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# Very-forward photon production in p-p and p-Pb collisions measured by the LHCf experiment

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The main purpose of the LHCf experiment is to test the hadronic interaction models used in ground based cosmic rays experiments to simulate air-showers induced by ultra-high-energy cosmic rays in the Earth atmosphere. Since most of the air-shower energy flow is contained in the very forward region (where soft-QCD processes dominate), Monte Carlo simulations must rely on phenomenological models. The data from accelerator experiments are therefore very important for the tuning of these hadronic interaction models.
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: the particular position of the detectors allows LHCf to measure neutral particles up to zero-degree with respect to the beam, with a pseudorapidity coverage of $\eta > 8.4$. Each detector is composed by two sampling and position sensitive calorimeters.
In this contribution the latest photon production measurements from LHCf will be compared with the predictions of DPMJET, EPOS, PYTHIA, QGSJET and SIBYLL Monte Carlo event generators, commonly used in air-shower simulations. The photon production cross section in proton-proton collisions at $\sqrt{s}$ = 13 TeV and the preliminary results in proton-lead collisions at $\sqrt{s_{NN}}$ = 8.16 TeV will be shown. Furthermore, the LHCf-ATLAS combined results on photon production cross section in p-p collisions at $\sqrt{s}$ = 13 TeV will be presented: using ATLAS information on central particles production the type of the interaction (diffractive or non-diffractive) can be discriminated experimentally and it is possible to study in particular the low-mass diffractive interactions.
There is not any hadronic interaction model well reproducing all the experimental data measured by the LHCf experiment. However, these data in the very-forward region will be useful in the tuning of the models and consequently reducing the discrepancy between their predictions.

## Summary

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