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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 ($\rho, \omega, \phi$) 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 $\phi$ meson production with respect to $\rho$ and $\omega$ mesons, while the measurement of the $\phi$ 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 $\phi$ 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 $\phi$ 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 $p_{\mathrm{T}}$.

The $\phi$ 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 $p_{\mathrm{T}}$ range at midrapidity in the hadronic channel $\phi \to KK$.

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