Search for nuclear modifications of B+ meson production in p-Pb collisions at CERN CMS detector

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Heavy hadrons, which contain a ‘b’ or ‘c’ quark, are key tools for studying Quantum Chromodynamics (QCD) in high-energy hadronic collisions (O~TeV). These particles enable the exploration of production mechanisms in proton-proton collisions and the strong interaction properties in dense media, such as the quark-gluon plasma (QGP). This state of matter has been experimentally observed on multiple occasions, with solid evidence supporting its existence. In this talk, we will examine nuclear effects on B^+ meson production in proton-lead collisions. The analysis focuses on the binary-collision-scaled cross section ratio across events with different multiplicities. The data were collected by the CMS experiment in 2016 at a nucleon-nucleon center-of-mass energy of sqrt(sNN)=8.16 TeV, corresponding to an integrated luminosity of 175 nb^{-1}. The scaling factors in the ratio were determined using a novel approach based on $Z \to \mu^+\mu^-$ cross sections measured in the same dataset. The results indicate that the scaled ratio for B^+ mesons is consistent with unity across all event multiplicities, imposing stringent constraints on nuclear modifications for heavy flavors.

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