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Results of the LHCf experiment in LHC Run II

After data taking in p-p collisions at $\sqrt{s} = 13$ TeV, the LHCf collaboration sustained a strong analysis effort in order to precisely measure neutral particle production in the very forward region at high energy. These results are expected to have a strong impact on the tuning of phenomenological models used to describe soft hadronic processes. In this contribution, we report about the measurement of differential production cross section of forward photons and neutrons generated from p-p collisions at $\sqrt{s} = 13$ TeV. Both analyses, already published by the collaboration, show that no model is able to satisfactorily reproduce the experimental observations in all the regions covered by LHCf.

In addition, the ATLAS-LHCf joint analysis, exploiting the ATLAS information in the central region, allows LHCf to identify different processes responsible for particle production in the forward region, especially distinguishing between diffractive and non-diffractive mechanisms. In this contribution, we discuss about the first result of this joint collaboration, released in a common conference note, relative to the role of diffraction processes in the production of forward photons generated from p-p collisions at $\sqrt{s} = 13$ TeV. After the photon analysis will have been published, the same procedure will be applied to the neutron case and some prospects in this analysis are also reported.

Finally, we present the preliminary results relative to forward photons generated from p-Pb collisions at $\sqrt{s_{NN}} = 8.16$ TeV in the proton remnant side, as measured by the LHCf Arm2 detector.

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