

Summary of CIDEr-ML collaboration meeting

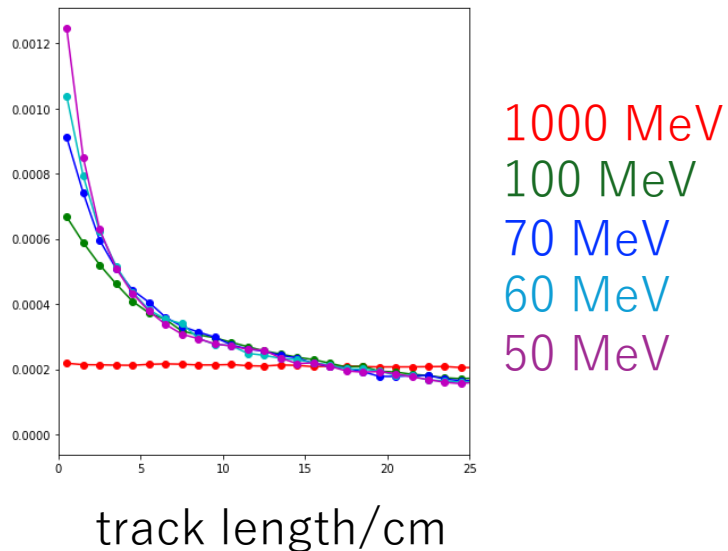
29 March 2024

Ryo Matsumoto (TokyoTech)

Current status

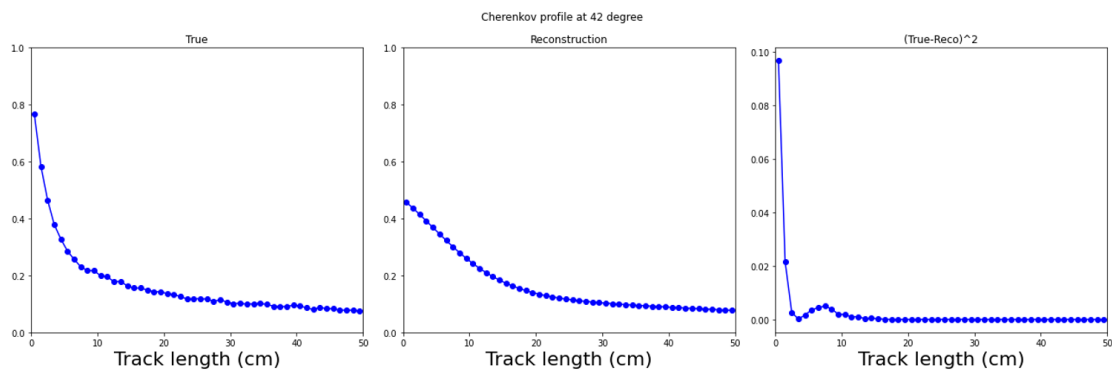
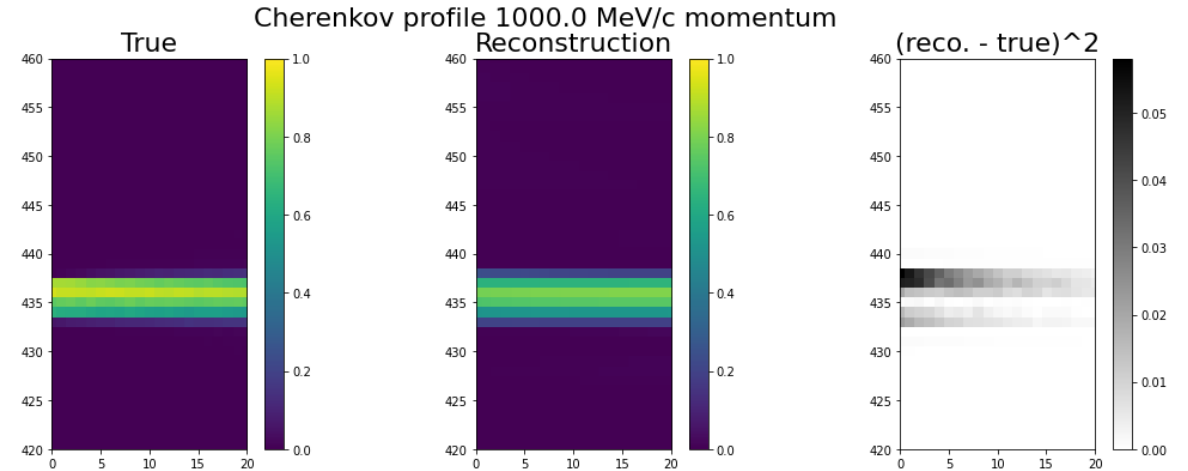
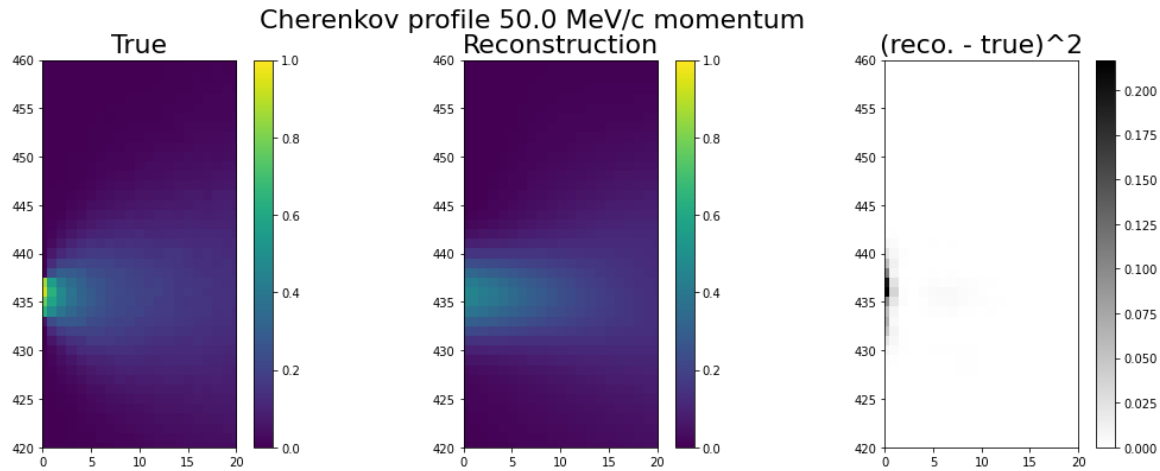
- I have been working on the training of Cherenkov profile.
- I have applied weights normalized for each momentum sample

Weights around angle = 42 degree (e-)



weighted by the Cherenkov profile normalized for each momentum
 $\text{loss} = (\text{model_output} - \text{ground_truth})^{**2}$
 $\text{loss} = \text{loss} * (\text{weight} * 500. + 1.)$
 $\text{loss} = \text{loss.mean}()$

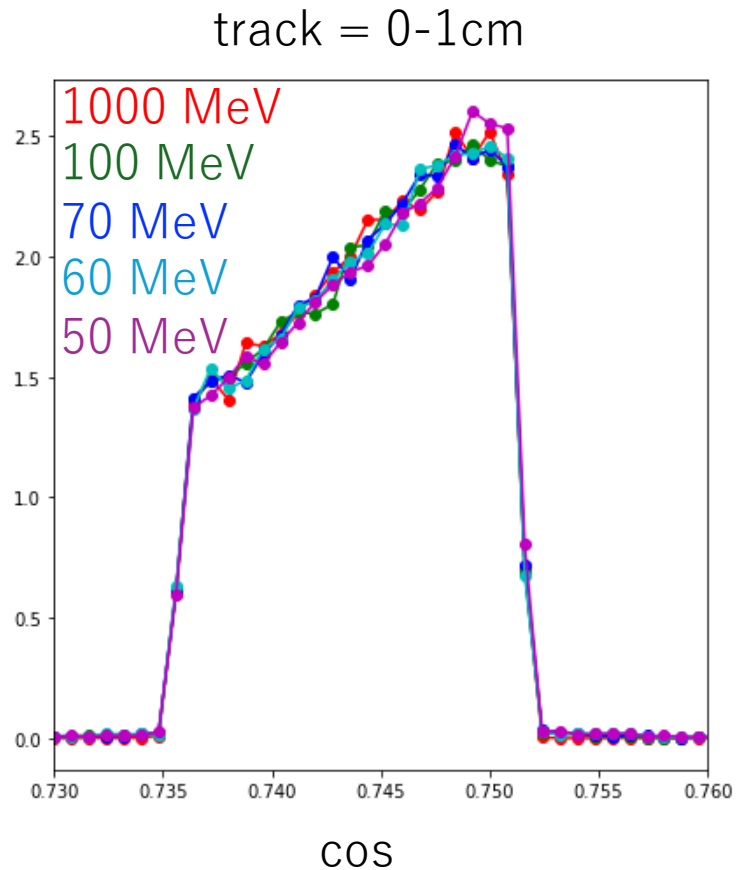
Current status



50 MeV/c, e⁻

- The overall shape has been learned, but there are discrepancy in the area near the peak which changes rapidly

Current status



- We have to take detailed bins in track length to avoid the significant changes of the profile, but if the bins are too many, an unsmooth structure due to the model of Geant4 will appear in cosine distribution
 - I am also interested in the modeling the SKDETSIM used in SK
- I have to adjust the binning for each momentum to get smooth distributions

Prospects

- Adjust the binning of the profile and train the network again
- All study were for the electron. It is needed to check if the unsmooth structure may appear clearer in muon
- Check the interpolation of the network
- Check the model of Cherenkov emission of Geant4 and SKDETSIM