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The CMS Electromagnetic Calorimeter Clustering and Energy reconstruction for LHC Run3

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During Run III, the LHC is expected to operate at a higher average instantaneous luminosity of around 2x10ˆ34cm-2s-1, and to deliver an integrated luminosity of up to 100fb-1 per year. This will result in higher average pileup values during LHC fills and larger detector ageing effects. We propose to mitigate the increase in the noise contribution to the signal due to the ECAL barrel front-end readout components ageing and to the crystals transparency loss, by revisiting the clustering algorithm. We will show the results obtained for the simulated reconstruction efficiency of the photons/electrons superclusters, their reconstructed energy and the resolution obtained for the latter when refining the interplay between the different noise thresholds in the reconstruction of clusters and exploring less conventional methods for the collection of signals contributing to the electromagnetic shower, such as machine learning.

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