

Status of the LHCf experiment

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A precise understanding of hadronic interactions is essential to interpreting the mass composition of ultra-high energy cosmic rays from the results of air shower experiments. The LHC-forward (LHCf) experiment aims to measure forward neutral particles to validate hadronic interaction models adopted in air shower simulations.

We already published the energy spectrum of forward photons and neutrons for proton-proton collisions at $\sqrt{s} = 13$ TeV. Recently, we showed a preliminary result of the energy spectrum of forward η mesons for proton-proton collisions at $\sqrt{s} = 13$ TeV. Moreover, in September 2022, we have another data-taking for proton-proton collisions at $\sqrt{s} = 13.6$ TeV. In the data-taking, we plan to obtain ten times larger π^0 and η candidates for precise measurements and have a joint operation with the ATLAS Roman pots and Zero-degree calorimeters. Thanks to the joint operation with the ATLAS Roman pots, we can measure diffractive mass and neutral particles from diffractive dissociation simultaneously. Furthermore, energy resolution for neutrons is expected to be improved from 40% to 20% by combining the LHCf and the ATLAS zero-degree calorimeters.

In this talk, we report the status and prospects of the LHCf experiment.

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