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Probing initial and final state effects with Z bosons in PbPb and Drell-Yan in pPb with the CMS detector

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The differential yields of Z bosons decaying to lepton pairs are measured in PbPb collisions collected in 2018 by the CMS experiment at the LHC. The measurement uses 1.8 nb^{-1} of 5.02 TeV data. The yields in various centrality bins are compared to the HG-PYTHIA model, which indicates that geometric and selection biases could be present for peripheral events. In some cases, the uncertainties of the measurement are smaller than the modeling uncertainties of the Glauber model, showing that Z-counting could be a preferred experimental measure of effective nucleon-nucleon luminosity. Additionally, a high precision measurement of the Z boson azimuthal anisotropy (v_2) is presented. This observable provides a second method to study whether Z bosons reconstructed in the leptonic decay channel experience significant final-state modifications. This is relevant for measurements in which a high- p_T Z boson is used as a tag of a recoiling jet's p_T . The final state modification of these jets is quantified by examining the p_T imbalance of Z boson + jet pairs. A new measurement of the Drell-Yan (DY) process is also presented in pPb collision at the center of mass energy of 8.16 TeV with the CMS detector. The rapidity dependence of this process is particularly sensitive to nPDFs, but further information can be gained by studying the mass dependence of DY production, measured for the first time in pPb collisions at 8.16 TeV , down to 15 GeV . In addition, differential measurements in the dimuon p_T or ϕ^* (an angular variable correlated with p_T measured for the first time in pPb) provide insights on soft gluon emission at low p_T .

Collaboration (if applicable)

CMS

Track

Electroweak Probes

Contribution type

Contributed Talk

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