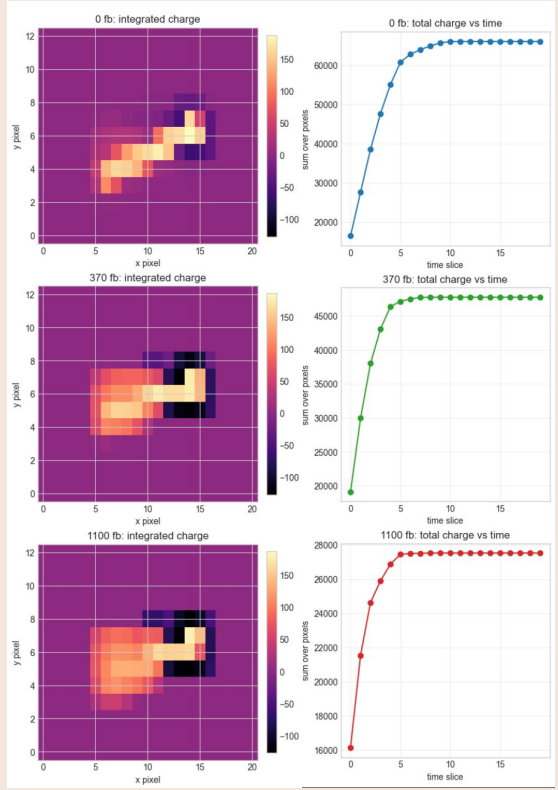
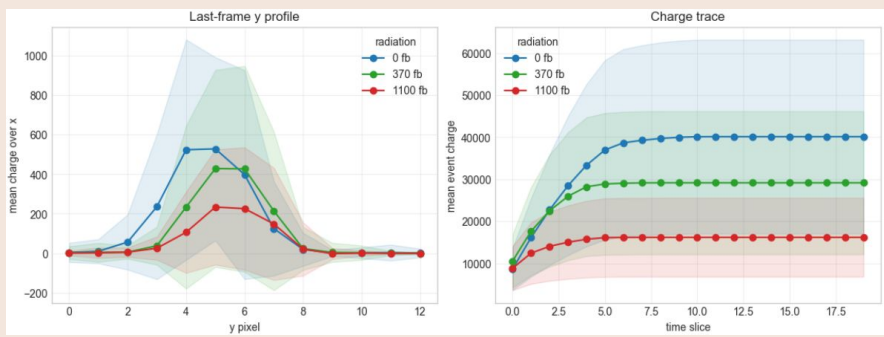


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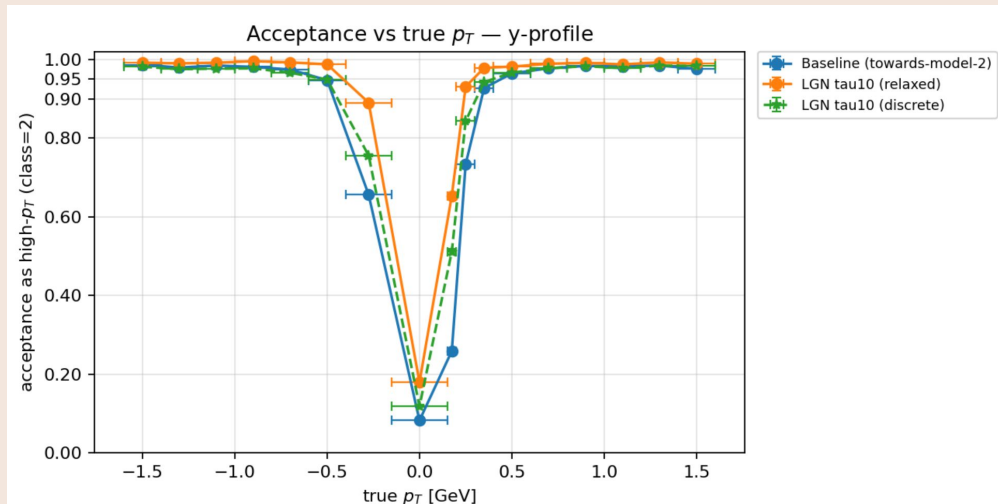
Lino Gerlach, **Mila Bileska** , Elliott Kauffman

Radiation Dataset Visualizations

- The radiation dataset has the same base events as the non-irradiated one.
- The total charge recorded differs.



Optimized Model-2 on Non-Irradiated Dataset



About the graph:

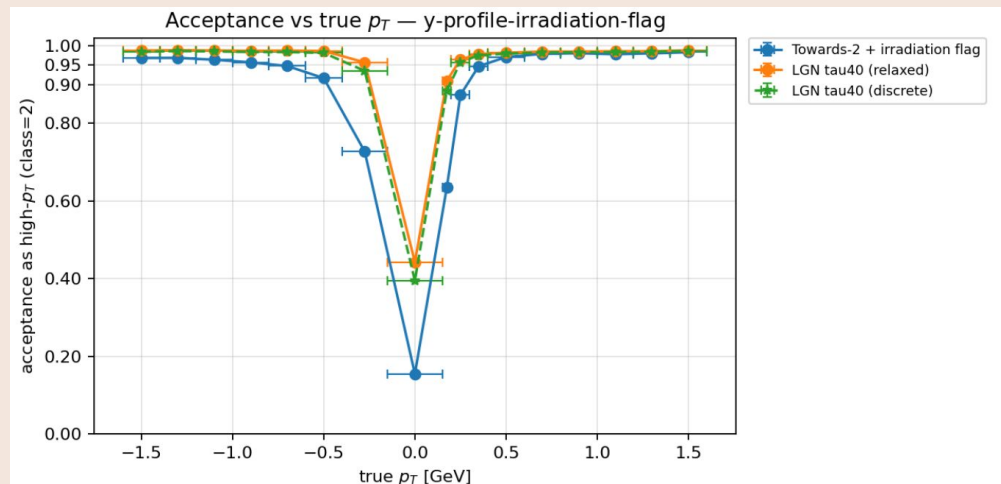
- LGN (y_0 + y-profile, 14 inputs) outperforms **unquantized** baseline.
- Trained on physical a barrel distribution.
- Training dataset was non-irradiated.

Optimized Model-2 on Irradiated Dataset

Approach:

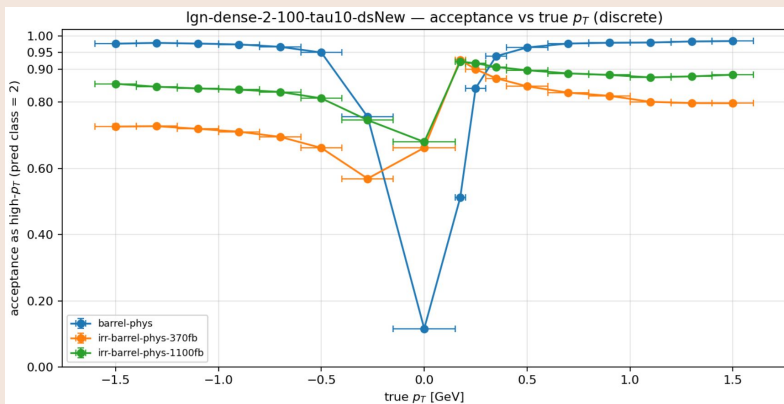
- Add an additional flag: **0** for no radiation, **1** for 370fb, and **2** for 1100fb.
- Feed this into the model:
 - Model-2: 14 -> 15 features.

Results:

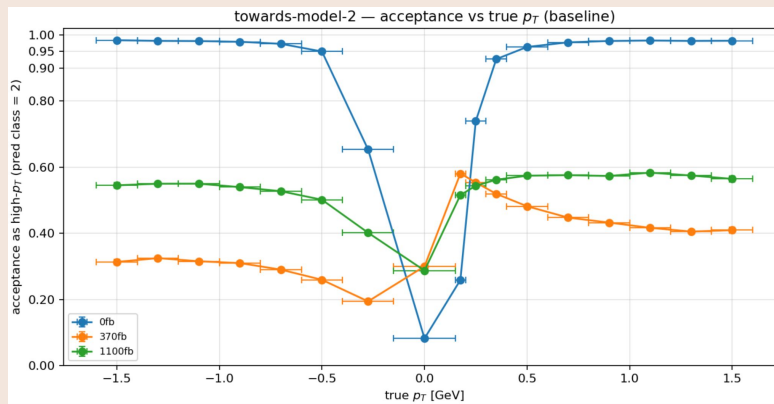


Step 1: Training on non-irradiated, testing on irradiated data

LGN Discrete:



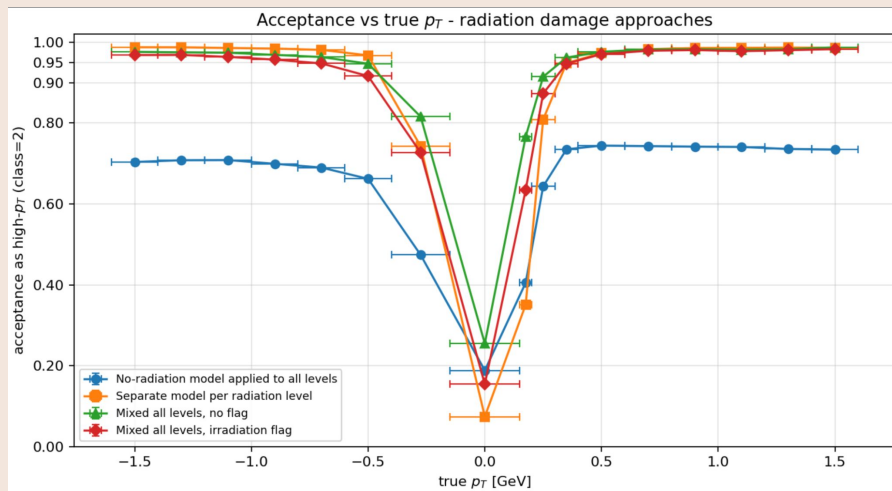
Torch Unquantized:



Open questions:

- Why is there an asymmetry?
- Why is 1100fb dataset performing better than 370fb?

Step 2: Determining Best Approach



- All models here are **unquantized torch**.
- The labels are different training mechanisms:
 - **Blue**: trained on no radiation, evaluated on radiation.
 - **Orange**: 3 separate models trained on each radiation damage dataset, tested on radiation.
 - **Green**: trained on radiation, but 14 inputs, no radiation flag.
 - **Red**: trained on radiation, with a radiation flag.

Step 3: Future Work

- For torch models, training a no-additional-flag model on irradiated dataset performed well. Next step is to **train LGNs for the two remaining scenarios** (1 model per radiation level, and no-flag approach).
- Quantize the torch models via brevitass.
- Obtain ASIC estimates for both the LGNs and torch models.