

Status Report

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Kuze Laboratory

CIDeR-ML meeting

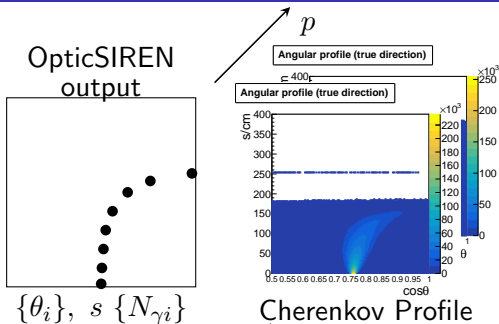
July 26, 2024

Workshop Target of Ryotaro

- First week:
 - By using toy-model fakedata, evaluate and improve reconstruction algorithm.
 - Use new toy-model fakedata.
 - Add randomness when generating fake data.
- Second week:
 - Develop PID algorithm for e , μ , π .
 - By calculating losses of each particles and comparing the losses and reconstructed momentum.
 - Any other goal.
 - I think I can do other study else.

appendix

appendix: Reconstruction



- I used a maximum-likelihood method for the reconstruction.
- Likelihood:

$$\mathcal{L}_i \sim \exp\left(-\frac{(N_{\gamma i} - N_{CP})^2}{2\sigma^2}\right).$$

$(N_{CP} = N_{CP}(\theta_i, s_i, p).)$

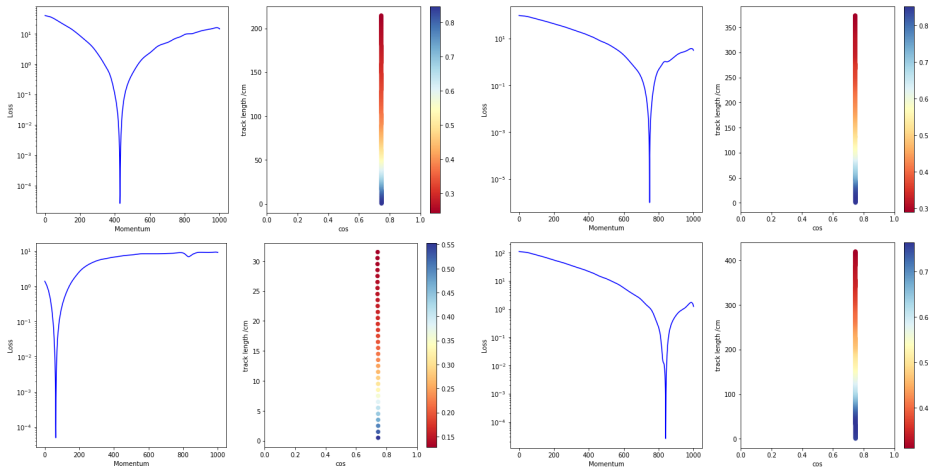
$$\mathcal{L}(p) = \prod_i \mathcal{L}_{CP}(p, \theta_i, s_i)$$

↓ Minimize $-\ln \mathcal{L}$ by GDM

$p_{\text{best-fit}}$

- To decide the initial momentum, scanned all momentum between 50-1000 MeV in 1 MeV steps and take minimum.

appendix: Fake data examples



● color: number of photon.