

ω and K_s Meson Productions in Pb+Pb Collisions and Global Extraction \hat{q} with Six Types of Identified Hadrons Suppression at the NLO

Previous efforts on the extraction of jet quenching parameter \hat{q} were mainly focused on the production suppression of π^0 . However, we have achieved some understanding of the production suppression patterns of different mesons by conducting R_{AA} and particle ratios calculations and analysis for π^0 , η , ρ^0 and ϕ .

In this work, we pave the way to further calculate the productions of ω meson and K_{short}^0 meson both in p+p and A+A collisions at the RHIC and the LHC. The same broken SU(3) model to give the initial scale fragmentation functions (FFs) as ρ^0 and ϕ has been employed to have the DGLAP evolved FFs for ω meson. The K_{short}^0 FFs in the vacuum are taken from AKK08 parameterization directly. And we make good p+p descriptions with the experimental data for them in the calculation framework of the NLO pQCD improved parton model at both the RHIC and the LHC. With the same higher-twist approach to take into account the jet quenching effect by medium modified FFs, underestimation of the nuclear modification factors has been observed for ω meson and K_{short}^0 meson at the RHIC as it is the first theoretical calculation has been presented. We provide predictions of R_{AA} of ω meson at the LHC, at the same time the K_{short}^0 's result has met the limited ALICE data at the lower p_T region. The particle ratio has also been investigated. The calculation of ω/π^0 ratio at the RHIC meet the PHENIX data, while the LHC results have been predicted. The ratio of K_{short}^0/π^0 has been firstly calculated at both the RHIC and the LHC compared with the rather limited data points at lower p_T regions. In the second part of our work, we re-extract the \hat{q} by fitting the theoretical results of all 6 identified mesons' R_{AA} at hand with the available experimental data both in the RHIC and the LHC. Therefore the constraint to the \hat{q} by different final state hadrons has been performed.

Summary

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