

Measurement of the $\mu^+\mu^-$ Invariant Mass Spectra in p+p and p+Au Collisions at $\sqrt{s_{NN}} = 200$ GeV with the Muon Telescope Detector at STAR

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Dileptons (l^+l^-) are produced during all stages of heavy-ion collisions (HIC) via various production mechanisms. Since leptons interact through the electromagnetic force, not via the strong force, they carry pristine information about the produced medium. For this reason, dileptons provide an essential tool for studying the properties of the strongly interacting medium produced in HICs. The installation of the Muon Telescope Detector (MTD) allows a measurement of the dimuon ($\mu^+\mu^-$) production over a large invariant mass range ($0 < M_{\mu^+\mu^-} < 4$ GeV/c²) for the first time at STAR. Data have been collected with the fully installed MTD from p+p and p+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. These two data sets allow for new opportunities to measure the dimuon invariant mass spectra at STAR. In this talk, we will present new measurements of the $\mu^+\mu^-$ invariant mass spectra in p+p and p+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. The muon identification techniques employing deep neural networks and the novel background estimation methodology will be discussed. Finally, the invariant mass spectra will be compared with the hadronic cocktail and the physics will be discussed.

Summary

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