“Usage of CUDA for improving HLT performance”

Belytskyi Dmytro
Taras Shevchenko National University of Kyiv

IRIS-HEP Summer Fellowship
Mentor: Andrii Usachov

July 26,2024

prerequisites

Figure 1: The "Bullet Cluster" (1E 0657-558). A combined image with data from the Chandra X-ray Observatory, the Magelland and Hubble space telescope, and gravitational lensing

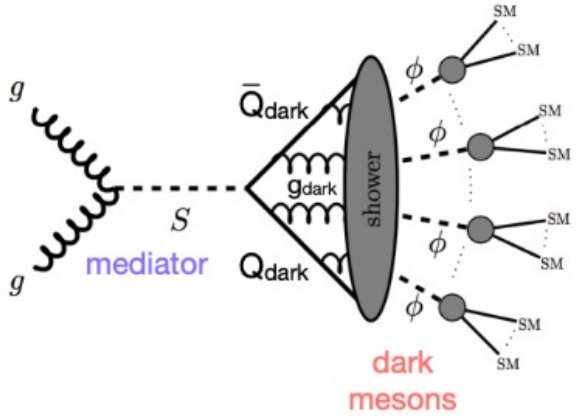
One of the ways to solve the problem is to attempt to expand the Standard Model (SM), ensuring its alignment with observable data on cosmological scales.

Where to search?

- The perspective place for searching for possible candidates is the region of long-lived particles.

- If “dark” particle is long-lived it should leave exotic traces in low level data.

- Thus, we will search low-level data for anomalies.



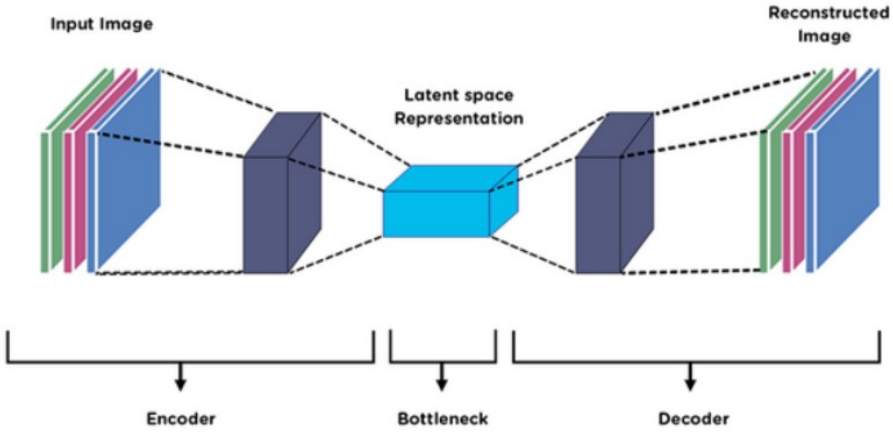
Dark shower process

to do list

The first step is to generate a large amount of data using dark shower model in PYTHIA code

Generate background data for proton-proton collisions

Use the background sample for training the unsupervised ML method (first to try: simple autoencoder already used by CMS for SUEPs models)



Thank you for attention!