

# Very-forward neutral pion production cross section in proton-proton collisions at $\sqrt{s} = 13$ TeV measured with the LHCf experiment

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The LHCf experiment, situated at the LHC accelerator, is composed of two independent detectors located at 140 metres from the ATLAS interaction point (IP1) on opposite sides along the beam axis. LHCf covers the pseudorapidity region above 8.4, with the capability to measure zero-degree neutral particles. The physics motivation of the experiment is to test the hadronic interaction models commonly used in ground-based cosmic rays experiments to simulate air-showers induced by ultra-high-energy cosmic rays (UHECR) in the Earth atmosphere. The data from accelerator experiments are very important for the tuning of these phenomenological models in order to reduce the systematic uncertainty of UHECR measurements.

A precise measurement of the  $\pi^0$ s produced in the very-forward region in high energy collisions provides the possibility to study the electromagnetic component of secondary particles produced in the first interaction of a UHECR with the atmosphere. In this contribution the results from the  $\pi^0$  analysis of the data acquired in proton-proton collisions at  $\sqrt{s} = 13$  TeV will be presented. The Feynman-x and transverse momentum spectra will be shown and they will be compared with the predictions of several hadronic interaction models. The comparison with the results obtained at lower collision energies, which allows to test scaling laws (such as Feynman scaling), will be also discussed.

## Keywords

LHCf; neutral pion;  $\pi^0$ ; LHC; UHECR; cosmic rays; hadronic interaction models; forward; zero degree; Feynman scaling; 13 TeV

## Collaboration

### other Collaboration

LHCf

## Subcategory

Experimental Results

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