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Production of Muons from Heavy-Flavour Hadron Decays in p–Pb Collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV with ALICE at the LHC

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The LHC heavy-ion physics program aims at investigating the properties of
strongly-interacting matter in extreme conditions of temperature
and energy density,
where the formation of the Quark Gluon Plasma (QGP) is expected.
In high-energy heavy-ion collisions, heavy quarks(charm and beauty) are regarded as efficient probes of the properties of the QGP
as they are created on a short time compared to that of the QGP.
One of the observables for the study of the QGP properties is the nuclear modification $R_{\rm AA}$ defined as the ratio of the yield measured in Pb–Pb collisions to that observed in pp collisions scaled by the number of binary nucleon-nucleon collisions.

In order to disentangle hot and cold nuclear matter effects, the nuclear modification factor has been measured in p–Pb collisions.
In particular, $R_{\rm pPb}$ is expected to be around unity
if cold nuclear matter effects are small.
Moreover, measuring $R_{\rm pPb}$ also allows us to test models implementing
cold nuclear matter effects such as
modification of parton distribution
functions and parton saturation in the low-x region.

With ALICE, the detector designed and optimized for heavy-ion physics at
the LHC, open heavy-flavours are measured with the muon spectrometer in the pseudo-rapidity range $-4 < \eta < -2.5$ using semi-muonic decays.
The latest results on muons from heavy-flavour hadron decays
at forward and backward rapidity in p–Pb collisions at
$\sqrt{s_{\rm NN}} = 5.02$ TeV will be presented.
The nuclear modification factor of muons from heavy-flavour hadron decays
($R_{\rm pPb}$) and the forward-to-backward ratio ($R_{\rm FB}$) are presented as a function transverse momentum in minimum bias collisions.

Summary

The data are compared to perturbative QCD calculations including the EPS09 NLO parameterization
of shadowing.
The results confirm that the strong suppression measured at high $p_{\rm T}$ in central Pb–Pb collisions relative to binary scaled pp collisions, is due to the hot nuclear medium.

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