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$\Upsilon(1S)$ and $(2S)$ suppression in QGP at LHC energies: Transverse Momentum and Centrality Dependence

Quarkonia suppression in heavy-ion collisions at the Relativistic Heavy Ion Collider (RHIC) and Large Hadron Collider (LHC) experiments indicate the quark-gluon plasma (QGP) formation in such collisions. Recent experiments at LHC has given some indications of hot matter effect in asymmetric p−Pb nuclear collisions. Here, we employ a theoretical model to investigate the bottomonium suppression in Pb−Pb at $\sqrt{s_{NN}} = 2.76$, 5.02 TeV, and in p−Pb at $\sqrt{s_{NN}} = 5.02$ TeV center-of-mass energies under a QGP formation scenario. Our present formulation is based on a unified model consisting of suppression due to color screening, gluonic dissociation along with the collisional damping. Regeneration due to correlated $Q\bar{Q}$ pairs has also been taken into account in the current work. In the current work, we obtain the net bottomonium suppression in terms of survival probability under the combined effect of suppression along with the regeneration in the deconfined QGP medium. We mainly concentrate here on the centrality, N_{part} and transverse momentum, (p_t) dependence of $\Upsilon(1S)$ and $\Upsilon(2S)$ states suppression in Pb−Pb and p−Pb collisions at mid-rapidity. We compare our model outcomes for $\Upsilon(1S)$ and $\Upsilon(2S)$ suppression to the corresponding experimental data obtained at the LHC energies. We find that the experimental observations on p_t and N_{part} dependent suppression agree reasonably well with our model predictions.

Summary

Above work is based on analysis of bottomonium suppression data under the QGP formation scenario in p-Pb, Pb-Pb collisions at LHC energies using a gluonic dissociation along with collisional damping based model. We mainly concerned here the centrality and transverse momentum dependence suppression.

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