

# Reconstruction of multiple calorimetric clusters in the LHCf experiment with machine learning techniques

*Saturday 20 July 2024 09:21 (17 minutes)*

In this work, we would like to present a novel approach to the reconstruction of multiple calorimetric clusters within the Large Hadron Collider forward (LHCf) experiment using Machine Learning techniques. The LHCf experiment is dedicated to understand the hadronic components of cosmic rays by measuring particle production in the forward region of LHC collisions. One of the significant challenges in the LHCf experiment is the efficient and accurate reconstruction of unstable neutral particles, such as  $\pi^0$ ,  $K_s^0$  and  $\Lambda^0$ , within the calorimeters. These particles play a crucial role in cosmic ray physics and are pivotal for tuning hadronic interaction models. By using a comprehensive training dataset obtained from detailed Monte Carlo simulations, our method leverages advanced Machine Learning algorithms to enhance the reconstruction of multiple calorimetric clusters, significantly improving both the resolution and the efficiency compared to traditional techniques.

## Alternate track

1. Astro-particle Physics and Cosmology

## I read the instructions above

Yes

**Primary author:** PIPARO, Giuseppe (Universita e INFN, Catania (IT))

**Presenter:** PIPARO, Giuseppe (Universita e INFN, Catania (IT))

**Session Classification:** Computing and Data handling

**Track Classification:** 14. Computing, AI and Data Handling