

Technically, this project includes the study of anomaly search settings in the view of possible implementation at HLT1 depending on the required GPU resources for such anomaly search

Preliminary Timeline:

Weak 1 Getting familiar with the basic theory of “dark” particles, and literature about LHCb detector.

Weak 2-6 Produce simulation samples for dark shower models assuming different values of mass and lifetime of dark hadrons (dark shower particles). The dark pions will be allowed to decay into multiple channels following available theory framework. This part assumes using available MC production pipelines and adjusting them for use in LHCb Run 3. Simulated samples will be produced at Nikhef stoomboot cluster

Weak 7-11 Use the background sample for training the unsupervised ML method (first to try: simple autoencoder already used by CMS for SUEPs models)[5]. Study the signal efficiency using signal samples, and end up with the ML model for the search.

Weak 12 Preparing a report with a description of the work done.

References:

[1]

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[3]

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