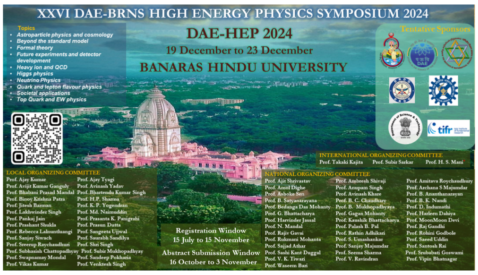

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Probing the hadronic phase and strangeness production in high energy collisions with EPOS4 hydrodynamical model

The measurement of strangeness production is an important tool for understanding the hot, dense matter created in relativistic heavy-ion collisions. The strange hadron production is enhanced in heavy-ion collisions due to thermal gluon saturation, while it is suppressed in smaller systems as predicted by canonical models. Although strangeness enhancement is among the earliest proposed signatures of quark-gluon plasma formation, it remains a subject of debate till today. Hadronic resonances such as $\rho(770)^0$, $K^*(890)^0$, $\phi(1020)$, $\Sigma(1385)^{\pm}$, $\Lambda(1520)$, and $\Xi(1530)^0$ serve as sensitive probes of the hadronic phase —the stage between chemical and kinetic freeze-out. Their yields relative to stable hadrons alter with collision centrality or multiplicity, depending on their lifetimes, and provide insight into the hadronic phase properties. Additionally, baryon-to-meson ratios reveal information about the various production mechanisms involved in hadron formation, and require further theoretical investigations. This study presents the yield ratios of strange to non-strange hadrons, resonance to stable hadron yield ratios, estimates of hadronic phase lifetime, and p_{T}-differential baryon-to-meson yield ratios in pp collisions at $\sqrt{s} = 13.6$ TeV and Pb−Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.36$ TeV using the EPOS4 hydrodynamical model. These are the highest energies at which collisions are being recorded at the LHC, providing a foundation for future data comparisons.

Field of contribution

Theory

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