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ρ^{0} vector-meson elliptic flow (v_{2}) measurement in STAR experiment at RHIC

Content :

The study of elliptic flow (v_{2}) of the short-lived resonances provides a sensitive tool to probe the hot and dense medium produced in relativistic heavy ion collisions. It has been proposed that the measurement of v_{2} of the resonances can distinguish whether the resonance was produced at hadronization via quark coalescence or later in the collision via hadron re-scattering. The ρ^{0} vector-meson is one among such resonances which has a very short life time with respect to the life time of the system formed in heavy-ion collisions. Therefore, the measurement of ρ^{0} v_{2} can potentially provide information on the ρ^{0} production mechanism in relativistic heavy-ion collisions. In the intermediate p_{T} range (1.5 < p_{T} < 5 GeV/c), the elliptic flow parameter v_{2}, shows a deviation from the particle mass ordering for different hadron species. For identified hadrons, v_{2} is found to follow a scaling with the number of constituent quarks n, which is expected from the quark coalescence model. ρ^{0} being a meson, its v_{2} is expected to follow the $n=2$ in the universal curve of $ v_{2} (p_{T}/n) vs p_{T}/n $. On the other hand, if ρ^{0} is produced from the $\pi^{+} \pi^{-}$ scattering during hadronization, it would follow the $n=4$ quark scaling (i.e. 2 for each pions). We will discuss the first time measurement of ρ^{0} elliptic flow in $Cu+Cu$ and $Au+Au$ collisions at $sqrt(s_{NN}) = 200$ GeV using the STAR Time Projection Chamber (TPC) and STAR Forward Time Projection Chamber (FTPC). The methods used in this measurement will be presented in the conference.

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