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Deep learning techniques for reconstruction of ultra-high energy extensive air showers observed by fluorescence detectors

Fluorescence light detectors have been a crucial part of ultra-high energy cosmic ray observatories, facilitating the study of the longitudinal development of extensive air showers. In this contribution, we evaluate the feasibility of using neural networks to reconstruct shower geometry, using the Fluorescence Detector at the Pierre Auger Observatory as a case study. We compare our results to the standard reconstruction algorithm, assessing the performance of various neural network architectures in reconstruction of key shower geometry observables. Additionally, we briefly discuss the challenges in reconstructing the primary particle's energy. Our results show that the tested architectures do not outperform the standard method in the reconstruction of regular events observed at the Pierre Auger Observatory.

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