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Low mass dimuon production in pp, p-Pb and Pb-Pb collisions with the ALICE muon spectrometer

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Low mass vector meson (ρ, ω, ϕ) production provides key information on the hot and dense state of strongly interacting matter produced in high-energy heavy ion collisions (called Quark Gluon Plasma). Strangeness enhancement is one of the possible signatures of the Quark Gluon Plasma formation and can be accessed through the measurement of ϕ meson production with respect to ρ and ω mesons, while the measurement of the ϕ nuclear modification factor provides a powerful tool to probe the production dynamics and hadronization process in relativistic heavy ion collisions.
We present results on the low mass dimuon analysis in pp, p-Pb and Pb-Pb collisions. In pp collisions at $\sqrt{s}$ = 2.76 TeV the ϕ differential cross section as a function of the transverse momentum has been measured. The comparison with PHOJET and the PYTHIA tunes Perugia-0, Perugia-11, ATLAS-CSC and D6T shows that Perugia-0, Perugia-11 and ATLAS-CSC underestimate the data, D6T slightly overestimates them and PHOJET is in good agreement.
The ϕ yield and the nuclear modification factor R_{pPb} at forward and backward rapidity have been measured in p-Pb collisions at $\sqrt{s}$ = 5.02 TeV.
At forward rapidity, R_{pPb} increases as a function of p_T, saturating for $p_{\mathrm{T}} > 3$ GeV/c at $R_{pPb} \sim 1$. At backward rapidity R_{pPb} shows an increase as a function of the transverse momentum up to a factor of 1.6 for p_T $\sim$ 3-4 GeV/c, followed by a decrease at higher p_{T}.
The ϕ yield and nuclear modification factor R_{AA} have been measured in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV in the intermediate p_T region $2 < p_T < 5$ GeV/c, as a function of the number of participating nucleons. Remarkable differences are observed in the comparison between these results and the ones measured in the same p_{T} range at midrapidity in the hadronic channel $\phi \rightarrow KK$.

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