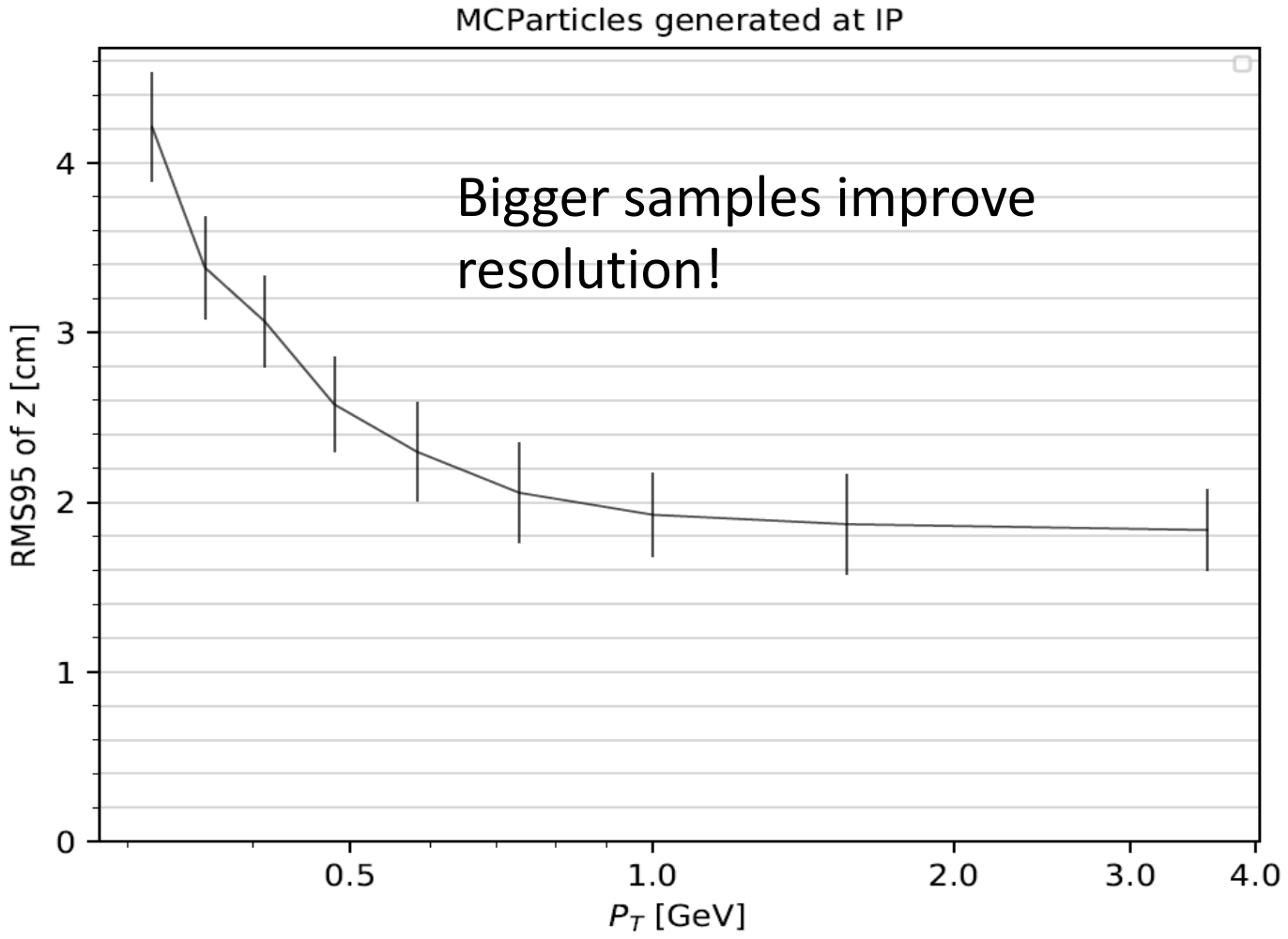
Network Resolutions – Typical Example



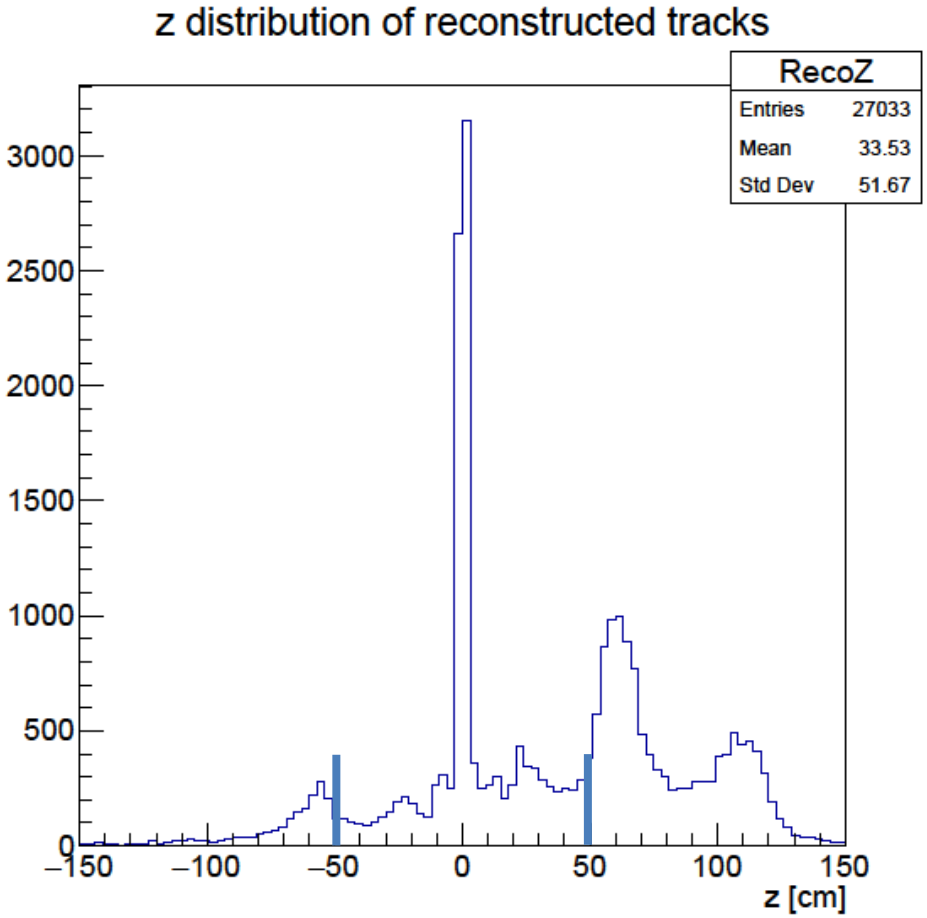
MC trained and tested

Network Resolutions – Large Training Sample

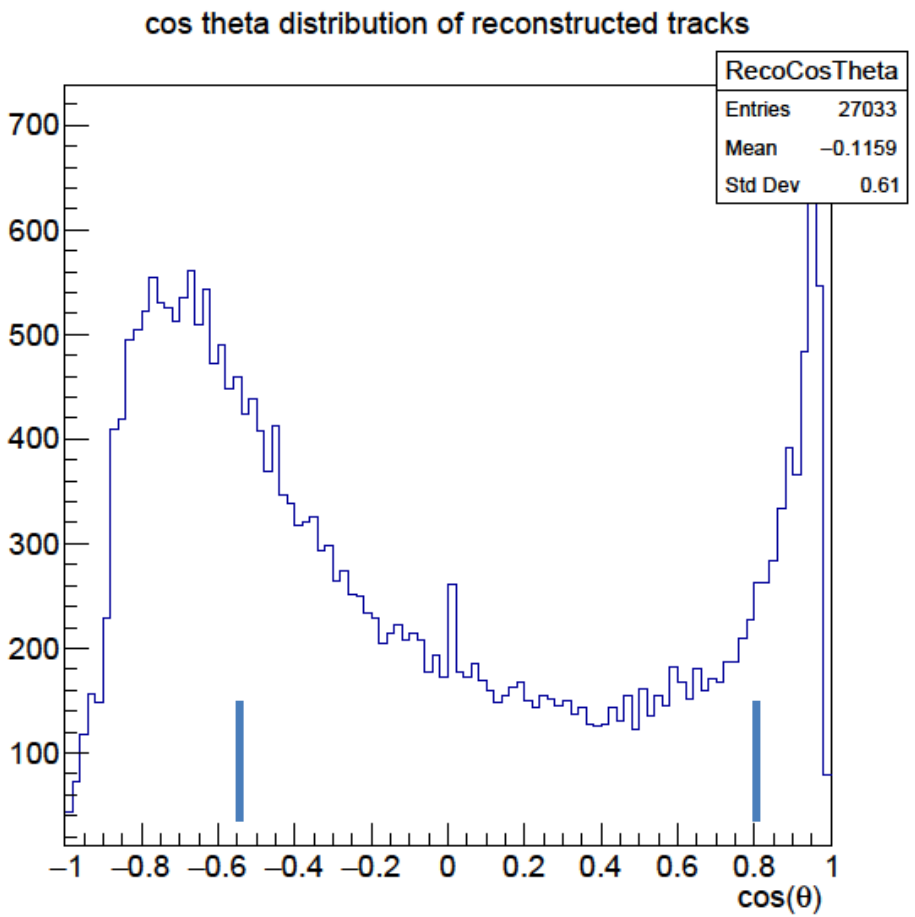
„Supersamples“ = 10 x Standard



More DQM Analysis on Real Data (Run 1703)



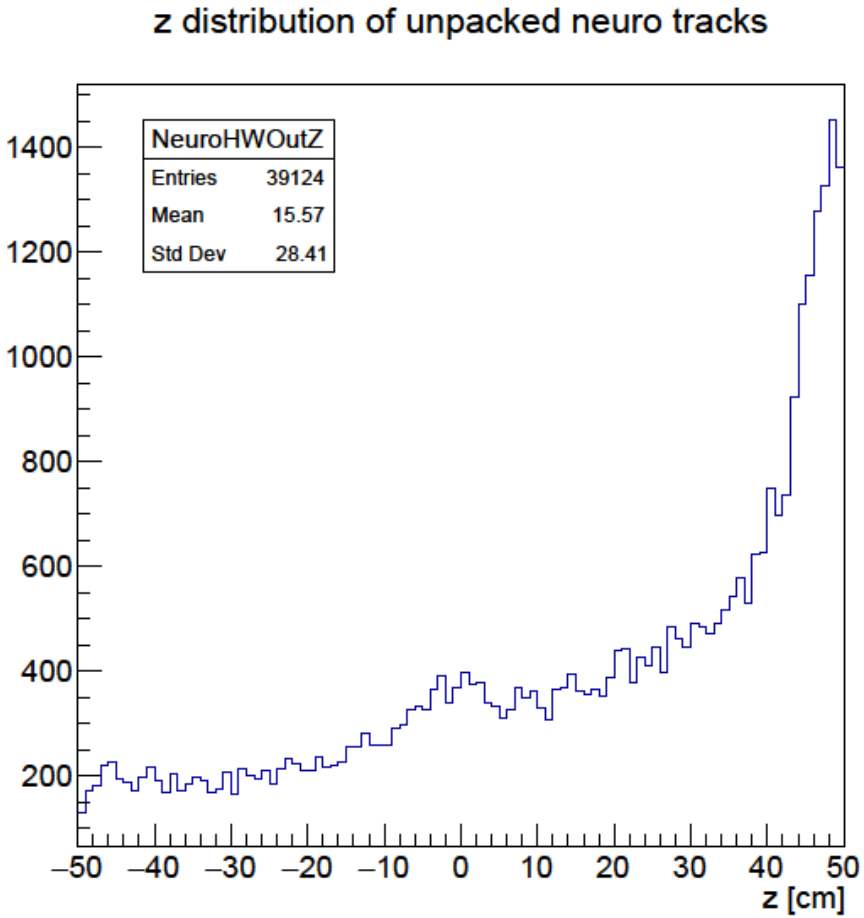
range of z-Trigger

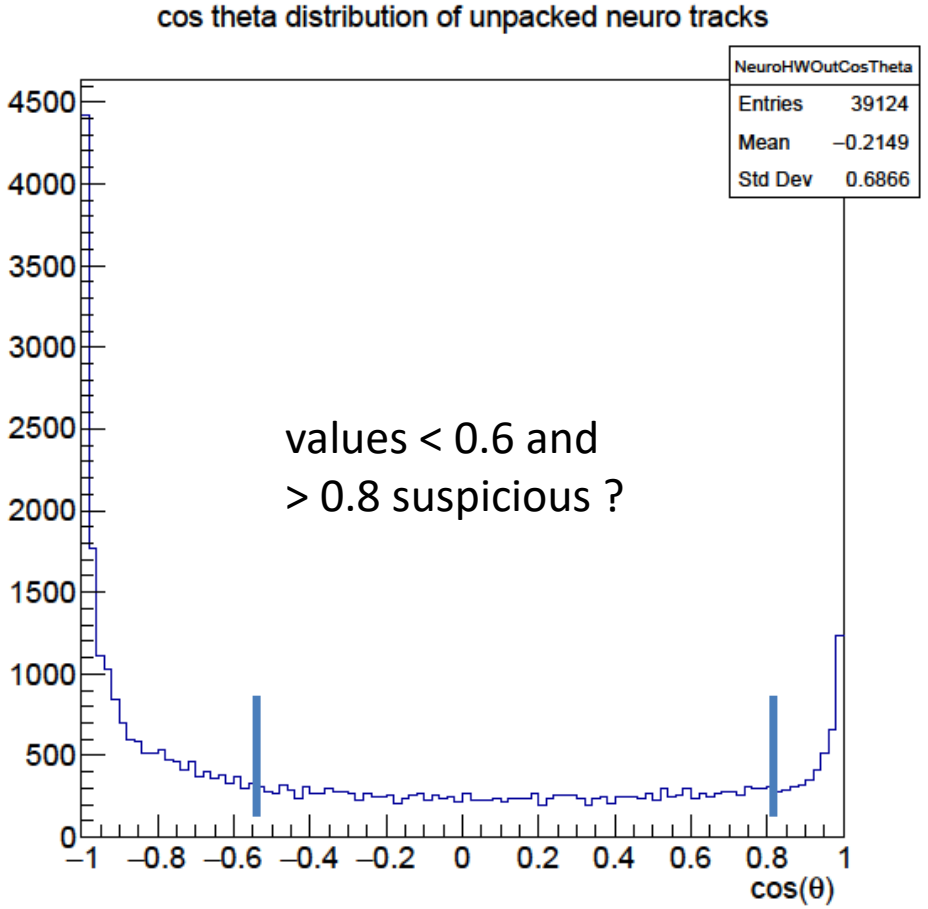


range of z-Trigger (?)

Output from Reco tracks

More DQM Analysis on Real Data



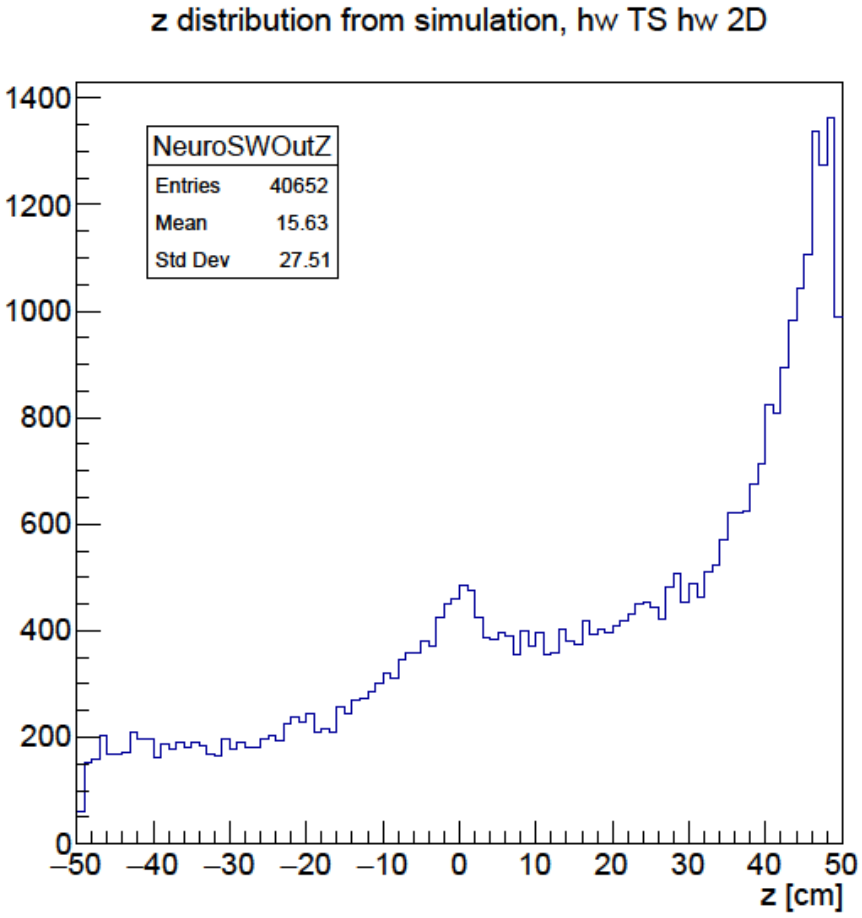


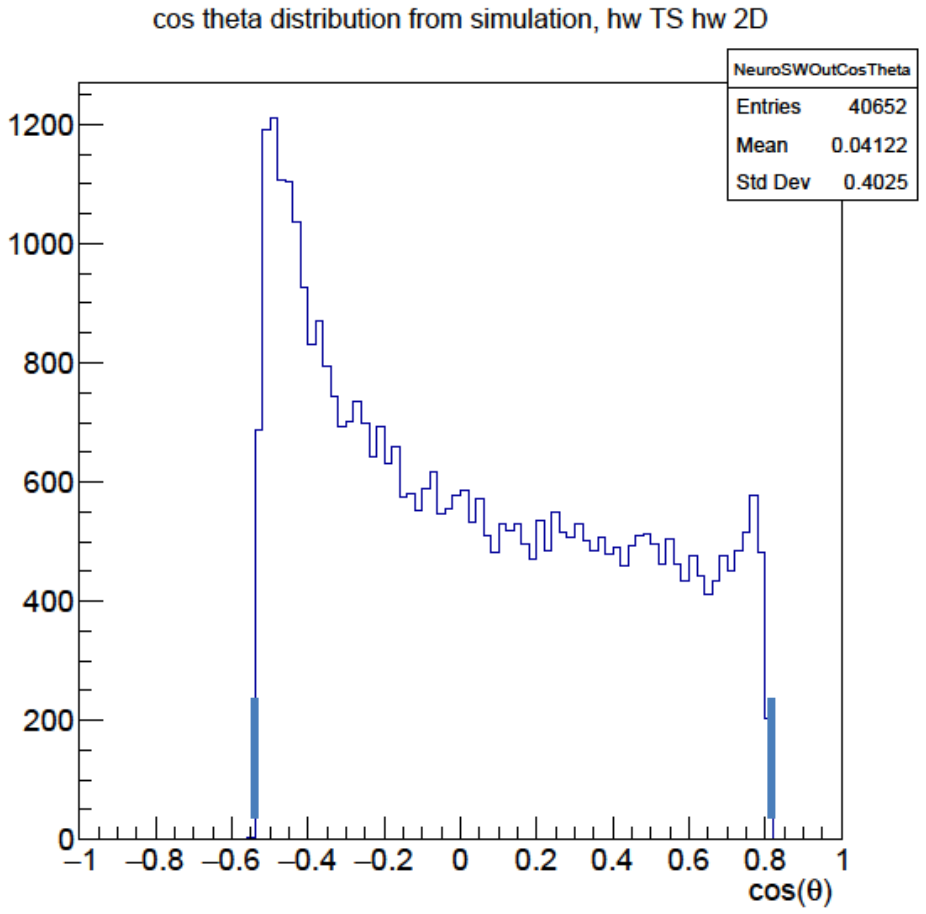
values < 0.6 and
> 0.8 suspicious ?

Output of z-Trigger HW:
1.4 HW / reco

network from
standard file BG x 2

More DQM Analysis on Real Data

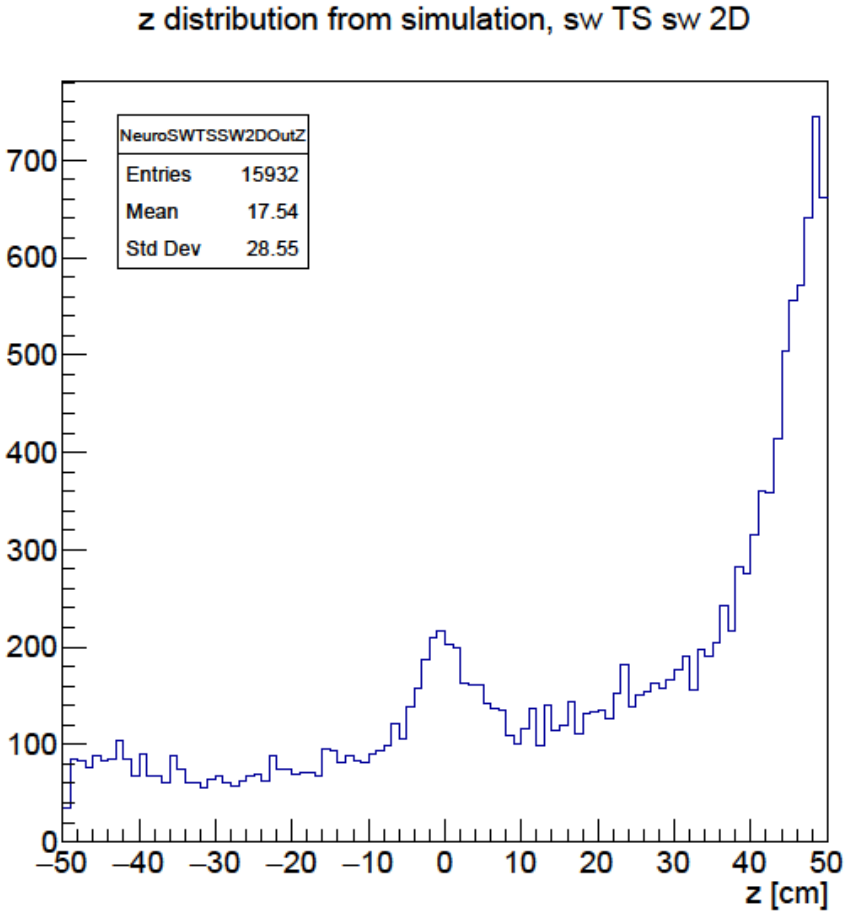


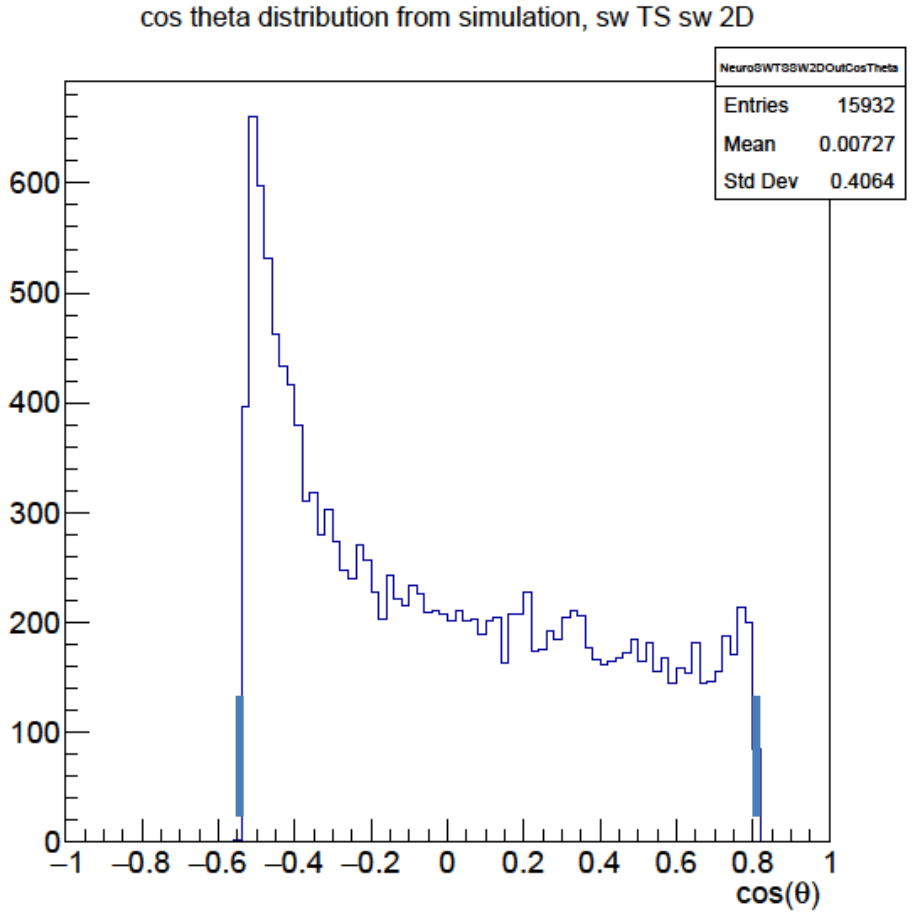


Simulated NN, hw TS & 2D
more tracks than from HW: 1.04

Why is cos(theta) so different between SW and HW network?

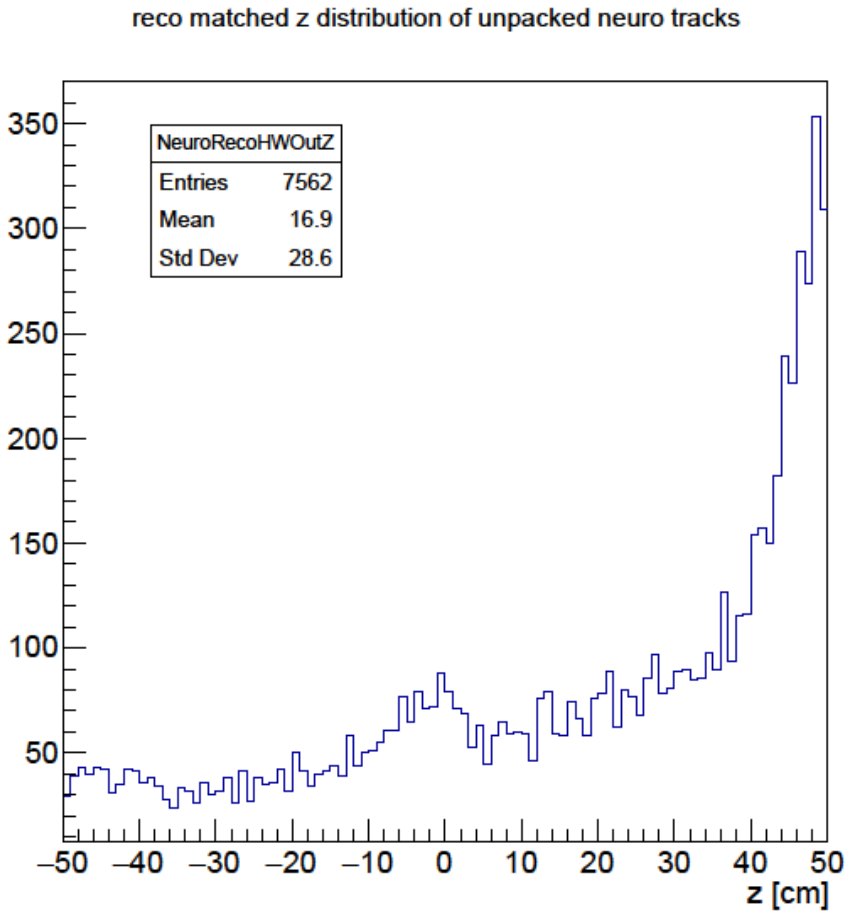
More DQM Analysis on Real Data

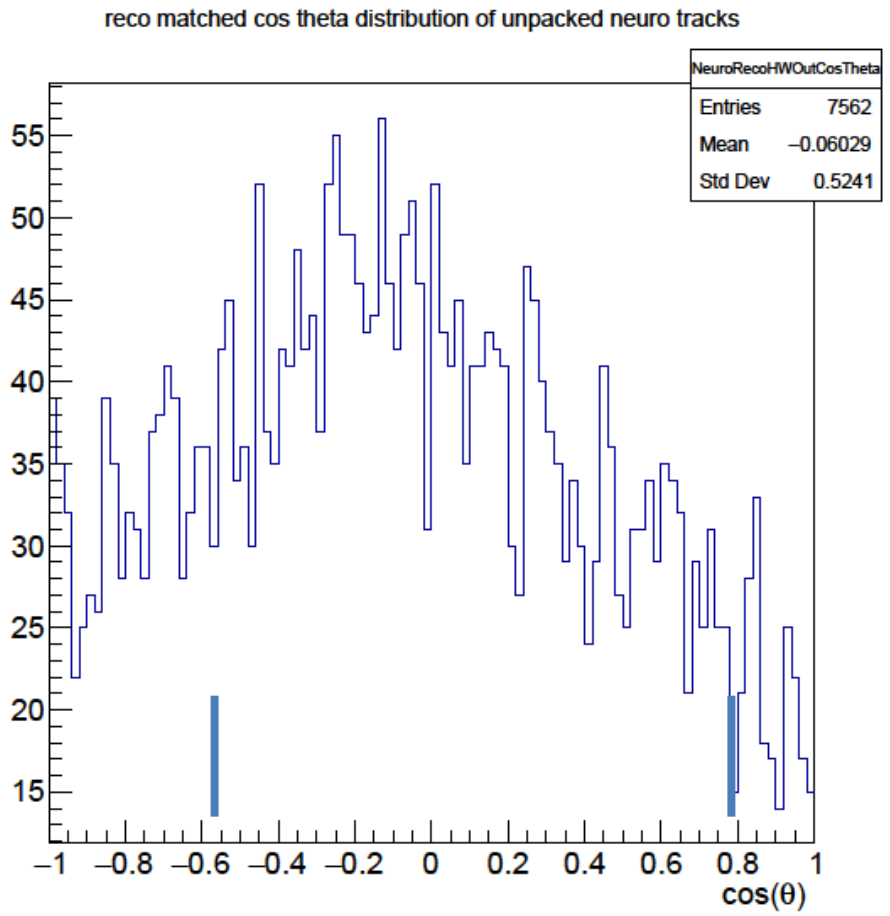




Simulated NN, sw TS & 2D:
much less events now: ~ 40% of HW + sim NN (??)
(software finds fewer TS and 2D than HW)

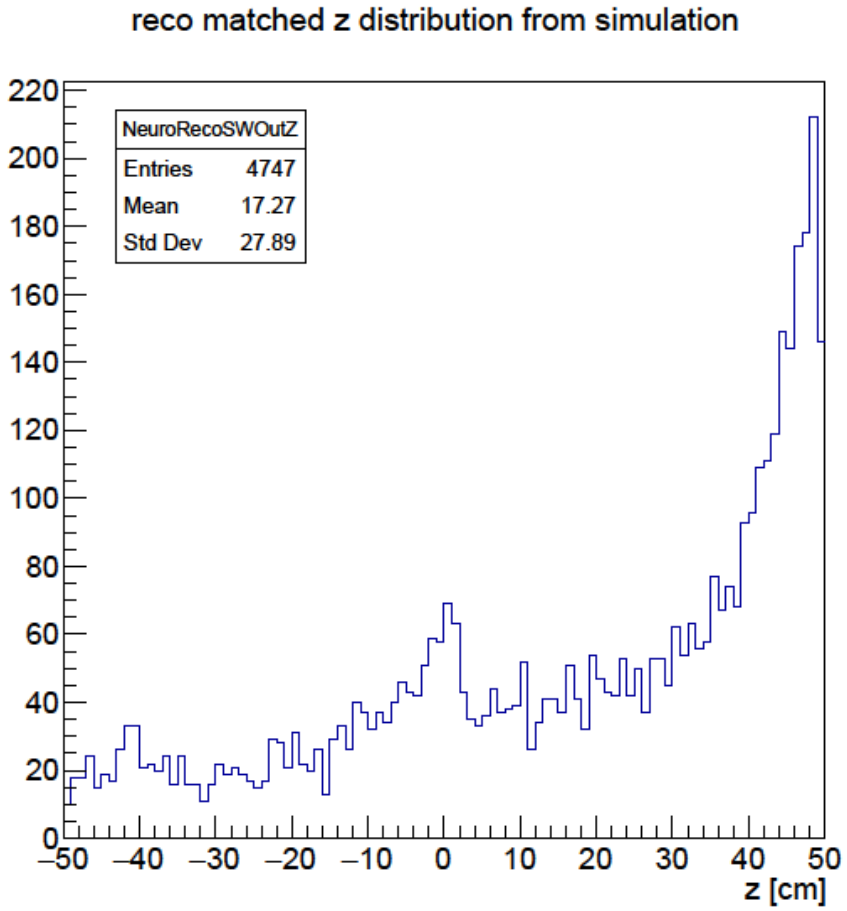
More DQM Analysis on Real Data

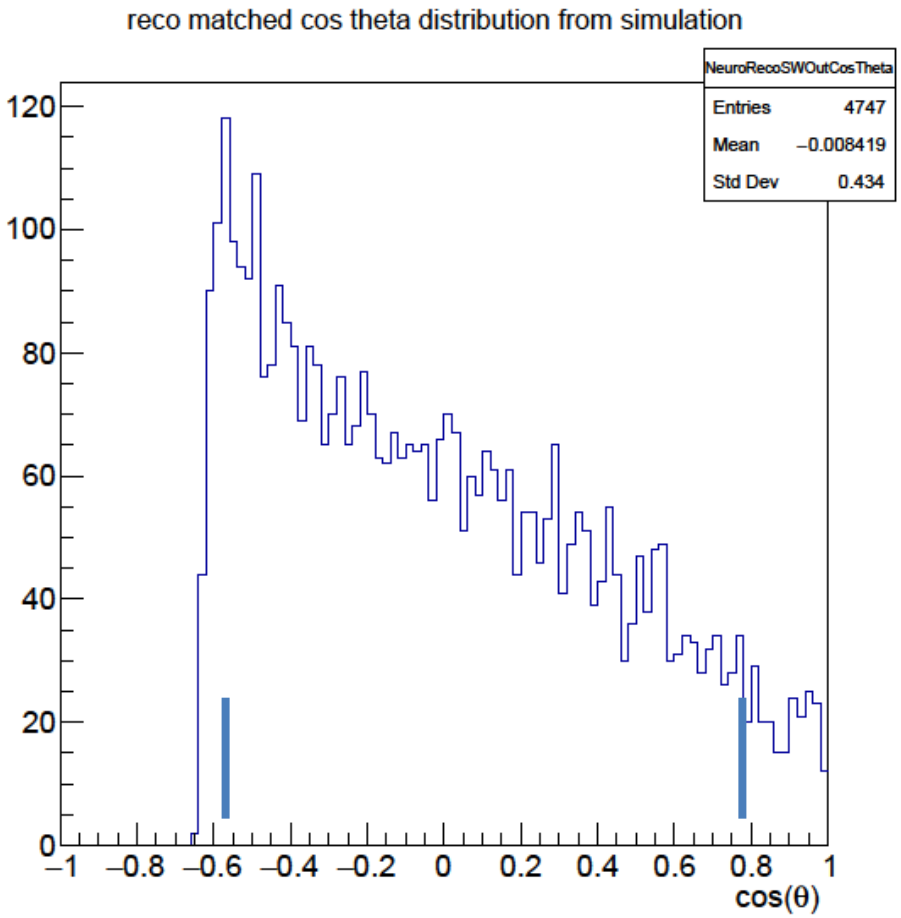




HW z-trigger matched with Reco tracks
very few events: ~ 28% of found HW tracks

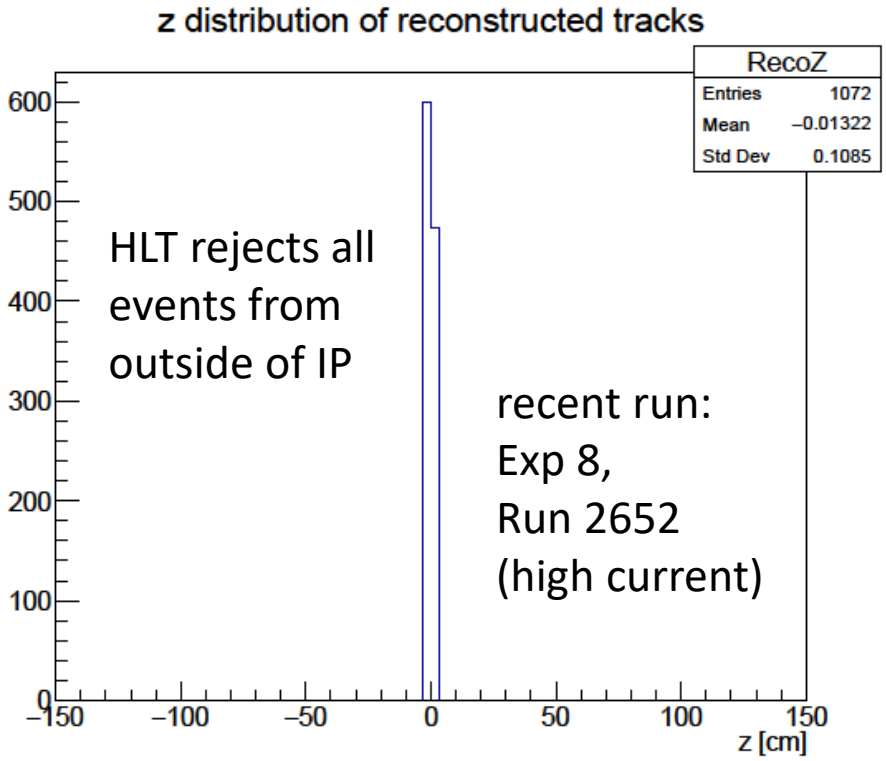
More DQM Analysis on Real Data

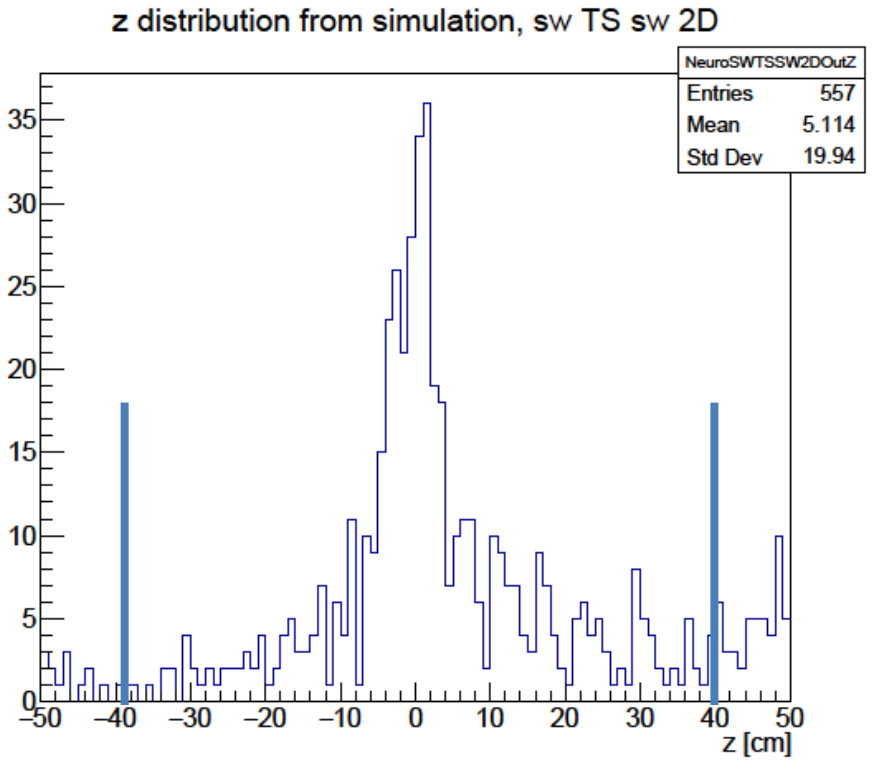




SW z-trigger matched with Reco tracks
even fewer events: ~ 18% of found HW
cos(theta) values beyond 0.8 ??

Real Data: Select 2-Prongs from the IP

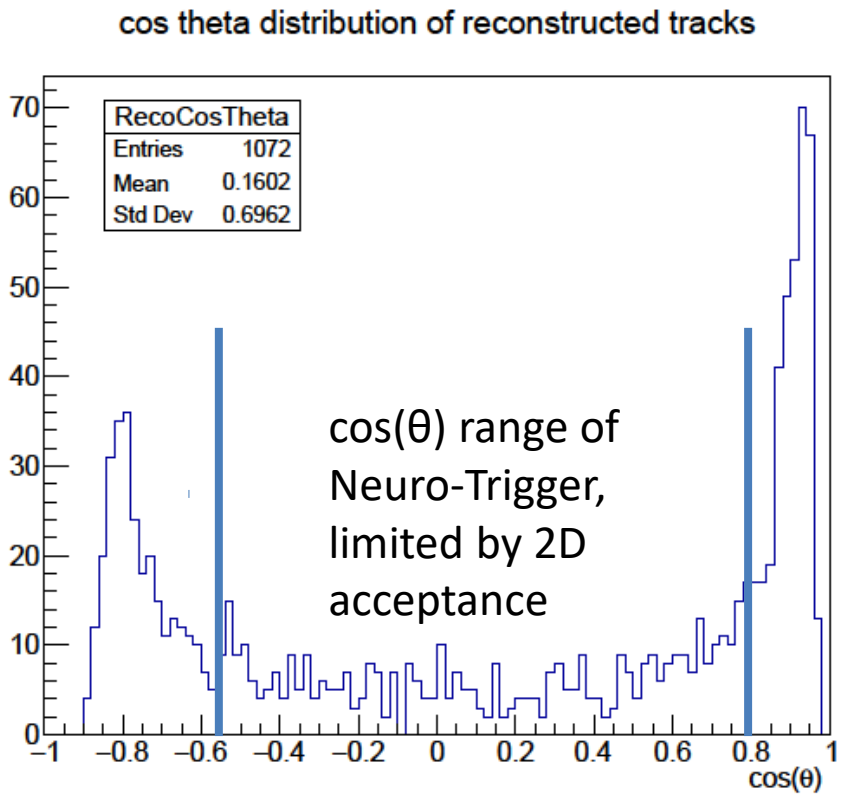


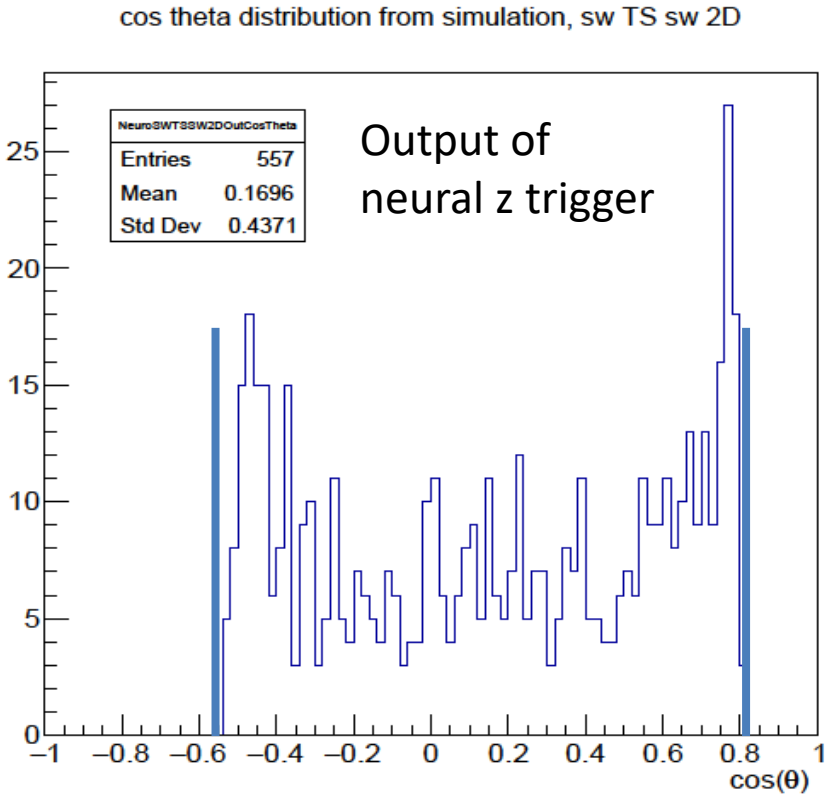


„Commissioning Network“: trained with MC tracks, applied to real data
not optimized yet for present background conditions

here: SW simulation (HW performancs almost identical,
discrepancies are explained, firmware is being improved

Real Data: Select 2-Prongs from the IP

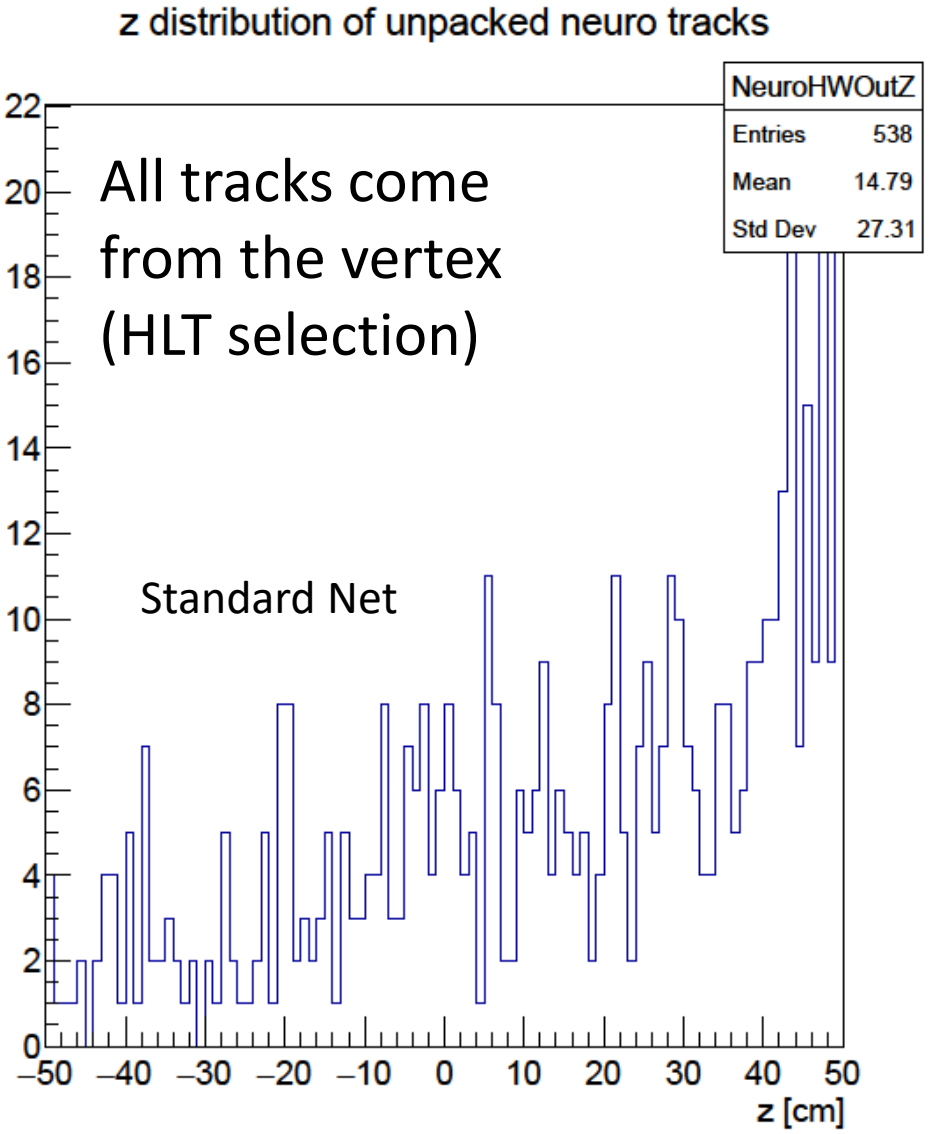


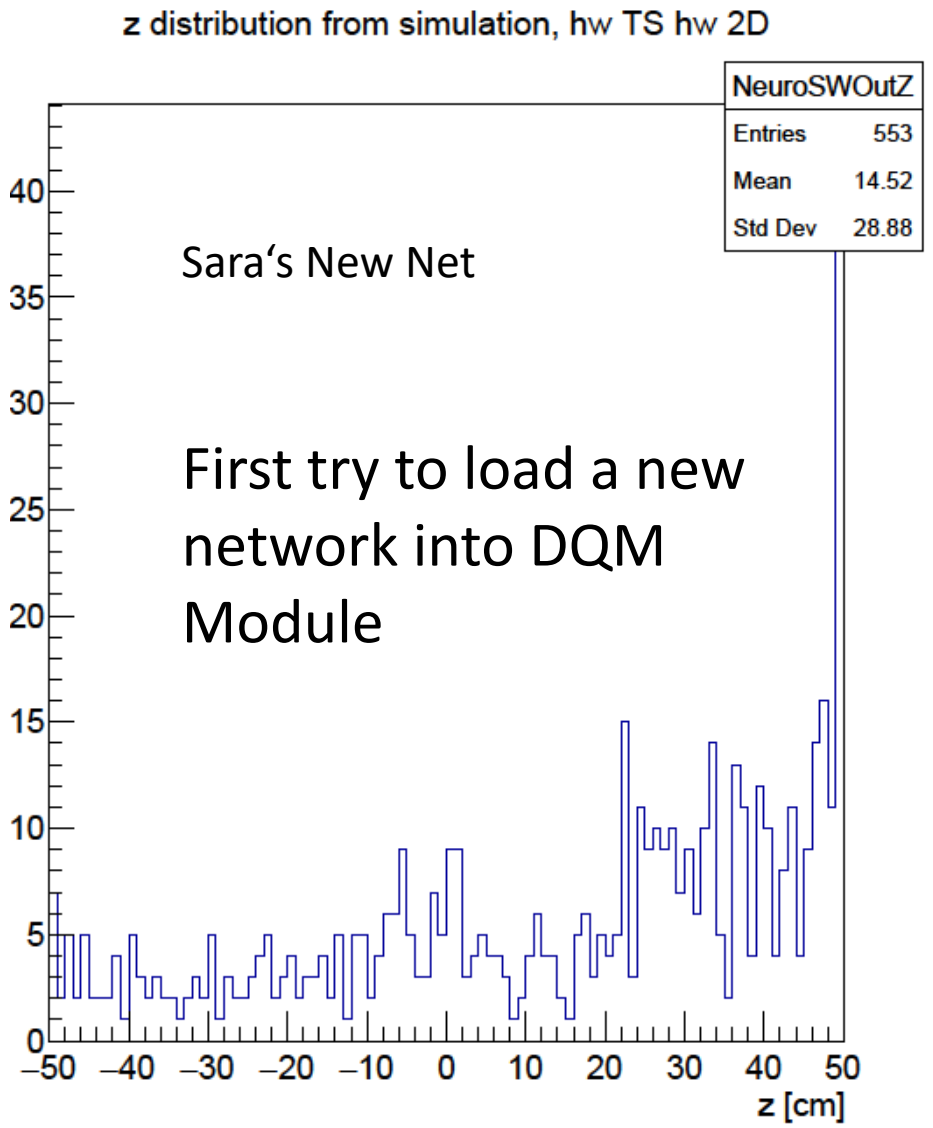


„Commissioning Network“: trained with MC tracks, applied to real data
not optimized yet for present background conditions

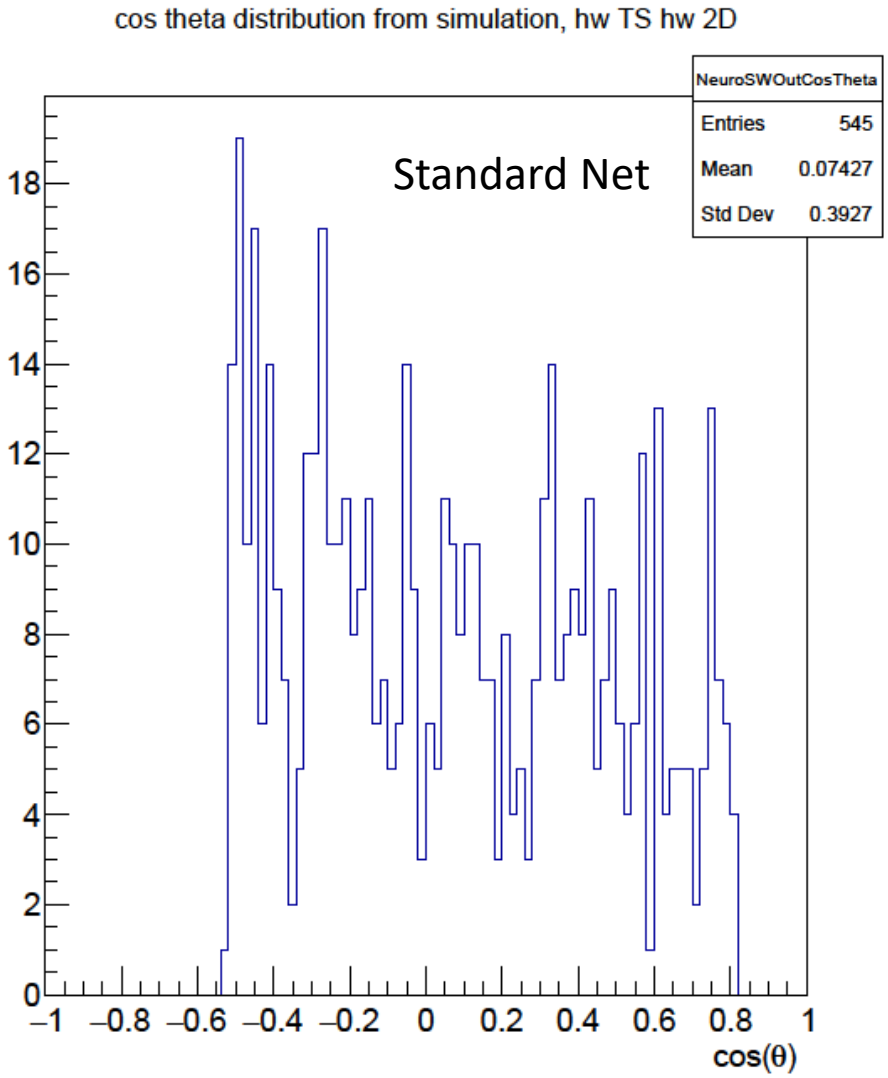
here: SW simulation (HW performancs almost identical,
discrepancies are explained, firmware is being improved

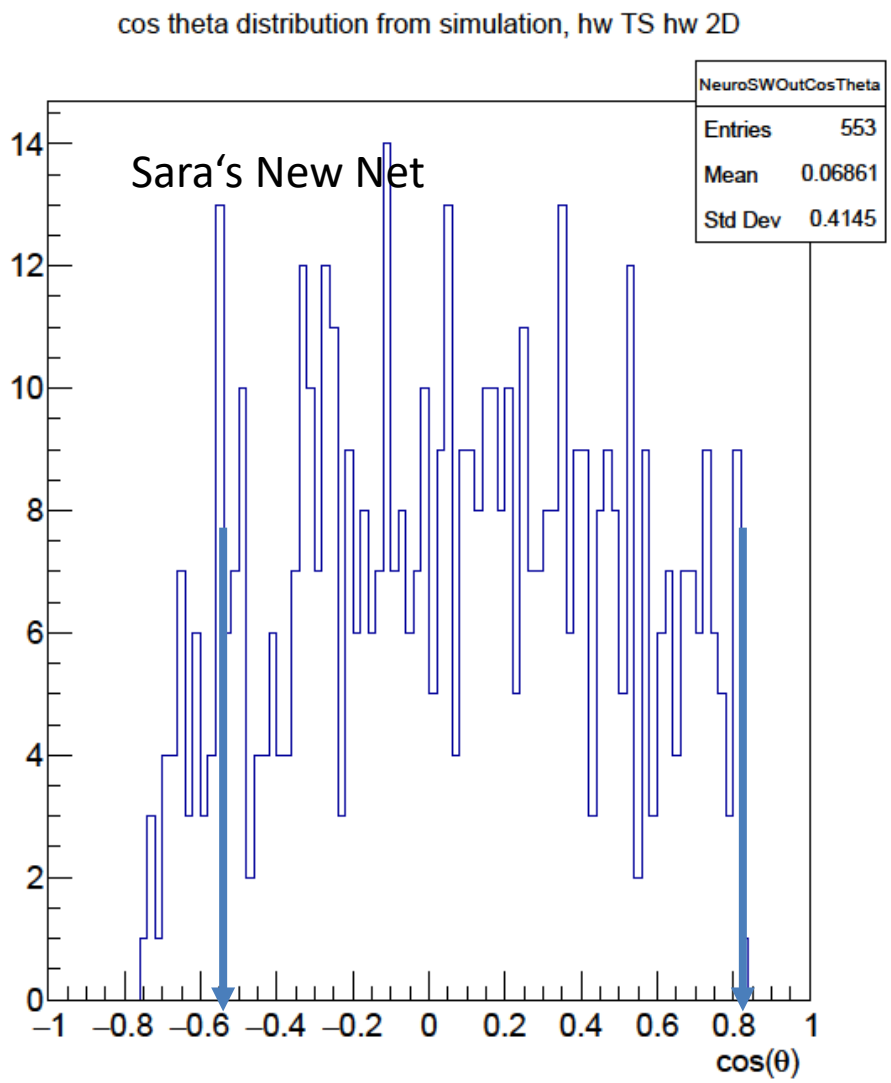
New Network: 2-Prong sample Run 2802





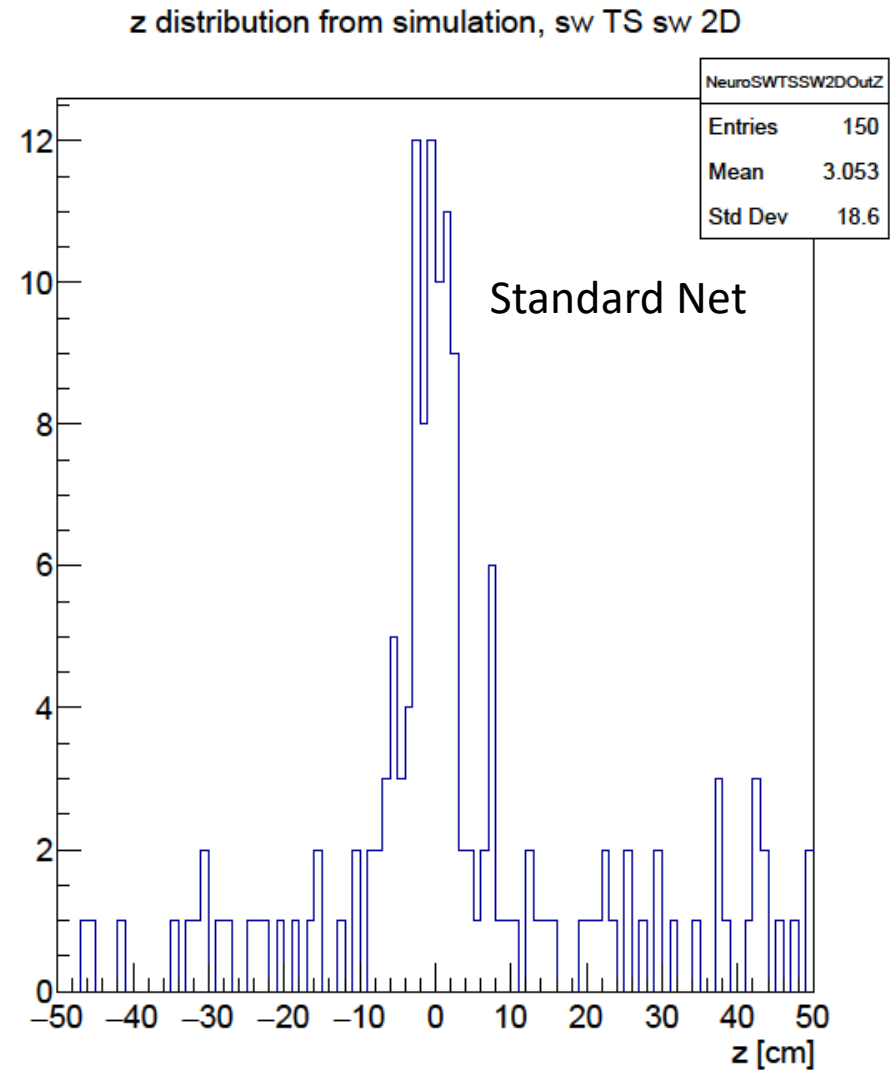
Real Data: 2-Prong sample Run 2802

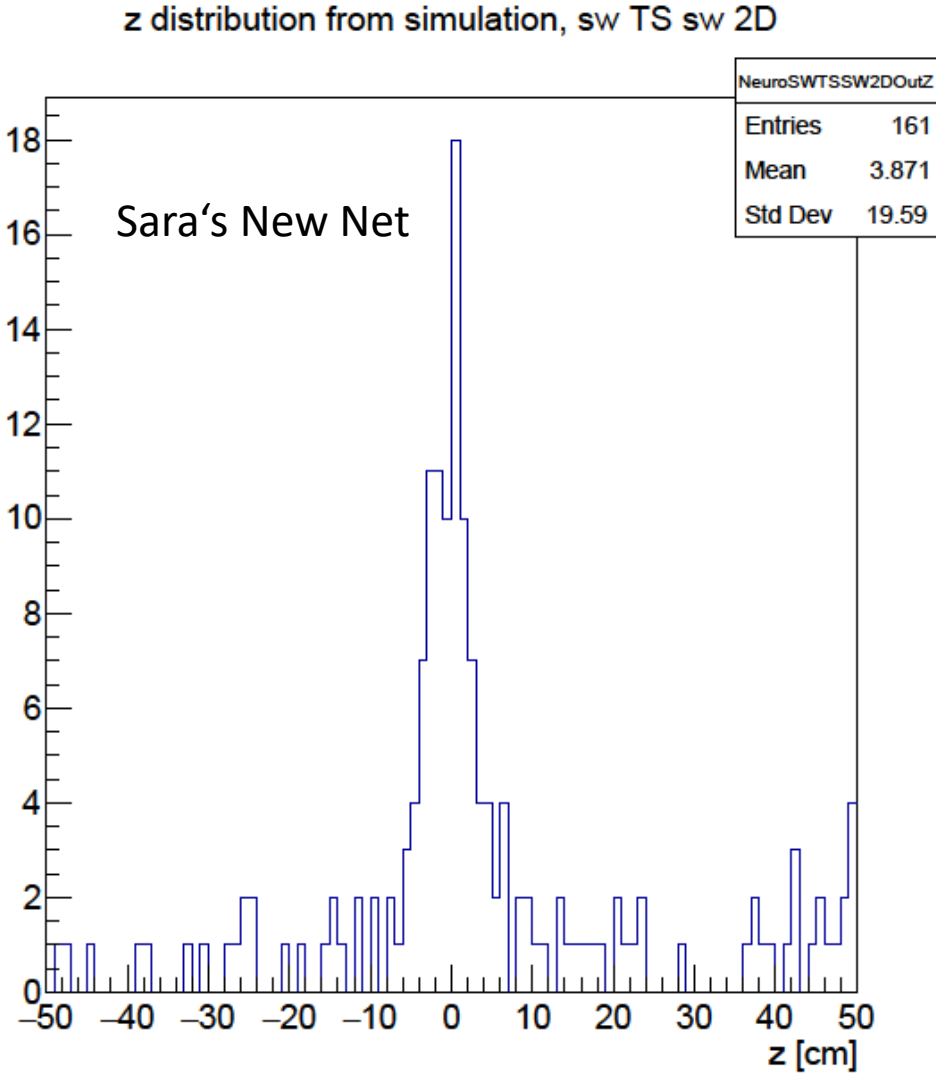




Sara‘s net has a wider range in negative cos(θ)

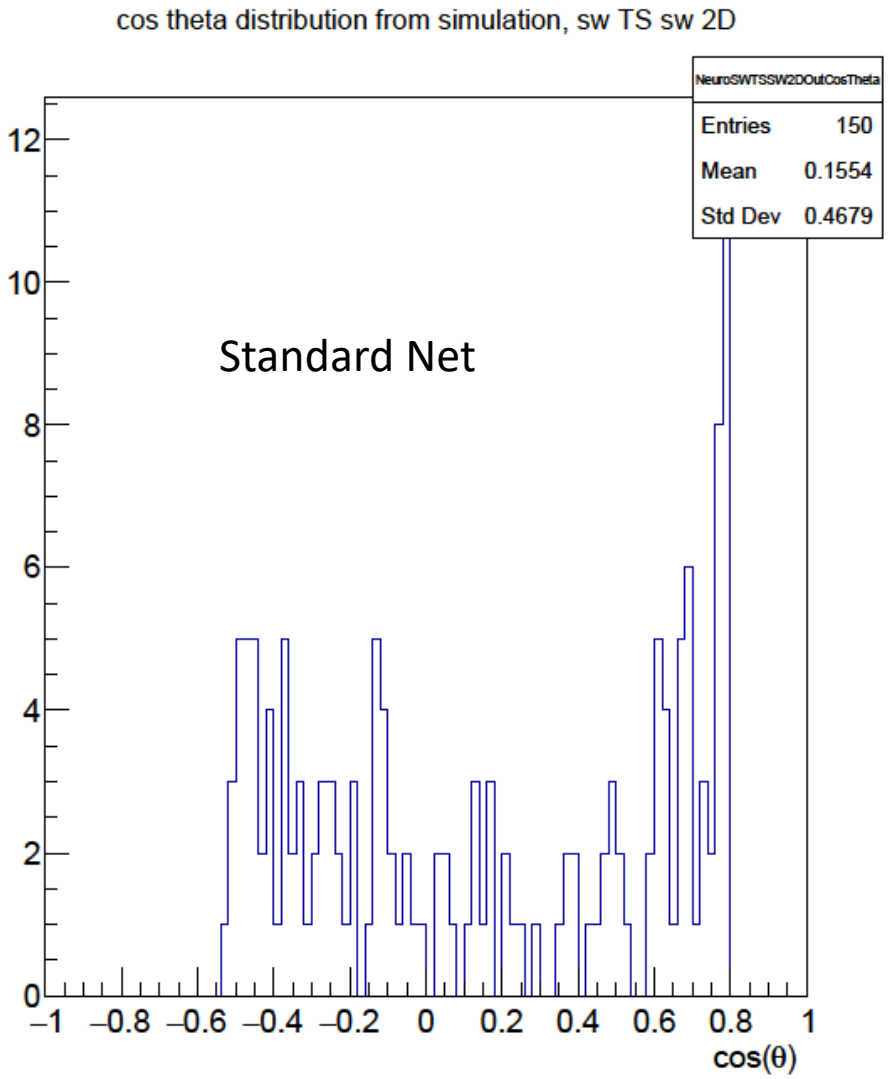
Real Data: 2-Prong sample Run 2802

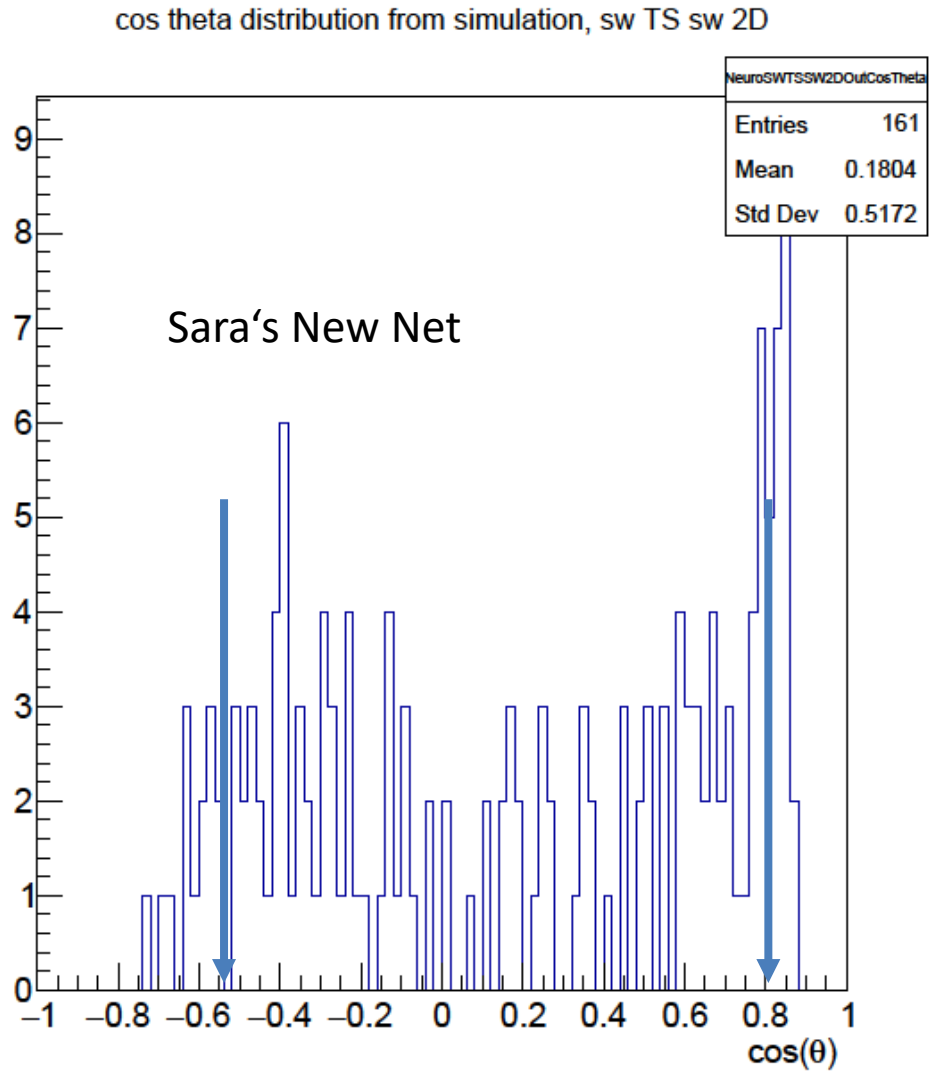




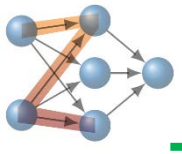
Sara‘s net has a better resolution in z (it seems)

Real Data: 2-Prong sample Run 2802





Sara‘s net has a wider range in negative cos(θ)



Conclusions

- Need to fix the unpacker code in order to get the correct cos(θ) range from the hardware

- The training should be done with much larger samples for training, validation and test (the „factor 10 rule“ seems not sufficient. The new net by Sara seems better than the Standard

- We need to extend the range in z: +- 100 cm is a „must“. We see very strange behavior close to the +-40 cm cut in the standard network (with a range of +-50 cm). We need to do correlation plots (z_MC vs z_net, same for cos(θ))

- Preliminary studies of Sara show that we get reasonable resolutions also with the extended z range. The correlation plot should look more reasonable (to be done).

- We need to carefully investigate the 3 samples (train, validation, test). It seems very strange that the validation error for several trainings is smaller than the training error.