Measuring electroweak boson production in p–Pb and Pb–Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV with ALICE at LHC.

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W and Z bosons are electroweak probes and, therefore, insensitive to the strong interaction, they are clean observables of the initial state of heavy-ion collisions. Despite their low production rates, their relatively clean signatures in the leptonic decay channels allow their study in heavy-ion collisions at the LHC. W and Z bosons measurements in p–Pb and Pb–Pb collisions provide constraints on the nuclear parton distribution functions (nPDFs) of (anti)quarks. In particular, the W and Z rapidity-differential production cross-sections and the decay lepton charge asymmetry as a function of rapidity provide stringent tests of nPDFs. Electroweak boson measurements in heavy-ion collisions also constitute a reference for medium- induced effects on other probes.

In this contribution, the measurement of W and Z boson production in p-Pb and Pb-Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV at forward rapidity ($2.5 < y_{\mathrm{lab}} < 4.0$) with ALICE at the LHC will be presented. These measurements are complementary to those by ATLAS and CMS at central rapidity, and more precise than LHCb ones with similar rapidity coverage. Rapidity differential measurements of W and Z, as well as of the charge asymmetry of W-decay leptons, in p-Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV will be discussed.

Final results on Z production cross-section in Pb–Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV will be shown together with the first measurement of W production at forward rapidity. Results will be compared with model calculations including nPDFs. In addition, the centrality dependence of W yields in p–Pb collisions and of Z production in Pb-Pb collisions will be discussed as a test of binary scaling.

Summary

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