

# Autoencoders for anomaly detection in real-time at the LHC

*Monday, 30 November 2020 14:40 (6 minutes)*

At the LHC, data are collected at 40 MHz but only 1 kHz of data can be stored for physics studies. A typical LHC experiment operates a real-time selection system, that has to decide if an event should be stored or discarded. The first stage of this system, the L1 trigger, runs on custom electronic boards, mounting FPGAs. A L1 algorithm needs to operate within  $O(1\mu\text{sec})$  latency. In this system, we aim to operate an unsupervised algorithm designed to identify outliers. Possibly highlighting the occurrence of new phenomena in LHC collisions. To this purpose, we design an autoencoder processing particle four momenta and we exploit hls4ml to deploy the model on an FPGA and evaluate its resource consumption and latency in various configurations.

**Primary author:** GOVORKOVA, Katya (CERN)

**Presenter:** GOVORKOVA, Katya (CERN)