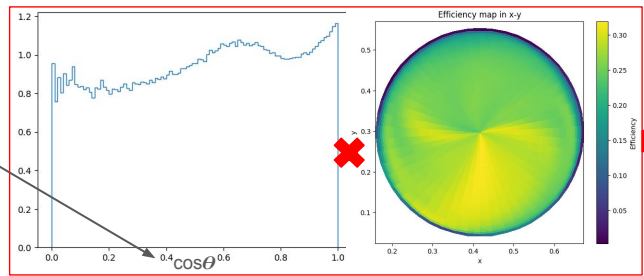
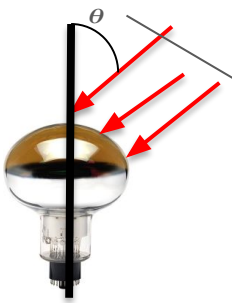


Weekly Report.
15/05

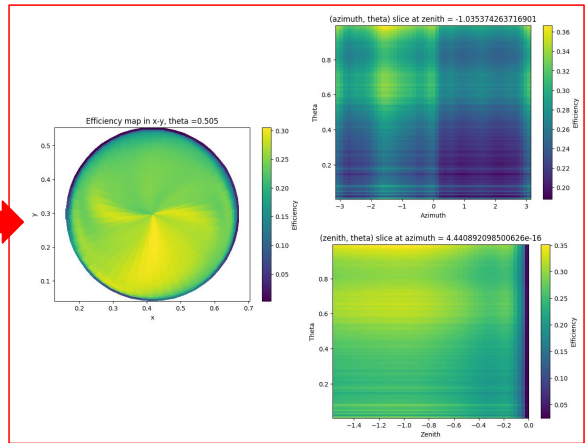
Introduction

- Goal: include PMT acceptance with angular and magnetic field dependance in LUCiD.
- To do so: Use data from photosensor test facility in TRIUMF to train a SIREN.



1D hist : incidence angle dependant (100 datapoints)

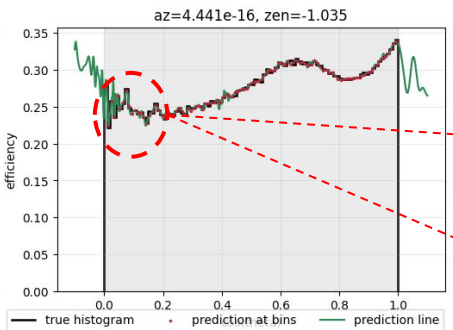
2D hist : magnetic field dependant (2550 datapoints)



Slices of the resulting LUT of corrections (2550, 5000, 5100)

10,000 epochs, omega parameters : 30 and 20, learning rate : 1e-4/1e-6

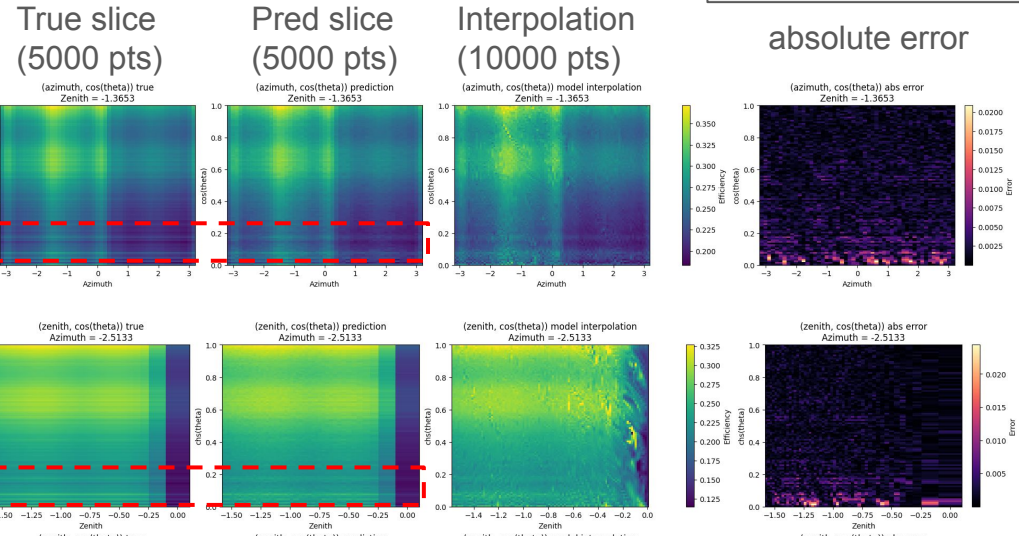
Previous results with SIREN.



Overfitting

Fixed zenith

Fixed azimuth



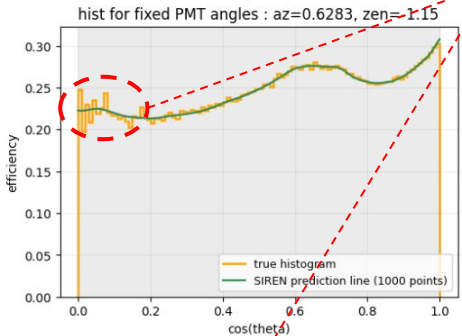
Result : example of 1D histogram (with fixed azimuth and zenith)

Results : example for 2D slices

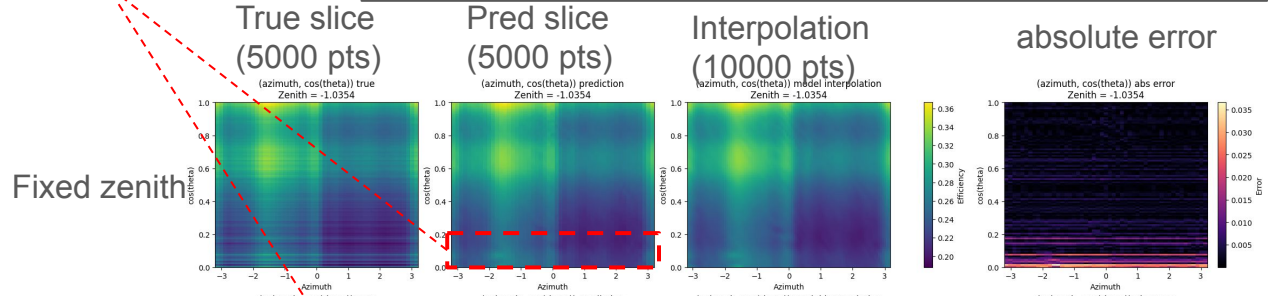
→ Add a second term to the loss depending on second derivative to prevent the overfitting. Weight the different contributions to target small cos(theta) region.

Latest results :

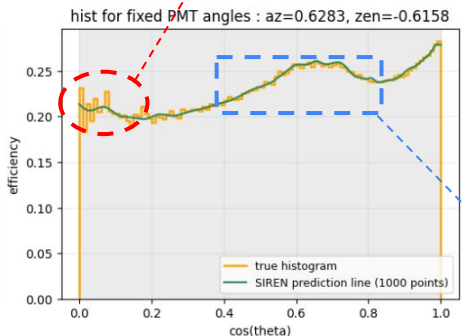
10,000 epochs, omega parameters : 30 and 15, learning rate : $1e-4$ / $1e-6$
penalty param : $1e-4$, penalty points : randomly sampled from data, extra weights to target the low $\cos(\theta)$ region)



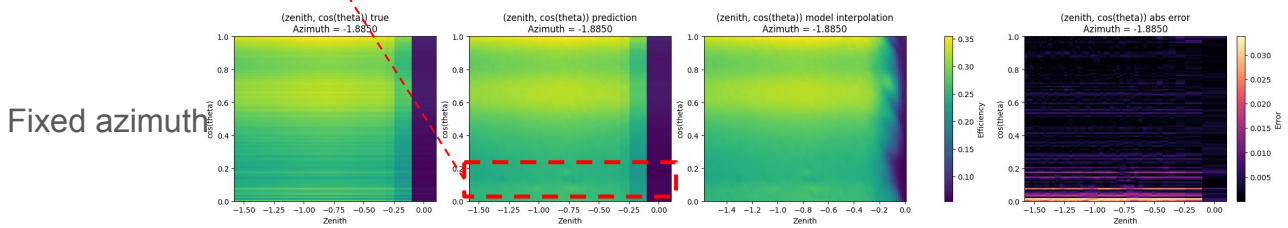
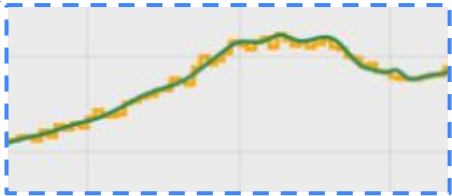
Reduced overfitting



Results : example of 1D histograms (with fixed azimuth and zenith)

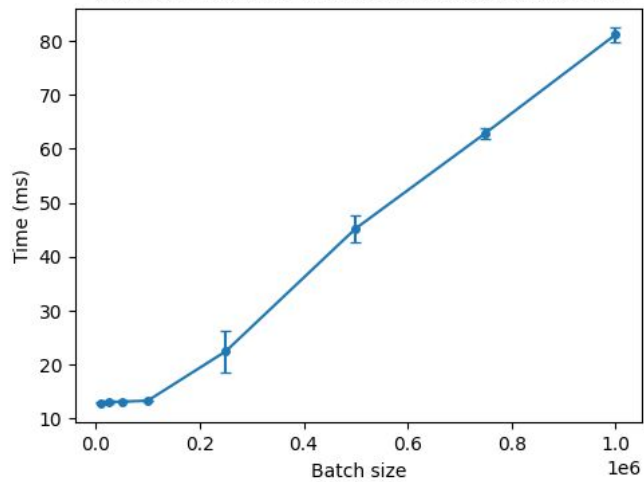


Not smooth everywhere

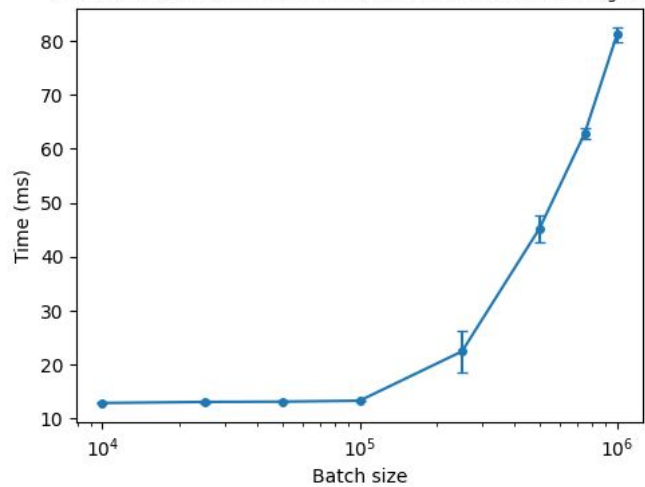


Results : example for 2D slices for new network

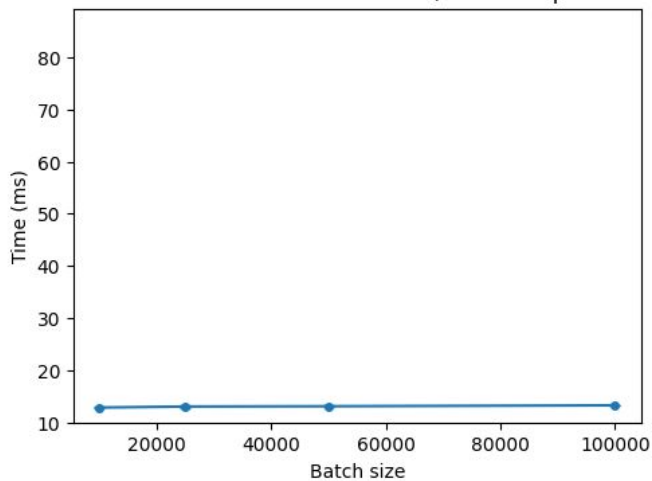
SIREN runtime vs Batch Size (mean over 50 runs for each size)



SIREN runtime vs Batch Size (mean over 50 runs for each size), log scale



SIREN runtime vs Batch Size, constant part



SIREN runtime vs Batch Size, varying part

