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## Kernel Density Estimation based simulations of Monte-Carlo events at LHC

We have developed a machine learning-based generative model to estimate the kernel density of the data using the Gaussian kernel and then have generated additional samples from this distribution. This model uses scikit-learn to generate a list of particle four-momenta from the proton-proton collisions produced at the Large Hadron Collider (LHC). We demonstrate the ability of this approach to reproduce a set of kinematic features, that are used for the search for new resonances decaying to  $Z(l\bar{l})\gamma$  final states at the LHC. This model is constructed to take the pre-processed  $Z\gamma$  events and generate sample data with accurate statistics, mimicking the original distributions and achieving better performances compared to the standard event Monte-Carlo generators.

### Apply to be considered for a student ; award (Yes / No)?

Yes

### Level for award;(Hons, MSc, PhD, N/A)?

PhD

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