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Measurement of electroweak-boson production in p-Pb and Pb-Pb collisions at the LHC with ALICE

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W and Z bosons are created in the hard scattering processes occurring in the initial stage of heavy-ion collisions and they are insensitive to the presence of a strongly-interacting medium. This makes them clean probes of the initial-state effects of the collision, such as the nuclear modification of the parton distribution functions (nPDFs). The measurement of the electroweak-boson production in p-Pb and Pb-Pb collisions at the LHC provides constraints on the nPDFs of the (anti-)quarks in a phase-space region that is poorly constrained by previous experiments.

ALICE measures the electroweak-boson production in the muonic decay channel at forward rapidities ($2.5 < y_{\text{lab}} < 4$). In this contribution, recent results on the Z-boson production in Pb-Pb collisions at a center-of-mass energy per nucleon pair of $\sqrt{s_{\text{NN}}} = 5.02$ TeV, exploiting the combined 2015 and 2018 data sets, will be presented. The invariant production yield as well as the nuclear modification factor (R_{AA}) will be shown as a function of rapidity and collision centrality. Similarly, results on the rapidity dependence of the Z-boson production cross section in p-Pb collisions at $\sqrt{s_{\text{NN}}} = 8.16$ TeV will be discussed. The latter will be complemented by new results on the W-boson production cross-section in the same collision system. The different results will be compared to calculations obtained with or without including nuclear modifications of the PDFs, as well as to results obtained by other LHC experiments.

Collaboration (if applicable)

ALICE

Track

Initial State

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Contributed Talk

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