

A deep learning method for the gamma-ray identification with the DAMPE space mission

The Dark Matter Particle Explorer (DAMPE) is the largest calorimeter-based space-borne experiment. Since its launch in December 2015, DAMPE detects electrons, positrons and gamma rays from few GeV to 10 TeV, as well as protons and heavier nuclei from 10 GeV to 100 TeV. The study of galactic and extragalactic gamma-ray sources and diffuse emissions as well as the search for dark-matter signatures in the gamma-ray flux are main objectives of the DAMPE mission. In this contribution we present a convolutional neural network (CNN) model developed for the gamma-ray identification with the DAMPE calorimeter. It is shown that this method significantly outperforms all the existing algorithms, both in gamma-ray efficiency and proton rejection. Good agreement between simulation and real data is demonstrated.

Primary authors: Dr PERRINA, Chiara (EPFL - Ecole Polytechnique Federale Lausanne (CH)); FRIEDEN, Jennifer Maria (EPFL - Ecole Polytechnique Federale Lausanne (CH)); NIGGLI, Loïs

Presenter: FRIEDEN, Jennifer Maria (EPFL - Ecole Polytechnique Federale Lausanne (CH))